UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-Q

(MARK ONE)

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

FOR THE QUARTERLY PERIOD ENDED APRIL 30, 2019

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

FOR THE TRANSITION PERIOD FROM TO

COMMISSION FILE NUMBER: 000-19807

SYNOPSYS, INC.
(Exact name of registrant as specified in its charter)

DELAWARE	**56-1546236**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification Number)**

690 EAST MIDDLEFIELD ROAD
MOUNTAIN VIEW, CA 94043
(Address of principal executive offices, including zip code)

(650) 584-5000
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock ($0.01 par value)	SNPS	Nasdaq Global Select Market

---

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☒	Accelerated Filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of May 22, 2019, there were 149,899,115 shares of the registrant’s common stock outstanding.

SYNOPSYS, INC.

QUARTERLY REPORT ON FORM 10-Q
FOR THE FISCAL QUARTER ENDED APRIL 30, 2019

TABLE OF CONTENTS

		Page
PART I.	**Financial Information**	1
Item 1.	Financial Statements	1
	Unaudited Condensed Consolidated Balance Sheets	1
	Unaudited Condensed Consolidated Statements of Operations	2
	Unaudited Condensed Consolidated Statements of Comprehensive Income	3
	Unaudited Condensed Consolidated Statements of Stockholders' Equity	4
	Unaudited Condensed Consolidated Statements of Cash Flows	5
	Notes to Unaudited Condensed Consolidated Financial Statements	6
Item 2.	Management's Discussion and Analysis of Financial Condition and Results of Operations	30
Item 3.	Quantitative and Qualitative Disclosures about Market Risk	45
Item 4.	Controls and Procedures	46
PART II.	**Other Information**	47
Item 1.	Legal Proceedings	47
Item 1A.	Risk Factors	48
Item 2.	Unregistered Sales of Equity Securities and Use of Proceeds	59
Item 6.	Exhibits	60
Signatures		61

PART I. FINANCIAL INFORMATION

Item 1. *Financial Statements*

SYNOPSYS, INC.

UNAUDITED CONDENSED CONSOLIDATED BALANCE SHEETS
(in thousands, except par value amounts)

	April 30, 2019	October 31, 2018*
ASSETS		
Current assets:		
Cash and cash equivalents	$ 631,161	$ 723,115
Accounts receivable, net	526,691	554,217
Inventories	166,329	122,407
Income taxes receivable and prepaid taxes	59,853	76,525
Prepaid and other current assets	259,849	67,533
Total current assets	1,643,883	1,543,797
Property and equipment, net	344,176	309,310
Goodwill	3,143,795	3,143,249
Intangible assets, net	306,927	360,404
Long-term prepaid taxes	22,093	138,312
Deferred income taxes	352,667	404,166
Other long-term assets	380,682	246,736
Total assets	$ 6,194,223	$ 6,145,974
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable and accrued liabilities	$ 365,848	$ 578,326
Accrued income taxes	6,983	27,458
Deferred revenue	1,194,404	1,152,862
Short-term debt	165,692	343,769
Total current liabilities	1,732,927	2,102,415
Long-term accrued income taxes	34,667	50,590
Long-term deferred revenue	60,825	116,859
Long-term debt	126,152	125,535
Other long-term liabilities	324,217	265,560
Total liabilities	2,278,788	2,660,959
Stockholders' equity:		
Preferred stock, $0.01 par value: 2,000 shares authorized; none outstanding	—	—
Common stock, $0.01 par value: 400,000 shares authorized; 149,982 and 149,265 shares outstanding, respectively	1,500	1,493
Capital in excess of par value	1,659,484	1,644,830
Retained earnings	2,912,811	2,543,688
Treasury stock, at cost: 7,278 and 7,996 shares, respectively	(567,503)	(597,682)
Accumulated other comprehensive income (loss)	(96,720)	(113,177)
Total Synopsys stockholders' equity	3,909,572	3,479,152
Non-controlling interest	5,863	5,863
Total stockholders' equity	3,915,435	3,485,015
Total liabilities and stockholders' equity	$ 6,194,223	$ 6,145,974

* Derived from audited financial statements.

See accompanying notes to unaudited condensed consolidated financial statements.

SYNOPSYS, INC.

UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except per share amounts)

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
Revenue:				
Time-based products	$ 558,305	$ 556,770	$ 1,112,021	$ 1,127,703
Upfront products	143,401	99,960	273,914	191,564
Maintenance and service	134,536	120,106	270,708	226,995
Total revenue	836,242	776,836	1,656,643	1,546,262
Cost of revenue:				
Products	116,010	108,199	232,630	219,593
Maintenance and service	59,788	50,130	118,617	100,884
Amortization of intangible assets	14,881	20,450	32,324	39,458
Total cost of revenue	190,679	178,779	383,571	359,935
Gross margin	645,563	598,057	1,273,072	1,186,327
Operating expenses:				
Research and development	290,299	252,134	561,625	516,545
Sales and marketing	158,652	147,188	314,611	297,700
General and administrative	56,351	58,809	98,412	115,181
Amortization of intangible assets	10,316	10,736	21,100	20,275
Restructuring	14,443	2,176	14,408	1,894
Total operating expenses	530,061	471,043	1,010,156	951,595
Operating income	115,502	127,014	262,916	234,732
Other income (expense), net	18,415	(7,715)	18,056	4,670
Income before income taxes	133,917	119,299	280,972	239,402
Provision (benefit) for income taxes	15,707	16,827	9,248	140,621
Net income	$ 118,210	$ 102,472	$ 271,724	$ 98,781
Net income per share:				
Basic	$ 0.79	$ 0.69	$ 1.82	$ 0.66
Diluted	$ 0.77	$ 0.67	$ 1.77	$ 0.64
Shares used in computing per share amounts:				
Basic	149,712	149,034	149,500	149,245
Diluted	153,904	153,167	153,383	153,664

See accompanying notes to unaudited condensed consolidated financial statements.

SYNOPSYS, INC.

UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(in thousands)

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
Net income	$ 118,210	$ 102,472	$ 271,724	$ 98,781
Other comprehensive income:				
Change in foreign currency translation adjustment	(3,327)	(11,122)	2,056	9,958
Cash flow hedges:				
Deferred gains (losses), net of tax of $(123) and $(1,714), for the three and six months ended April 30, 2019, respectively, and of $2,264 and $(1,155) for each of the same periods in fiscal 2018, respectively.	447	(8,533)	5,914	4,480
Reclassification adjustment on deferred (gains) losses included in net income, net of tax of $(1,050) and $(2,286), for the three and six months ended April 30, 2019 respectively, and of $1,195 and $2,520 for each of the same periods in fiscal 2018, respectively.	4,012	(5,542)	8,487	(10,848)
Other comprehensive income (loss), net of tax effects	1,132	(25,197)	16,457	3,590
Comprehensive income	$ 119,342	$ 77,275	$ 288,181	$ 102,371

See accompanying notes to unaudited condensed consolidated financial statements.

SYNOPSYS, INC.

UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands)

	Common Stock		Capital in Excess of Par Value	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive Income (Loss)	Total Synopsys Stockholders' Equity	Non-controlling Interest	Stockholders' Equity
	Shares	Amount							
Balance at October 31, 2018	149,265	$ 1,493	$1,644,830	$ 2,543,688	$ (597,682)	$ (113,177)	$ 3,479,152	$ 5,863	$ 3,485,015
Net income				153,514			153,514		153,514
Retained earnings adjustment due to adoption of accounting standards related to revenue(1)				257,594			257,594		257,594
Retained earnings adjustment due to adoption of an accounting standard related to income taxes(2)				(130,544)			(130,544)		(130,544)
Other comprehensive income (loss), net of tax effects						15,325	15,325		15,325
Purchases of treasury stock	(346)	(3)	3		(29,185)		(29,185)		(29,185)
Common stock issued, net of shares withheld for employee taxes	357	3	(27,736)	(3,342)	26,755		(4,320)		(4,320)
Stock-based compensation			37,266				37,266		37,266
Balance at January 31, 2019	149,276	$ 1,493	$1,654,363	$ 2,820,910	$ (600,112)	$ (97,852)	$ 3,778,802	$ 5,863	$ 3,784,665
Net income				118,210			118,210		118,210
Other comprehensive income (loss), net of tax effects						1,132	1,132		1,132
Purchases of treasury stock	(780)	(8)	8		(80,000)		(80,000)		(80,000)
Equity forward contract			(20,000)				(20,000)		(20,000)
Common stock issued, net of shares withheld for employee taxes	1,486	15	(11,795)	(26,309)	112,609		74,520		74,520
Stock-based compensation			36,908				36,908		36,908
Balance at April 30, 2019	149,982	$ 1,500	$1,659,484	$ 2,912,811	$ (567,503)	$ (96,720)	$ 3,909,572	$ 5,863	$ 3,915,435
Balance at October 31, 2017	150,445	$ 1,505	$1,622,429	$ 2,143,873	$ (426,208)	$ (65,979)	$ 3,275,620	$ 4,104	$ 3,279,724
Net income (loss)				(3,691)			(3,691)		(3,691)
Other comprehensive income (loss), net of tax effects						28,787	28,787		28,787
Purchases of treasury stock	(1,987)	(20)	20		(180,000)		(180,000)		(180,000)
Equity forward contract			(20,000)				(20,000)		(20,000)
Common stock issued, net of shares withheld for employee taxes	495	5	(22,103)	(6,328)	32,126		3,700		3,700
Stock-based compensation			32,113				32,113		32,113
Balance at January 31, 2018	148,953	$ 1,490	$1,612,459	$ 2,133,854	$ (574,082)	$ (37,192)	$ 3,136,529	$ 4,104	$ 3,140,633
Net income				102,472			102,472		102,472
Retained earnings adjustment due to adoption of an accounting standard related to reclassification of certain tax effects from accumulated other comprehensive income				(293)			(293)		(293)
Other comprehensive income (loss), net of tax effects						(25,197)	(25,197)		(25,197)
Purchases of treasury stock	(916)	(9)	9		(75,000)		(75,000)		(75,000)
Equity forward contract			40,000				40,000		40,000
Common stock issued, net of shares withheld for employee taxes	924	9	(6,196)	(12,746)	64,066		45,133		45,133
Stock-based compensation			32,649				32,649		32,649
Balance at April 30, 2018	148,961	$ 1,490	$1,678,921	$ 2,223,287	$ (585,016)	$ (62,389)	$ 3,256,293	$ 4,104	$ 3,260,397

(1) See *Note 2. Summary of Significant Accounting Policies* for additional information on the retained earnings adjustment due to adoption of Accounting Standards Codification (ASC) 606 and ASC 340.
(2) See *Note 14. Taxes* for additional information on the retained earnings adjustment due to adoption of Accounting Standard Update (ASU) 2016-16.

See accompanying notes to unaudited condensed consolidated financial statements.

SYNOPSYS, INC.

UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Six Months Ended April 30,	
	2019	**2018**
Cash flows from operating activities:		
Net income	$ 271,724	$ 98,781
Adjustments to reconcile net income to net cash provided by operating activities:		
Amortization and depreciation	102,841	96,829
Amortization of capitalized costs to obtain revenue contracts	28,425	—
Stock compensation	75,374	65,288
Allowance for doubtful accounts	3,950	3,367
(Gain) loss on sale of property and investments	(3,744)	(93)
Deferred income taxes	(23,486)	38,878
Net changes in operating assets and liabilities, net of acquired assets and liabilities:		
Accounts receivable	23,478	(105,457)
Inventories	(50,358)	(40,997)
Prepaid and other current assets	(18,547)	(6,442)
Other long-term assets	(91,271)	(21,728)
Accounts payable and accrued liabilities	(160,492)	(131,763)
Income taxes	(32,059)	(44,577)
Deferred revenue	82,966	52,229
Net cash provided by operating activities	208,801	4,315
Cash flows from investing activities:		
Proceeds from sales and maturities of short-term investments	—	12,449
Proceeds from sales of long-term investments	4,176	—
Proceeds from sales of property and equipment	—	1,662
Purchases of property and equipment	(68,962)	(48,612)
Cash paid for acquisitions and intangible assets, net of cash acquired	—	(643,537)
Capitalization of software development costs	(1,491)	(1,760)
Net cash used in investing activities	(66,277)	(679,798)
Cash flows from financing activities:		
Proceeds from credit facilities	188,760	450,000
Repayment of debt	(366,562)	(69,687)
Issuances of common stock	83,352	58,975
Payments for taxes related to net share settlement of equity awards	(13,173)	(11,883)
Purchase of equity forward contract	(20,000)	—
Purchases of treasury stock	(109,185)	(235,000)
Other	(762)	—
Net cash (used in) provided by financing activities	(237,570)	192,405
Effect of exchange rate changes on cash, cash equivalents and restricted cash	3,093	5,773
Net change in cash, cash equivalents and restricted cash	(91,953)	(477,305)
Cash, cash equivalents and restricted cash, beginning of period	725,001	1,050,075
Cash, cash equivalents and restricted cash, end of period	$ 633,048	$ 572,770

See accompanying notes to unaudited condensed consolidated financial statements.

Note 1. Description of Business

Synopsys, Inc. (Synopsys or the Company) provides products and services used by designers across the entire silicon to software spectrum, from engineers creating advanced semiconductors to software developers seeking to ensure the security and quality of their code. The Company is a global leader in supplying the electronic design automation (EDA) software that engineers use to design and test integrated circuits (ICs), also known as chips. The Company also offers semiconductor intellectual property (IP) products, which are pre-designed circuits that engineers use as components of larger chip designs rather than designing those circuits themselves. The Company provides software and hardware used to validate the electronic systems that incorporate chips and the software that runs on them. To complement these offerings, the Company provides technical services and support to help its customers develop advanced chips and electronic systems. These products and services are part of the Company's Semiconductor & System Design segment.

The Company is also a leading provider of software tools and services that improve the security and quality of software code in a wide variety of industries, including electronics, financial services, media, automotive, medicine, energy and industrials. These tools and services are part of the Company's Software Integrity segment.

Note 2. Summary of Significant Accounting Policies

The Company has prepared the accompanying unaudited condensed consolidated financial statements pursuant to the rules and regulations of the Securities and Exchange Commission (SEC). Pursuant to these rules and regulations, the Company has condensed or omitted certain information and footnote disclosures it normally includes in its annual consolidated financial statements prepared in accordance with U.S. generally accepted accounting principles (U.S. GAAP). In management's opinion, the Company has made all adjustments (consisting only of normal, recurring adjustments, except as otherwise indicated) necessary to fairly present its unaudited condensed consolidated balance sheets, results of operations, comprehensive income, stockholders' equity and cash flows. The Company's interim period operating results do not necessarily indicate the results that may be expected for any other interim period or for the full fiscal year. These financial statements and accompanying notes should be read in conjunction with the consolidated financial statements and notes thereto in Synopsys' Annual Report on Form 10-K for the fiscal year ended October 31, 2018 as filed with the SEC on December 17, 2018.

Use of Estimates. To prepare financial statements in conformity with U.S. GAAP, management must make estimates and assumptions that affect the amounts reported in the unaudited condensed consolidated financial statements and accompanying notes. Actual results could differ from these estimates and may result in material effects on the Company's operating results and financial position.

Principles of Consolidation. The unaudited condensed consolidated financial statements include the accounts of the Company and all of its subsidiaries. All intercompany accounts and transactions have been eliminated.

Fiscal Year End. The Company's fiscal year generally ends on the Saturday nearest to October 31 and consists of 52 weeks, with the exception that every five or six years, the Company has a 53-week year. When a 53-week year occurs, the Company includes the additional week in the first quarter to realign fiscal quarters with calendar quarters. Fiscal 2019 is a 52-week year and will end on November 2, 2019. Fiscal 2018 was a 53-week year and ended on November 3, 2018.

The results of operations for the first six months of fiscal 2019 and 2018 included 26 weeks and 27 weeks, respectively, and ended on May 4, 2019 and May 5, 2018, respectively. For presentation purposes, the unaudited condensed consolidated financial statements and accompanying notes refer to the closest calendar month end.

Segment Reporting. Effective in fiscal 2019, the Company realigned its business to evaluate the results of its Software Integrity business separately from Synopsys' traditional electronic design automation (EDA) and semiconductor IP business. The Chief Operating Decision Makers (CODMs) now regularly review disaggregated information for the following two reportable segments: (1) Semiconductor & System Design, which includes EDA tools, IP products, system integration solutions and associated services, and (2) Software Integrity, which includes security and quality solutions for software development across many industries. Synopsys' CODMs are its two co-Chief Executive Officers. Historical segment disclosures have been recast to retrospectively reflect the change from one to two reportable segments.

Goodwill. Effective in the first quarter of fiscal 2019, with the change in the Company's reportable segments, the Company has determined there are now two reporting units, requiring goodwill to be allocated to the two reporting units using a relative fair value method. Goodwill represents the excess of the aggregate purchase price over the fair value of the net tangible and identifiable intangible assets acquired by the Company. The carrying amount of goodwill at each reporting unit is tested for impairment annually as of October 31, or more frequently if facts and circumstances warrant a review. As a result of changes to the Company's segment reporting, the Company conducted a quantitative impairment test for each of its reporting units and concluded that there was no impairment. The Company performs either a qualitative or quantitative analysis when testing a reporting unit's goodwill for impairment. A qualitative goodwill impairment test is performed when the fair value of a reporting unit historically has significantly exceeded the carrying value of its net assets and based on current operations is expected to continue to do so. Otherwise, the Company is required to conduct a quantitative impairment test for each reporting unit and estimates the fair value of each reporting unit using a combination of a discounted cash flow analysis and a market approach based on market multiples. The discount rate used in an income approach is based on the Company's weighted-average cost of capital and may be adjusted for the relevant risks pertaining to projecting future cash flows. If the fair value of a reporting unit is less than its carrying value, a goodwill impairment charge is recorded for the difference. Refer to *Note 3. Goodwill and Intangible Assets* for a discussion of the change in reporting units as related to the realignment of the Company's segments.

Revenue Recognition. In May 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Codification (ASC 606), "Revenue from Contracts with Customers," which supersedes the revenue recognition requirements in "Revenue Recognition (ASC 605)." The new guidance creates a single, principle-based model for revenue recognition that is intended to expand and improve companies' revenue disclosures. For revenue recognition policies under ASC 605, refer to Note 2 - Summary of Significant Accounting Policies in the Company's Annual Report on Form 10-K for the year ended October 31, 2018.

ASC 606 requires a company to recognize revenue when goods are transferred or services are provided to customers in an amount that reflects the consideration to which the company expects to be entitled to in exchange for those goods or services. ASC 606 also requires disclosures enabling users of financial statements to understand the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. The FASB has issued several amendments to ASC 606, including amendments that deferred the initially proposed adoption date and clarified accounting for licenses of intellectual property and identifying performance obligations.

The Company adopted ASC 606 at the beginning of fiscal 2019 using the modified retrospective transition method. Under this method, periods prior to the adoption date are not adjusted and continue to be reported under the revenue accounting literature in effect during those periods. The Company evaluated contracts that were in effect at the beginning of fiscal 2019 as if they had been accounted for under ASC 606 from the contract inception and summarized the most significant adoption impacts as follows:

- Revenue for certain ongoing contracts that was previously deferred would have been recognized in the periods prior to adoption under ASC 606. Therefore, upon adoption, the Company recorded the following adjustments to the beginning balances to reflect the amount of revenue that will no longer be recognized in future periods for such contracts: an increase to retained earnings of $265.1 million, a decrease to unbilled receivables of $27.4 million, an increase to contract assets of $126.9 million, and a decrease in deferred revenue of $165.6 million.
- The Company capitalized $73.8 million of incremental costs for obtaining contracts with customers at the adoption date with a corresponding adjustment to retained earnings and is amortizing these costs over the contract term.
- The Company recorded an increase in its opening deferred tax liability of $81.4 million, with a corresponding adjustment to retained earnings, to record the tax effect of the above adjustments.

The impacts of adopting ASC 606 on the Company's unaudited condensed consolidated financial statements for the six months are summarized in the tables below.

Balance Sheet Accounts

The following table summarizes the effects of adopting ASC 606 on certain account balances of the unaudited condensed consolidated balance sheet that were impacted as of April 30, 2019:

	As reported under ASC 606	Adjustments	Adjusted balance under ASC 605
		(in thousands)	
Receivables, net	$ 526,691	$ 61,849	$ 588,540
Prepaid and other current assets	259,849	(168,487)	91,362
Deferred income taxes	352,667	67,763	420,430
Other long-term assets	380,682	(96,441)	284,241
Accounts payable and other accrued liabilities	365,848	(9,499)	356,349
Deferred revenue	1,194,404	91,067	1,285,471
Long-term deferred revenue	60,825	73,454	134,279
Other long-term liabilities (1)	324,217	(16,671)	307,546
Retained earnings	2,912,811	(273,667)	2,639,144

(1) Includes long-term deferred tax liabilities.

Statements of Operations

The following table summarizes the effects of adopting ASC 606 on the unaudited condensed consolidated statements of operations for the three and six months ended April 30, 2019:

	Three Months Ended April 30, 2019			Six Months Ended April 30, 2019		
	As reported under ASC 606	Adjustments	Adjusted under ASC 605	As reported under ASC 606	Adjustments	Adjusted under ASC 605
	(in thousands, except per share amounts)					
Revenue:						
Time-based products	$ 558,305	$ 86,762	$ 645,067	$ 1,112,021	$ 102,618	$ 1,214,639
Upfront products	143,401	(61,057)	82,344	273,914	(77,843)	196,071
Maintenance and service	134,536	(9,379)	125,157	270,708	(30,793)	239,915
Total revenue	836,242	16,326	852,568	1,656,643	(6,018)	1,650,625
Cost of Revenue:						
Products	116,010	—	116,010	232,630	—	232,630
Maintenance and service	59,788	—	59,788	118,617	—	118,617
Amortization of intangible assets	14,881	—	14,881	32,324	—	32,324
Total cost of revenue	190,679	—	190,679	383,571	—	383,571
Gross margin	645,563	16,326	661,889	1,273,072	(6,018)	1,267,054
Operating expenses:						
Research and development	290,299	—	290,299	561,625	—	561,625
Sales and marketing	158,652	1,942	160,594	314,611	13,126	327,737
General and administrative	56,351	—	56,351	98,412	—	98,412
Amortization of intangible assets	10,316	—	10,316	21,100	—	21,100
Restructuring	14,443	—	14,443	14,408	—	14,408
Total operating expenses	530,061	1,942	532,003	1,010,156	13,126	1,023,282
Operating income	115,502	14,384	129,886	262,916	(19,144)	243,772
Other income (expense), net	18,415	—	18,415	18,056	—	18,056
Income before provision for income taxes	133,917	14,384	148,301	280,972	(19,144)	261,828
Provision (benefit) for income taxes	15,707	2,599	18,306	9,248	(3,071)	6,177
Net income	$ 118,210	$ 11,785	$ 129,995	$ 271,724	$ (16,073)	$ 255,651
Net income per share:						
Basic	$ 0.79	$ 0.08	$ 0.87	$ 1.82	$ (0.11)	$ 1.71
Diluted	$ 0.77	$ 0.07	$ 0.84	$ 1.77	$ (0.10)	$ 1.67
Shares used in computing per share amounts:						
Basic	149,712		149,712	149,500		149,500
Diluted	153,904		153,904	153,383		153,383

Statements of Cash Flows

Adoption of ASC 606 had no impact to cash from or used in operating, financing, or investing activities on the unaudited condensed consolidated cash flows statements.

Revenue Policy

The core principle of ASC 606 is to recognize revenue for the transfer of services or products to customers in an amount that reflects the consideration to which the Company expects to be entitled in exchange for those services or products. The principle is achieved through the following five-step approach:

- Identification of the contract, or contracts, with the customer
- Identification of the performance obligation in the contract
- Determination of the transaction price
- Allocation of the transaction price to the performance obligations in the contract
- Recognition of revenue when, or as, the Company satisfies a performance obligation

Nature of Products and Services

The Company generates revenue from the sale of products that include software licenses and, to a lesser extent, hardware products, maintenance and services. The various types are set forth below.

Electronic Design Automation

Software license revenue consists of fees associated with the licensing of the Company's software primarily through Technology Subscription License (TSL) contracts. TSLs are time-based licenses for a finite term and generally provide the customer with limited rights to receive, or to exchange certain quantities of licensed software for, unspecified future technology. The majority of the Company's arrangements are TSLs due to the nature of its business and customer requirements. In addition to the licenses, the arrangements also include: post-contract customer support, which includes providing frequent updates and upgrades to maintain the utility of the software due to rapid changes in technology; other intertwined services such as multiple copies of the tools; assisting the Company's customers in applying the Company's technology in the customers' development environment; and rights to remix licenses for other licenses. Payments are generally received in equal or near equal installments over the term of the arrangement. Under ASC 605, these arrangements were qualified to be recognized ratably over the contract terms. Under ASC 606, the Company has concluded that its software licenses in TSL contracts are not distinct from its obligation to provide unspecified software updates to the licensed software throughout the license term. Such updates represent inputs to a single, combined performance obligation, commencing upon the later of the arrangement effective date or transfer of the software license. Remix rights are not an additional promised good or service in the contract, and where unspecified additional software product rights are part of the contract with the customer, such rights are accounted for as part of the single performance obligation that includes the licenses, updates, and technical support because such rights are provided for the same period of time and have the same pattern of transfer to the customer over the duration of the subscription term.

IP & System Integration

The Company generally licenses IP under nonexclusive license agreements that provide usage rights for specific applications. Additionally, for certain IP license agreements, royalties are collected as customers sell their own products that incorporate the Company’s IP. Under ASC 605, the Company recognized revenue either upfront if certain criteria in ASC 605 were met, or over the contractual period for IP licensing and support arrangements if such arrangements were combined with other TSL arrangements. Under ASC 606, these arrangements generally have two distinct performance obligations that consist of transferring the licensed IP and the support service. Support services consist of a stand-ready obligation to provide technical support and software updates over the support term. Revenue allocated to the IP license is recognized at a point in time upon the later of the delivery date or the beginning of the license period, and revenue allocated to support services is recognized ratably over the support term. Royalties are recognized as revenue is earned, generally when the customer sells its products that incorporate the Company’s IP.

Software Integrity Products

Software Integrity product arrangements provide customers the right to software licenses, software updates and technical support. Under the term of these arrangements, the customer expects to receive integral updates to the software licenses that protect the customer’s software from potential security vulnerabilities. The licenses and software updates together serve to fulfill the Company’s commitment to the customer, as they represent inputs to a single, combined performance obligation that commences upon the later of the arrangement effective date or transfer of the software license. Software updates are part of the contract with the customer, and such rights are accounted for as part of the single performance obligation that includes the licenses, updates, and technical support because such rights are provided for the same period of time and have the same time-based pattern of transfer to the customer.

Hardware

The Company generally has two performance obligations in arrangements involving the sale of hardware products. The first performance obligation is to transfer the hardware product, which includes embedded software integral to the functionality of the hardware product. The second performance obligation is to provide maintenance on the hardware and its embedded software, including rights to technical support, hardware repairs and software updates that are all provided over the same term and have the same time-based pattern of transfer to the customer. The portion of the transaction price allocated to the hardware product is generally recognized as revenue at a point in time when the hardware is delivered to the customer. The Company has concluded that control generally transfers upon delivery because the customer has title to the hardware, physical possession of the hardware, and a present

obligation to pay for the hardware. The portion of the transaction price allocated to maintenance is recognized as revenue that is ratable over the maintenance term. The adoption of ASC 606 did not change the timing of revenue recognition for hardware products and related services.

Professional Services

Our arrangements often include service elements (other than maintenance and support services). These services include training, design assistance, and consulting. Services performed on a time and materials basis are recognized over time, as the customer simultaneously receives and consumes the benefit provided. Certain arrangements also include the customization or modification of licensed IP. Revenue from these contracts is recognized over time as the services are performed, when the development is specific to the customer's needs and Synopsys has enforceable rights to payment for performance completed. Performance is generally measured using costs incurred or hours expended to measure progress. The Company has a history of accurately estimating project status and the costs necessary to complete projects. A number of internal and external factors can affect these estimates, including labor rates, utilization and efficiency variances, specification and testing requirement changes, and changes in customer delivery priorities. Payments for services are generally due upon milestones in the contract or upon consumption of the hourly resources.

Flexible Spending Accounts

Some customers enter into a non-cancelable Flexible Spending Account arrangement (FSA) whereby the customer commits to a fixed dollar amount over a specified period of time that can be used to purchase from a list of Synopsys products or services. These arrangements do not meet the definition of a revenue contract until the customer executes a separate order to identify the required products and services that they are purchasing. The combination of the FSA arrangement and the subsequent order creates enforceable rights and obligations, thus meeting the definition of a revenue contract. Each separate order under the agreement is treated as an individual contract under the new standard and accounted for based on the respective performance obligations included within the FSA arrangements.

Disaggregated Revenue

The following table shows the percentage of revenue by product groups:

	Three Months Ended April 30, 2019		Six Months Ended April 30, 2019	
	2019	2018	2019	2018
EDA	58%	62%	59%	63%
IP & System Integration	31%	29%	30%	29%
Software Integrity Products & Services	10%	9%	10%	8%
Other	1%	—%	1%	—%
Total	100%	100%	100%	100%

Judgments

The Company's contracts with customers often include promises to transfer multiple products and services to a customer. Determining whether services and products are considered distinct performance obligations that should be accounted for separately versus together requires significant judgment. The Company has concluded that (1) its EDA software licenses in TSL contracts are not distinct from its obligation to provide unspecified software updates to the licensed software throughout the license term, because those promises represent inputs to a single, combined performance obligation, and (2) where unspecified additional software product rights are part of the contract with the customer, such rights are accounted for as part of the single performance obligation that includes the licenses, updates, and technical support, because such rights are provided for the same period of time and have the same time-based pattern of transfer to the customer. In reaching this conclusion, the Company considered the nature of the obligation to customers which is to provide an ongoing right to use the most up to date and relevant software. As EDA customers operate in a rapidly changing and competitive environment, satisfying the obligation requires providing critical updates to the existing software products, including ongoing iterative interaction with customers to make the software relevant to customers' ability to meet the time to go to market with advanced products.

Similarly, the Company also concluded that in its Software Integrity business, the licenses and maintenance updates serve together to fulfill the Company's commitment to the customer as both work together to provide the

functionality to the customer and represent a combined performance obligation because the updates are essential to the software's central utility, which is to identify security vulnerabilities and other threats.

Judgment is also required to determine the standalone selling price (SSP) for each distinct performance obligation. For non-software performance obligations (IP, Hardware, and services), SSP is established based on observable prices of products and services sold separately. SSP for license (and related updates and support) in a contract with multiple performance obligations is determined by applying a residual approach whereby all other non-software performance obligations within a contract are first allocated a portion of the transaction price based upon their respective SSP, using observable prices, with any residual amount of the transaction price allocated to the license because the Company does not sell the license separately, and the pricing is highly variable.

Contract Balances

The timing of revenue recognition may differ from the timing of invoicing to customers, and these timing differences result in receivables (billed or unbilled), contract assets, or contract liabilities (deferred revenue) on the Company's unaudited condensed consolidated balance sheet. The Company records a contract asset when revenue is recognized prior to the right to invoice, or deferred revenue when revenue is recognized subsequent to invoicing. For time-based software agreements, customers are generally invoiced in equal, quarterly amounts, although some customers prefer to be invoiced in single or annual amounts. The Company records an unbilled receivable when revenue is recognized and it has an unconditional right to invoice and receive payment.

The contract assets indicated below are presented as prepaid and other current assets in the unaudited condensed consolidated balance sheet. The contract assets are transferred to receivables when the rights to invoice and receive payment become unconditional.

Contract balances are as follows:

	As of April 30, 2019	As of October 31, 2018 as adjusted
	(in thousands)	
Contract assets	$ 168,487	$ 126,897
Unbilled receivables	38,133	36,699
Deferred revenue	1,255,229	1,104,110

During the three and six months ended April 30, 2019, the Company recognized $474.4 million and $961.5 million, respectively, of revenue that were included in the deferred revenue balance at the beginning of the period, as adjusted for the adoption of ASC 606.

Contracted but unsatisfied or partially unsatisfied performance obligations were approximately $4.3 billion as of April 30, 2019, which includes $512.3 million in non-cancellable FSA commitments from customers where actual product selection and quantities of specific products or services are to be determined by customers at a later date. The Company has elected to exclude future sales-based royalty payments from the remaining performance obligations. The contracted unsatisfied performance obligations, excluding non-cancellable FSA, expected to be recognized over the next 12 months is approximately 52%, with the remainder recognized thereafter.

During the three and six month periods ended April 30, 2019, the Company recognized $28.5 million and $47.3 million, respectively, from performance obligations satisfied in previous periods. These amounts represent sales based royalties earned during the periods.

Costs of Obtaining a Contract with Customer

The incremental costs of obtaining a contract with a customer, which consist primarily of direct sales commissions earned upon execution of the contract, are required to be capitalized under ASC 340-40 and amortized over the estimated period of which the benefit is expected to be received. As direct sales commissions paid for renewals are commensurate with the amounts paid for initial contracts, the deferred incremental costs will be recognized over the contract term. Total capitalized direct commission costs as of April 30, 2019 were $96.4 million and are included in other assets in the Company's unaudited condensed consolidated balance sheet. Amortization of these assets was $15.6 million and $28.4 million during the three and six months ended April 30, 2019, respectively, and are included

in sales and marketing expense in the Company's unaudited condensed consolidated statements of operations.

Note 3. Goodwill and Intangible Assets

Following the realignment of the Company's operating segments during the first quarter of fiscal 2019, as described in *Note 12. Segment Disclosure,* the Company has two reporting units and has assigned assets and liabilities to each of the reporting units based on each unit's operating activities. Previously, the Company operated as a single reporting segment and reporting unit. Goodwill was reallocated to the reporting units using a relative fair value method and assessed for impairment. No impairment of goodwill was identified for any periods presented.

Intangible assets as of April 30, 2019 consisted of the following:

	Gross Assets	Accumulated Amortization	Net Assets
		(in thousands)	
Core/developed technology	$ 773,147	$ 629,360	$ 143,787
Customer relationships	358,522	223,374	135,148
Contract rights intangible	183,947	179,167	4,780
Trademarks and trade names	42,929	24,025	18,904
In-process research and development (IPR&D)(1)	1,200	—	1,200
Capitalized software development costs	37,309	34,201	3,108
Total	$ 1,397,054	$ 1,090,127	$ 306,927

(1) IPR&D is reclassified to core/developed technology upon completion or is written off upon abandonment.

Intangible assets as of October 31, 2018 consisted of the following:

	Gross Assets	Accumulated Amortization	Net Assets
		(in thousands)	
Core/developed technology	$ 773,147	$ 598,956	$ 174,191
Customer relationships	358,524	204,382	154,142
Contract rights intangible	183,953	177,191	6,762
Trademarks and trade names	42,929	21,944	20,985
In-process research and development (IPR&D)(1)	1,200	—	1,200
Capitalized software development costs	35,818	32,694	3,124
Total	$ 1,395,571	$ 1,035,167	$ 360,404

Amortization expense related to intangible assets consisted of the following:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Core/developed technology	$ 14,045	$ 18,985	$ 30,404	$ 37,053
Customer relationships	9,377	9,656	18,957	18,219
Contract rights intangible	866	1,372	1,982	2,262
Trademarks and trade names	909	1,172	2,081	2,198
Capitalized software development costs(2)	735	897	1,507	1,817
Total	$ 25,932	$ 32,082	$ 54,931	$ 61,549

(2) Amortization of capitalized software development costs is included in cost of products revenue in the unaudited condensed consolidated statements of operations.

The following table presents the estimated future amortization of the existing intangible assets as of April 30, 2019:

Fiscal Year	(in thousands)
Remainder of fiscal 2019	$ 48,131
2020	78,806
2021	56,118
2022	44,006
2023	29,219
2024 and thereafter	49,447
IPR&D(3)	1,200
Total	$ 306,927

(3) IPR&D assets are amortized over their useful lives upon completion or are written off upon abandonment.

Note 4. Financial Assets and Liabilities

Cash equivalents. The Company classifies time deposits and other investments with original maturities less than three months as cash equivalents.

As of April 30, 2019, the balances of the Company's cash equivalents are:

	Cost	Gross Unrealized Gains	Gross Unrealized Losses Less Than 12 Continuous Months	Gross Unrealized Losses 12 Continuous Months or Longer	Estimated Fair Value(1)
	(in thousands)				
Cash equivalents:					
Money market funds	$ 206,438	$ —	$ —	$ —	$ 206,438
Total:	$ 206,438	$ —	$ —	$ —	$ 206,438

(1) See *Note 5. Fair Value Measures* for further discussion on fair values of cash equivalents.

As of October 31, 2018, the balances of the Company's cash equivalents are:

	Cost	Gross Unrealized Gains	Gross Unrealized Losses Less Than 12 Continuous Months	Gross Unrealized Losses 12 Continuous Months or Longer	Estimated Fair Value(1)
			(in thousands)		
Cash equivalents:					
Money market funds	$ 165,296	$ —	$ —	$ —	$ 165,296
Total:	$ 165,296	$ —	$ —	$ —	$ 165,296

(1) See *Note 5. Fair Value Measures* for further discussion on fair values of cash equivalents.

Restricted Cash. In November 2016, the FASB issued ASU 2016-18, “Statement of Cash Flows (Topic 230): Restricted Cash.” The Company adopted the standard in the first quarter of fiscal 2019 and applied it retrospectively for the periods presented. As required by ASU 2016-18, the Company included amounts generally described as restricted cash and restricted cash equivalents in cash and cash equivalents when reconciling beginning-of-period and end-of-period total amounts shown on the statement of cash flows. All restricted cash is primarily associated with office leases and has no material impact on the Company’s unaudited condensed consolidated statement of cash flows.

The following table provides a reconciliation of cash, cash equivalents and restricted cash included in the unaudited condensed consolidated balance sheets:

	As of April 30, 2019	As of October 31, 2018
	(in thousands)	
Cash and cash equivalents	$ 631,161	$ 723,115
Restricted cash included in Prepaid expenses and other current assets	1,166	1,164
Restricted cash included in Other long-term assets	721	722
Total cash, cash equivalents and restricted cash	$ 633,048	$ 725,001

Non-marketable equity securities. The Company’s strategic investment portfolio consists of non-marketable equity securities in privately-held companies. The securities accounted for under cost method investments are reported at cost net of impairment losses. Securities accounted for under equity method investments are recorded at cost plus the proportional share of the issuers’ income or loss, which is recorded in the Company’s other income (expense), net. The cost basis of securities sold is based on the specific identification method. Refer to *Note 5. Fair Value Measures.*

Derivatives. The Company recognizes derivative instruments as either assets or liabilities in the unaudited condensed consolidated balance sheets at fair value and provides qualitative and quantitative disclosures about such derivatives. The Company operates internationally and is exposed to potentially adverse movements in foreign currency exchange rates. The Company enters into hedges in the form of foreign currency forward contracts to reduce its exposure to foreign currency rate changes on non-functional currency denominated forecasted transactions and balance sheet positions including: (1) certain assets and liabilities, (2) shipments forecasted to occur within approximately one month, (3) future billings and revenue on previously shipped orders, and (4) certain future intercompany invoices denominated in foreign currencies.

The duration of forward contracts ranges from approximately one month to 22 months, the majority of which are short-term. The Company does not use foreign currency forward contracts for speculative or trading purposes. The Company enters into foreign exchange forward contracts with high credit quality financial institutions that are rated ‘A’ or above and to date has not experienced nonperformance by counterparties. Further, the Company anticipates continued performance by all counterparties to such agreements.

The assets or liabilities associated with the forward contracts are recorded at fair value in other current assets or accrued liabilities in the unaudited condensed consolidated balance sheets. The accounting for gains and losses resulting from changes in fair value depends on the use of the foreign currency forward contract and whether it is designated and qualifies for hedge accounting.

Cash Flow Hedging Activities

Certain foreign exchange forward contracts are designated and qualify as cash flow hedges. These contracts have durations of approximately 22 months or less. Certain forward contracts are rolled over periodically to capture the full length of exposure to the Company's foreign currency risk, which can be up to three years. To receive hedge accounting treatment, all hedging relationships are formally documented at the inception of the hedge, and the hedges must be highly effective in offsetting changes to future cash flows on the hedged transactions. The effective portion of gains or losses resulting from changes in fair value of these hedges is initially reported, net of tax, as a component of other comprehensive income (OCI) in stockholders' equity and reclassified into revenue or operating expenses, as appropriate, at the time the hedged transactions affect earnings. The Company expects a majority of the hedge balance in OCI to be reclassified to the statements of operations within the next 12 months.

Hedging effectiveness is evaluated monthly using spot rates, with any gain or loss caused by hedging ineffectiveness recorded in other income (expense), net. The premium/discount component of the forward contracts is recorded to other income (expense), net, and is not included in evaluating hedging effectiveness.

Non-designated Hedging Activities

The Company's foreign exchange forward contracts that are used to hedge non-functional currency denominated balance sheet assets and liabilities are not designated as hedging instruments. Accordingly, any gains or losses from changes in the fair value of the forward contracts are recorded in other income (expense), net. The gains and losses on these forward contracts generally offset the gains and losses associated with the underlying assets and liabilities, which are also recorded in other income (expense), net. The duration of the forward contracts for hedging the Company's balance sheet exposure is approximately one month.

The Company also has certain foreign exchange forward contracts for hedging certain international revenues and expenses that are not designated as hedging instruments. Accordingly, any gains or losses from changes in the fair value of the forward contracts are recorded in other income (expense), net. The gains and losses on these forward contracts generally offset the gains and losses associated with the foreign currency in operating income. The duration of these forward contracts is usually less than one year. The overall goal of the Company's hedging program is to minimize the impact of currency fluctuations on its net income over its fiscal year.

The effect of the changes in the fair values of non-designated forward contracts is summarized as follows:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Gain (loss) recorded in other income (expense), net	$ 5,035	$ 1,248	$ 3,135	$ (323)

The notional amounts in the table below for derivative instruments provide one measure of the transaction volume outstanding:

	As of April 30, 2019	As of October 31, 2018
	(in thousands)	
Total gross notional amount	$ 962,157	$ 1,135,549
Net fair value	$ (1,359)	$ (18,120)

The notional amounts for derivative instruments do not represent the amount of the Company's exposure to market gain or loss. The Company's exposure to market gain or loss will vary over time as a function of currency exchange rates. The amounts ultimately realized upon settlement of these financial instruments, together with the gains and losses on the underlying exposures, will depend on actual market conditions during the remaining life of the instruments.

The following table represents the unaudited condensed consolidated balance sheet location and amount of derivative instrument fair values segregated between designated and non-designated hedge instruments:

	Fair values of derivative instruments designated as hedging instruments	Fair values of derivative instruments not designated as hedging instruments
	(in thousands)	
As of April 30, 2019		
Other current assets	$ 8,258	$ 428
Accrued liabilities	$ 9,879	$ 166
As of October 31, 2018		
Other current assets	$ 4,771	$ 131
Accrued liabilities	$ 22,890	$ 132

The following table represents the unaudited condensed consolidated statement of operations location and amount of gains and losses on derivative instrument fair values for designated hedge instruments, net of tax:

	Location of gain (loss) recognized in OCI on derivatives	Amount of gain (loss) recognized in OCI on derivatives (effective portion)	Location of gain (loss) reclassified from OCI	Amount of gain (loss) reclassified from OCI (effective portion)
		(in thousands)		
Three months ended April 30, 2019				
Foreign exchange contracts	Revenue	$ 1,949	Revenue	$ 199
Foreign exchange contracts	Operating expenses	(1,502)	Operating expenses	(4,211)
Total		$ 447		$ (4,012)
Three months ended April 30, 2018				
Foreign exchange contracts	Revenue	$ 662	Revenue	$ (169)
Foreign exchange contracts	Operating expenses	(9,195)	Operating expenses	5,711
Total		$ (8,533)		$ 5,542
Six months ended April 30, 2019				
Foreign exchange contracts	Revenue	$ 741	Revenue	$ 363
Foreign exchange contracts	Operating expenses	5,173	Operating expenses	(8,850)
Total		$ 5,914		$ (8,487)
Six months ended April 30, 2018				
Foreign exchange contracts	Revenue	$ (1,964)	Revenue	$ 1,498
Foreign exchange contracts	Operating expenses	6,444	Operating expenses	9,350
Total		$ 4,480		$ 10,848

The following table represents the ineffective portions and portions excluded from effectiveness testing of the hedge gains (losses) for derivative instruments designated as hedging instruments, which are recorded in other income (expense), net:

Foreign exchange contracts	Amount of gain (loss) recognized in statement of operations on derivatives (ineffective portion)(1)	Amount of gain (loss) recognized in statement of operations on derivatives (excluded from effectiveness testing)(2)
	(in thousands)	
For the three months ended April 30, 2019	$ 20	$ (706)
For the three months ended April 30, 2018	$ 308	$ 607
For the six months ended April 30, 2019	$ (84)	$ (719)
For the six months ended April 30, 2018	$ 522	$ 1,707

(1) The ineffective portion includes forecast inaccuracies.
(2) The portion excluded from effectiveness testing includes the discount earned or premium paid for the contracts.

Note 5. Fair Value Measures

Accounting standards require an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. Accounting standards also establish a fair value hierarchy based on the independence of the source and objective evidence of the inputs used. There are three fair value hierarchies based upon the level of inputs that are significant to fair value measurement:

Level 1—Observable inputs that reflect quoted prices (unadjusted) for identical instruments in active markets;

Level 2—Observable inputs other than quoted prices included in Level 1 for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active, and model-driven valuations in which all significant inputs and significant value drivers are observable in active markets; and

Level 3—Unobservable inputs to the valuation derived from fair valuation techniques in which one or more significant inputs or significant value drivers are unobservable.

On a recurring basis, the Company measures the fair value of certain of its assets and liabilities, which include cash equivalents, non-qualified deferred compensation plan assets, and foreign currency derivative contracts.

The Company's cash equivalents are classified within Level 1 or Level 2 because they are valued using quoted market prices in an active market or alternative independent pricing sources and models utilizing market observable inputs.

The Company's non-qualified deferred compensation plan assets consist of money market and mutual funds invested in domestic and international marketable securities that are directly observable in active markets and are therefore classified within Level 1.

The Company's foreign currency derivative contracts are classified within Level 2 because these contracts are not actively traded and the valuation inputs are based on quoted prices and market observable data of similar instruments.

The Company's borrowings under its credit and term loan facilities are classified within Level 2 because these borrowings are not actively traded and have a variable interest rate structure based upon market rates currently available to the Company for debt with similar terms and maturities. Refer to *Note 7. Credit Facility* for more information on these borrowings.

Assets and Liabilities Measured at Fair Value on a Recurring Basis

Assets and liabilities measured at fair value on a recurring basis are summarized below as of April 30, 2019:

Description	Total	Fair Value Measurement Using: Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
		(in thousands)		
Assets				
Cash equivalents:				
Money market funds	$ 206,438	$ 206,438	$ —	$ —
Prepaid and other current assets:				
Foreign currency derivative contracts	8,686	—	8,686	—
Other long-term assets:				
Deferred compensation plan assets	244,830	244,830	—	—
Total assets	$ 459,954	$ 451,268	$ 8,686	$ —
Liabilities				
Accounts payable and accrued liabilities:				
Foreign currency derivative contracts	$ 10,045	$ —	$ 10,045	$ —
Other long-term liabilities:				
Deferred compensation plan liabilities	244,830	244,830	—	—
Total liabilities	$ 254,875	$ 244,830	$ 10,045	$ —

Assets and liabilities measured at fair value on a recurring basis are summarized below as of October 31, 2018:

Description	Total	Fair Value Measurement Using: Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
		(in thousands)		
Assets				
Cash equivalents:				
Money market funds	$ 165,296	$ 165,296	$ —	$ —
Prepaid and other current assets:				
Foreign currency derivative contracts	4,902	—	4,902	—
Other long-term assets:				
Deferred compensation plan assets	212,165	212,165	—	—
Total assets	$ 382,363	$ 377,461	$ 4,902	$ —
Liabilities				
Accounts payable and accrued liabilities:				
Foreign currency derivative contracts	$ 23,022	$ —	$ 23,022	$ —
Other long-term liabilities:				
Deferred compensation plan liabilities	212,165	212,165	—	—
Total liabilities	$ 235,187	$ 212,165	$ 23,022	$ —

Assets/Liabilities Measured at Fair Value on a Non-Recurring Basis

Non-Marketable Equity Securities

Equity investments in privately-held companies, also called non-marketable equity securities, are accounted for using either the cost or equity method of accounting.

The non-marketable equity securities are measured and recorded at fair value when an event or circumstance which impacts the fair value of these securities indicates an other-than-temporary decline in value has occurred. In such events, these equity investments would be classified within Level 3 as they are valued using significant unobservable inputs or data in an inactive market, and the valuation requires management judgment due to the absence of market price and inherent lack of liquidity. The Company monitors these investments and generally uses the income approach to assess impairments based primarily on the financial conditions of these companies.

The Company did not recognize any impairment during the three and six months ended April 30, 2019 and April 30, 2018.

Note 6. Liabilities and Restructuring Charges

In the second quarter of fiscal 2019, the Company initiated restructuring plans for involuntary and voluntary employee terminations and facility closures actions as part of a business reorganization to better position the Company for future growth by reallocating resources to priority areas, and to a lesser extent, eliminating operational redundancy. The total charges under the 2019 restructuring plans are expected to be $35 million to $65 million and consist primarily of severance, termination, and retirement benefits under the 2019 Voluntary Retirement Program (VRP). The actual total charges will depend, in part, on the number of eligible employees to accept offers of the VRP. The 2019 restructuring plans are anticipated to be completed by the second quarter of fiscal 2020.

During the three and six months ended April 30, 2019, the Company incurred restructuring charges of approximately $14.7 million for involuntary employee termination actions. These charges consist primarily of severance and termination benefits. As of April 30, 2019, $6.8 million remained outstanding and was recorded in accounts payable and accrued liabilities in the unaudited condensed consolidated balance sheets.

During the three and six months ended April 30, 2018, the Company incurred restructuring charges of approximately $1.8 million as part of a business realignment. Total charges under this realignment were expected to be $8 million to $10 million consisting of severance and benefits. The outstanding balance as of April 30, 2019 was immaterial. As of October 31, 2018, $8.1 million remained outstanding and was recorded in accounts payable and accrued liabilities in the consolidated balance sheets.

Accounts payable and accrued liabilities consist of:

	As of April 30, 2019	As of October 31, 2018
	(in thousands)	
Payroll and related benefits	$ 272,998	$ 413,307
Other accrued liabilities	61,631	79,973
Accounts payable	31,219	85,046
Total	$ 365,848	$ 578,326

Other long-term liabilities consist of:

	As of April 30, 2019	As of October 31, 2018
	(in thousands)	
Deferred compensation liability	$ 244,830	$ 212,165
Other long-term liabilities	79,387	53,395
Total	$ 324,217	$ 265,560

Note 7. Credit Facility

In July 2018, the Company entered into a 220.0 million RMB (approximately $33.0 million) credit agreement with a lender in China to support its facilities expansion. Borrowings bear interest at a floating rate based on the Chinese Central Bank rate plus 10% of such rate. As of April 30, 2019, the Company had $14.6 million outstanding under the agreement.

On November 28, 2016, the Company entered into an amended and restated credit agreement with several lenders (the Credit Agreement) providing for (i) a $650.0 million senior unsecured revolving credit facility (the Revolver) and (ii) a $150.0 million senior unsecured term loan facility (the Term Loan). The Credit Agreement amended and

restated the Company's previous credit agreement dated May 19, 2015 (the 2015 agreement), in order to increase the size of the revolving credit facility from $500.0 million to $650.0 million, to provide a new $150.0 million senior unsecured term loan facility, and to extend the termination date of the revolving credit facility from May 19, 2020 to November 28, 2021. Subject to obtaining additional commitments from lenders, the principal amount of the loans provided under the Credit Agreement may be increased by the Company by up to an additional $150.0 million. The Credit Agreement contains financial covenants requiring the Company to operate within a maximum leverage ratio and a minimum interest coverage ratio, as well as other non-financial covenants. As of April 30, 2019, the Company was in compliance with all financial covenants.

As of April 30, 2019, the Company had $127.3 million outstanding balance, net of debt issuance costs, under the Term Loan, of which $111.6 million was classified as long-term liabilities. Outstanding principal payments under the Term Loan are due as follows:

Fiscal year	(in thousands)
Remainder of fiscal 2019	$ 7,500
2020	17,813
2021	27,187
2022	75,000
Total	$ 127,500

As of October 31, 2018, the Company had $133.8 million outstanding balance, net of debt issuance costs, under the Term Loan, of which $120.0 million was classified as long-term liabilities, and $330.0 million outstanding balance under the Revolver.

The total outstanding balance of the Revolver as of April 30, 2019 was $150.0 million, which was included in short-term liabilities. The Company expects its borrowings under the Revolver will fluctuate from quarter to quarter. Borrowings bear interest at a floating rate based on a margin over the Company's choice of market observable base rates as defined in the Credit Agreement. As of April 30, 2019, borrowings under the Term Loan bore interest at LIBOR +1.125% and the applicable interest rate for the Revolver was LIBOR +1.000%. In addition, commitment fees are payable on the Revolver at rates between 0.125% and 0.200% per year based on the Company's leverage ratio on the daily amount of the revolving commitment.

The carrying amount of the short-term and long-term debt approximates the estimated fair value. These borrowings under the Credit Agreement have a variable interest rate structure and are classified within Level 2 of the fair value hierarchy.

Note 8. Accumulated Other Comprehensive Income (Loss)

Components of accumulated other comprehensive income (loss), on an after-tax basis where applicable, were as follows:

	As of April 30, 2019	As of October 31, 2018
	(in thousands)	
Cumulative currency translation adjustments	$ (87,233)	$ (89,289)
Unrealized gain (loss) on derivative instruments, net of taxes	(9,487)	(23,888)
Total accumulated other comprehensive income (loss)	$ (96,720)	$ (113,177)

The effect of amounts reclassified out of each component of accumulated other comprehensive income (loss) (AOCI) into net income was as follows:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Reclassifications from AOCI to unaudited condensed consolidated statement of operations:				
Gain (loss) on cash flow hedges, net of taxes				
Revenues	$ 199	$ (169)	$ 363	$ 1,498
Operating expenses	(4,211)	5,711	(8,850)	9,350
Total reclassifications into net income	$ (4,012)	$ 5,542	$ (8,487)	$ 10,848

Note 9. Stock Repurchase Program

The Company's Board of Directors (the Board) previously approved a stock repurchase program pursuant to which the Company was authorized to purchase up to $500.0 million of its common stock, and has periodically replenished the stock repurchase program to such amount. The Board replenished the stock repurchase program up to $500.0 million on April 5, 2018. The program does not obligate the Company to acquire any particular amount of common stock, and the program may be suspended or terminated at any time by the Company's Chief Financial Officer or the Board. The Company repurchases shares to offset dilution caused by ongoing stock issuances from existing equity plans for equity compensation awards and issuances related to acquisitions, and when management believes it is a good use of cash. Repurchases are transacted in accordance with Rule 10b-18 of the Securities Exchange Act of 1934, as amended (the Exchange Act), and may be made through any means including, but not limited to, open market purchases, plans executed under Rule 10b5-1(c) of the Exchange Act and structured transactions. As of April 30, 2019, $195.8 million remained available for further repurchases under the program.

In February 2019, the Company entered into an accelerated share repurchase agreement (the February 2019 ASR) to repurchase an aggregate of $100.0 million of the Company's common stock. Pursuant to the February 2019 ASR, the Company made a prepayment of $100.0 million and received initial share deliveries valued at $80.0 million. The remaining balance of $20.0 million was settled in May 2019. Total shares repurchased under the February 2019 ASR were approximately 0.9 million shares, at an average purchase price of $114.01 per share.

Stock repurchase activities are as follows:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019 (1)	2018	2019 (1)	2018
	(in thousands)			
Total shares repurchased(2)(3)	780	916	1,126	2,902
Total cost of the repurchased shares (3)	$ 80,000	$ 75,000	$ 109,185	$ 255,000
Reissuance of treasury stock	1,486	924	1,843	1,419

(1) Does not include the 97,601 shares and $20.0 million equity forward contract, respectively, from the February 2019 ASR settled in May 2019.

(2) The first quarter of fiscal 2018 includes the settlement of the $20.0 million equity forward contract related to the Company's accelerated share repurchase agreement entered into in September 2017.

(3) The Company also repurchased 0.4 million shares at an average price of $82.61 per share, for an aggregate purchase price of $35.0 million during the second quarter of fiscal 2018.

Note 10. Stock Compensation

The compensation cost recognized in the unaudited condensed consolidated statements of operations for the Company's stock compensation arrangements was as follows:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Cost of products	$ 4,065	$ 3,460	$ 8,191	$ 6,843
Cost of maintenance and service	1,522	1,290	2,981	2,537
Research and development expense	18,115	15,150	36,419	30,546
Sales and marketing expense	7,158	6,875	14,430	13,496
General and administrative expense	6,054	6,190	13,353	11,866
Stock compensation expense before taxes	36,914	32,965	75,374	65,288
Income tax benefit	(6,214)	(6,336)	(12,688)	(12,548)
Stock compensation expense after taxes	$ 30,700	$ 26,629	$ 62,686	$ 52,740

As of April 30, 2019, there was $224.1 million of unamortized share-based compensation expense relating to options and restricted stock units and awards, which is expected to be amortized over a weighted-average period of approximately 2.3 years.

The intrinsic values of equity awards exercised during the periods are as follows:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Intrinsic value of awards exercised	$ 50,426	$ 12,017	$ 58,578	$ 30,792

Note 11. Net Income per Share

The Company computes basic net income per share by dividing net income available to common stockholders by the weighted-average number of common shares outstanding during the period. Diluted net income per share reflects the dilution from potential common shares outstanding, such as stock options and unvested restricted stock units and awards, during the period using the treasury stock method.

The table below reconciles the weighted-average common shares used to calculate basic net income per share with the weighted-average common shares used to calculate diluted net income per share:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands, except per share amounts)			
Numerator:				
Net income	$ 118,210	$ 102,472	$ 271,724	$ 98,781
Denominator:				
Weighted-average common shares for basic net income per share	149,712	149,034	149,500	149,245
Dilutive effect of potential common shares from equity-based compensation	4,192	4,133	3,883	4,419
Weighted-average common shares for diluted net income per share	153,904	153,167	153,383	153,664
Net income per share:				
Basic	$ 0.79	$ 0.69	$ 1.82	$ 0.66
Diluted	$ 0.77	$ 0.67	$ 1.77	$ 0.64
Anti-dilutive employee stock-based awards excluded(1)	49	761	1,538	618

(1) These employee stock-based awards were anti-dilutive for the respective periods and are excluded in calculating diluted net income per share. While such awards were anti-dilutive for the respective periods, they could be dilutive in the future.

Note 12. Segment Disclosure

Certain disclosures are required for operating segments, products and services, geographic areas of operation and major customers. Segment reporting is based upon the “management approach,” i.e., how management organizes the Company’s operating segments for which separate financial information is (1) available and (2) evaluated regularly by the Chief Operating Decision Makers (CODMs) in deciding how to allocate resources and in assessing performance. Synopsys’ CODMs are its two co-Chief Executive Officers.

In prior periods, the Company operated in a single segment. Effective in fiscal 2019, the Company realigned its business to evaluate the results of its Software Integrity business separately from the Company’s traditional EDA and semiconductor IP business. The CODMs now regularly review disaggregated information for the following two reportable segments: (1) Semiconductor & System Design, which includes EDA tools, IP products, system integration solutions and associated services, and (2) Software Integrity, which includes security and quality solutions for software development across many industries. The Company’s historical results have been recast to retrospectively reflect the change from one to two reportable segments.

As a result of the change in reporting structure, financial information provided to and used by the CODMs to assist in making operational decisions, allocating resources, and assessing performance reflects consolidated financial information as well as revenue, adjusted operating income, and adjusted operating margin information for the Semiconductor & System Design and Software Integrity segments, accompanied by disaggregated information relating to revenues by geographic region.

Information by reportable segment was as follows:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Total Segments:				
Revenues	$ 836,242	$ 776,836	$ 1,656,643	$ 1,546,262
Adjusted operating income	209,836	190,116	410,788	386,062
Adjusted operating margin	25%	24 %	25%	25 %
Semiconductor & System Design:				
Revenues	$ 753,055	$ 709,034	$ 1,490,961	$ 1,414,367
Adjusted operating income	201,406	195,741	396,724	394,857
Adjusted operating margin	27%	28 %	27%	28 %
Software Integrity:				
Revenues	$ 83,187	$ 67,802	$ 165,682	$ 131,895
Adjusted operating income	8,430	(5,625)	14,064	(8,795)
Adjusted operating margin	10%	(8)%	8%	(7)%

Certain operating expenses are not allocated to the segments and are managed at a consolidated level. The unallocated expenses managed at a consolidated level, including amortization of intangible assets, stock compensation and other operating expenses, are presented in the table below to provide a reconciliation of the total adjusted operating income from segments to the Company's consolidated operating income:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Total segment adjusted operating income	$ 209,836	$ 190,116	$ 410,788	$ 386,062
Reconciling items:				
Amortization of intangible expense	(25,197)	(31,186)	(53,424)	(59,733)
Stock-based compensation expense	(36,914)	(32,965)	(75,374)	(65,288)
Other	(32,223)	1,049	(19,074)	(26,309)
Total operating income	$ 115,502	$ 127,014	$ 262,916	$ 234,732

The CODMs do not use total assets by segment to evaluate segment performance or allocate resources. As a result, total assets by segment are not required to be disclosed.

Revenue by Geography

The CODMs consider where individual “seats” or licenses to the Company’s products are located in allocating revenue to particular geographic areas. Revenue is defined as revenues from external customers. Revenues related to operations in the United States and other geographic areas were:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Revenue:				
United States	$ 416,744	$ 376,636	$ 824,543	$ 761,210
Europe	83,542	97,014	167,428	182,479
Japan	72,703	70,435	137,776	138,824
Asia-Pacific and Other	263,253	232,751	526,896	463,749
Consolidated	$ 836,242	$ 776,836	$ 1,656,643	$ 1,546,262

Geographic revenue data for multi-region, multi-product transactions reflect internal allocations and are therefore subject to certain assumptions and the Company's methodology.

For the three and six months ended April 30, 2019 and 2018, one customer, including its subsidiaries, through multiple agreements accounted for greater than 10% of the Company's total revenues.

Note 13. Other Income (Expense), net

The following table presents the components of other income (expense), net:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Interest income	$ 1,927	$ 927	$ 3,491	$ 2,563
Interest expense	(3,841)	(3,880)	(8,394)	(6,723)
Gain (loss) on assets related to executive deferred compensation plan assets	16,226	(7,245)	20,515	6,195
Foreign currency exchange gain (loss)	2,718	1,117	2,302	98
Other, net	1,385	1,366	142	2,537
Total	$ 18,415	$ (7,715)	$ 18,056	$ 4,670

Note 14. Taxes

Effective Tax Rate

The Company estimates its annual effective tax rate at the end of each fiscal quarter. The effective tax rate takes into account the Company's estimations of annual pre-tax income, the geographic mix of pre-tax income and interpretations of tax laws and possible outcomes of audits.

The following table presents the provision (benefit) for income taxes and the effective tax rates:

	Three Months Ended April 30,		Six Months Ended April 30,	
	2019	2018	2019	2018
	(in thousands)			
Income before income taxes	$ 133,917	$ 119,299	$ 280,972	$ 239,402
Provision (benefit) for income taxes	$ 15,707	$ 16,827	$ 9,248	$ 140,621
Effective tax rate	11.7%	14.1%	3.3%	58.7%

The Tax Cuts and Jobs Act (Tax Act), enacted on December 22, 2017, lowered the statutory federal corporate income tax rate from 35% to 21% effective on January 1, 2018. Beginning in the Company's fiscal 2019, the annual statutory federal corporate tax rate is 21%.

The Tax Act includes certain new tax provisions listed below which apply to the Company beginning in fiscal 2019.

- A tax on global intangible low-tax income (GILTI), which is determined annually based on the Company's aggregate foreign subsidiaries' income in excess of certain qualified business asset investment return. In

the first quarter of fiscal 2019, the Company adopted an accounting policy to account for the tax effects of GILTI in the period that it is subject to such tax.

- A base erosion and anti-abuse tax (BEAT), which functions as a minimum tax that partially disallows deductions for certain related party transactions and certain tax credits.
- A special tax deduction for foreign-derived intangible income (FDII), which, in general, allows a deduction of certain intangible income earned in the U.S. and derived from foreign sources.
- Certain new limitations on the use of foreign tax credits.

In the first and second quarters of 2019, the U.S. Treasury Department issued proposed regulations that could impact the calculation of taxes related to these provisions. While the Company continues to evaluate the potential impact on its estimated annual tax rate, such regulations have not been finalized and are subject to change.

The Company's effective tax rate for the six months ended April 30, 2019 is lower than the statutory federal corporate tax rate of 21.0% primarily due to U.S. federal and California research credits, foreign-derived intangible income deduction, excess tax benefits from stock-based compensation, and a decrease in unrecognized foreign tax benefits, partially offset by state taxes, the effect of non-deductible stock-based compensation, and higher taxes on certain foreign earnings.

The Company's effective tax rate decreased in the three months ended April 30, 2019 as compared to the same period in fiscal 2018, primarily due to increase in excess tax benefits from stock-based compensation offset by an increase in unrecognized foreign tax benefits. The Company's effective tax rate decreased in the six months ended April 30, 2019, as compared to the same periods in fiscal 2018, primarily due to accounting for the effects of the Tax Act in fiscal 2018.

On July 27, 2015, the United States Tax Court (Tax Court) issued an opinion (*Altera Corp. et al. v. Commissioner*) regarding the treatment of stock-based compensation expense in intercompany cost-sharing arrangements. In view of the Tax Court opinion, the Company amended its cost-sharing arrangement effective February 1, 2016 to exclude stock-based compensation expense on a prospective basis and has reflected the corresponding benefits in its income tax expense for fiscal year 2016, 2017 and 2018. On July 24, 2018, the United States Court of Appeals for the Ninth Circuit reversed the decision of the Tax Court, however, subsequently withdrew the decision on August 7, 2018. A rehearing of the case was held on October 16, 2018, but a decision has not yet been issued. As the final resolution with respect to historical cost-sharing of stock-based compensation, and the potential impact on the Company, is unclear, the Company is recording no impact at this time and will continue to monitor developments related to this opinion and the potential impact of those developments on the Company's prior fiscal years. The Company's intercompany cost-sharing arrangement was terminated at the end of fiscal 2018 as part of a tax restructuring.

The timing of the resolution of income tax examinations is highly uncertain, as are the amounts and timing of various tax payments that are part of the settlement process. This could cause large fluctuations in the balance sheet classification of current and non-current assets and liabilities. The Company believes that in the coming 12 months, it is reasonably possible that either certain audits will conclude or the statute of limitations on certain state and foreign income and withholding taxes will expire, or both. Given the uncertainty as to ultimate settlement terms, the timing of payment and the impact of such settlements on other uncertain tax positions, the range of the estimated potential decrease in underlying unrecognized tax benefits is between $0 and $7 million. In addition, a settlement or changes in guidance could result in changes to the Company's valuation allowance.

Intra-Entity Transfers of Assets

In October 2016, the FASB issued ASU 2016-16, "Income Taxes (Topic 740), Intra-Entity Transfers of Assets Other Than Inventory." This ASU requires the immediate recognition of current and deferred income tax effects of intra-entity transfers of assets other than inventory. This ASU was adopted on the first day of fiscal 2019. As a result of the adoption, the Company recorded a decrease of approximately $130.5 million in retained earnings as of the beginning of the period of adoption, with a corresponding decrease in prepaid taxes related to the unamortized tax expense attributed to intra-entity transfers of assets other than inventory previously deferred. The Company will recognize the income tax consequences of new intra-entity transfers of assets other than inventory in the consolidated statement of income in the period when the transaction takes place.

Non-U.S. Examinations

In July 2017, the Hungarian Tax Authority (HTA) issued a final assessment against the Company's Hungarian subsidiary (Synopsys Hungary) for fiscal years 2011 through 2013. The HTA has applied withholding taxes on certain payments made to affiliates, resulting in an aggregate tax assessment of approximately $25.0 million and interest and penalties of $11.0 million (at current exchange rates). On August 2, 2017, Synopsys Hungary filed a claim contesting the final assessment with the Hungarian Administrative Court. In the first quarter of fiscal 2018, Synopsys Hungary paid the assessments, penalties and interest as required by law and recorded these amounts as prepaid taxes on its balance sheet, while continuing its challenge to the assessment through the Hungarian Administrative Court. On April 30, 2019, the Hungarian Administrative Court (Court) ruled against Synopsys Hungary. The Court's opinion was received on May 16, 2019. The Court ruling may be appealed to the Hungarian Supreme Court within 60 days of receipt of the Court's opinion. Synopsys Hungary is evaluating whether to appeal. In the second quarter of 2019, as a result of the Court's decision, the Company recorded a tax expense due to an unrecognized tax benefit of $17.4 million, which is net of estimated U.S. foreign tax credits for the tax assessments.

In the fourth quarter of 2018, the Company made significant changes to its international tax structure by transferring intangible assets between certain foreign subsidiaries, including its Hungarian subsidiary. In the first quarter of fiscal 2019, the Company received a ruling from the Hungarian authorities, which provided guidance on determining the tax associated with the gain recognized on the transfer, resulting in a benefit of $22.8 million recognized in the first quarter of fiscal 2019. The Company recorded an additional benefit of $10.3 million in the second quarter of fiscal 2019 upon the filing of its fiscal 2018 Hungarian return.

The Company was notified of audit by the HTA for fiscal years 2014 through 2018.

In the first quarter of fiscal 2019, the Company reached final settlement with Taiwanese tax authorities for fiscal year 2017 and recognized $5.5 million in previously unrecognized tax benefits.

The Company is also under examination by the tax authorities in certain other jurisdictions. No material assessments have been proposed in these examinations.

Note 15. Contingencies

Legal Proceedings

The Company is subject to routine legal proceedings, as well as demands, claims and threatened litigation that arise in the normal course of its business. The ultimate outcome of any litigation is often uncertain and unfavorable outcomes could have a negative impact on the Company's results of operations and financial condition. The Company regularly reviews the status of each significant matter and assesses its potential financial exposure. If the potential loss from any claim or legal proceeding is considered probable and the amount is estimable, the Company accrues a liability for the estimated loss. Legal proceedings are inherently uncertain and as circumstances change, it is possible that the amount of any accrued liability may increase, decrease, or be eliminated.

The Company has determined that, except as set forth below, no disclosure of estimated loss is required for a claim against the Company because: (1) there is not a reasonable possibility that a loss exceeding amounts already recognized (if any) may be incurred with respect to such claim; (2) a reasonably possible loss or range of loss cannot be estimated; or (3) such estimate is immaterial.

In March 2017, Siemens PLM Software (Siemens) acquired Mentor. On June 29, 2018, the Company, Siemens and Mentor settled all outstanding patent litigation between the Company and Mentor for a $65.0 million payment made from the Company to Mentor. The settlement included mutual seven-year patent cross-licenses between the Company and Siemens, and between the Company and Mentor. The Company and Mentor also amended an existing interoperability agreement to collaborate on a wide range of EDA products for the benefit of their mutual customers. The amendment includes a one-time termination charge between $0.0 and $25.0 million, payable to Mentor under certain conditions. As of April 30, 2019, there has been no change to the status of the contingent charges.

Tax Matters

The Company undergoes examination from time to time by U.S. and foreign authorities for non-income based taxes, such as sales, use and value-added taxes, and is currently under examination by tax authorities in certain jurisdictions. If the potential loss from such examinations is considered probable and the amount or the range of loss could be estimated, the Company would accrue a liability for the estimated expense.

In addition to the foregoing, the Company is, from time to time, party to various other claims and legal proceedings in the ordinary course of its business, including with tax and other governmental authorities. For a description of certain of these other matters, refer to *Note 14. Taxes.*

Note 16. Effect of New Accounting Pronouncements

In February 2016, the FASB issued ASU 2016-2, "Leases (Topic 842)," which supersedes the lease requirements in "Leases (Topic 840)." This ASU requires a lessee to recognize a right-of-use asset and a lease payment liability for most leases in the consolidated balance sheets. This ASU also makes minor changes to lessor accounting and aligns with the new revenue recognition guidance. This ASU will be effective for fiscal 2020, including interim periods within that reporting period, and earlier adoption is permitted. The Company is currently evaluating its lease portfolio and the impact of adoption is expected to be material to the consolidated balance sheets.

Item 2. *Management's Discussion and Analysis of Financial Condition and Results of Operations*

This Quarterly Report on Form 10-Q includes forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the Securities Act) and Section 21E of the Securities Exchange Act of 1934, as amended (the Exchange Act), which are subject to the "safe harbor" created by those sections. Any statements herein that are not statements of historical fact may be deemed to be forward-looking statements. For example, words such as "may," "will," "could," "would," "can," "should," "anticipate," "expect," "intend," "believe," "estimate," "project," "continue," "forecast," or the negatives of such terms, and similar expressions, are intended to identify forward-looking statements. Without limiting the foregoing, forward-looking statements contained in this Quarterly Report on Form 10-Q include, but are not limited to, statements concerning expected growth in the semiconductor and electronics industries, the effects of consolidation among our customers and within the industries in which we operate, our business outlook, our business model, our growth strategy, the ability of our prior acquisitions to drive revenue growth, the sufficiency of our cash, cash equivalents and cash generated from operations, our future liquidity requirements, and other statements that involve certain known and unknown risks, uncertainties and other factors that could cause our actual results, time frames or achievements to differ materially from those expressed or implied in our forward-looking statements. Such risks and uncertainties include, among others, those identified below in Part II, Item 1A. Risk Factors of this Quarterly Report on Form 10-Q. The information included herein represents our estimates and assumptions as of the date of this filing. Unless required by law, we undertake no obligation to update publicly any forward-looking statements, or to update the reasons actual results could differ materially from those anticipated in these forward-looking statements, even if new information becomes available in the future. All subsequent written or oral forward-looking statements attributable to Synopsys or persons acting on our behalf are expressly qualified in their entirety by these cautionary statements. Readers are urged to carefully review and consider the various disclosures made in this Quarterly Report on Form 10-Q and in other documents we file from time to time with the Securities and Exchange Commission (SEC) that attempt to advise interested parties of the risks and factors that may affect our business.

The following summary of our financial condition and results of operations should be read together with our unaudited condensed consolidated financial statements and the related notes thereto contained in Part I, Item 1 of this report and with our audited consolidated financial statements and the related notes thereto contained in our Annual Report on Form 10-K for the fiscal year ended October 31, 2018, as filed with the SEC on December 17, 2018.

Overview

Business Summary

Synopsys, Inc. provides products and services used by designers across the entire silicon to software spectrum, from engineers creating advanced semiconductors to software developers seeking to ensure the security and quality of their code. We are a global leader in supplying the electronic design automation (EDA) software that engineers use to design and test integrated circuits (ICs), also known as chips. We also offer semiconductor intellectual property (IP) products, which are pre-designed circuits that engineers use as components of larger chip designs rather than designing those circuits themselves. We provide software and hardware used to validate the electronic systems that incorporate chips and the software that runs on them. To complement these offerings, we provide technical services and support to help our customers develop advanced chips and electronic systems. We are also a leading provider of software tools and services that improve the security and quality of software code in a wide variety of industries, including electronics, financial services, media, automotive, medicine, energy and industrials.

Our EDA and IP customers are generally semiconductor and electronics systems companies. Our solutions help these companies overcome the challenges of developing increasingly advanced electronics products while also helping them reduce their design and manufacturing costs. While our products are an important part of our customers' development process, our sales could be affected based on their research and development budgets, and our customers' spending decisions may be affected by their business outlook and willingness to invest in new and increasingly complex chip designs. In addition, a number of consolidations have taken place in the semiconductor and electronics industries over the past several years. While we do not believe customer consolidations have had a material impact on our results, the future impact of potential consolidation remains uncertain. For a discussion of potential risks, please see the risk factor titled "Consolidation among our customers and within the industries in which we operate, as well as our dependence on a relatively small number of large customers, may negatively impact our operating results" in Part II, Item 1A. *Risk Factors*.

Our Software Integrity business delivers products and services that enable software developers to test their code - while it is being written - for known security vulnerabilities and quality defects, as well as testing for open source security vulnerabilities and license compliance. Our Software Integrity customers are software developers across many industries, including, but also well beyond, the semiconductor and systems industries. Our Software Integrity products and services form a platform that helps our customers build security into the software development lifecycle and across the entire cyber supply chain.

Despite global economic uncertainty, we have consistently grown our revenue since 2005. We achieved these results not only because of our solid execution, leading technologies and strong customer relationships, but also because of our time-based revenue business model. Under this model, a substantial majority of our customers pay over time and we typically recognize this revenue over the life of the contract, which averages approximately three years. Time-based revenue consists of time-based products, maintenance and service revenue. The revenue we recognize in a particular period generally results from selling efforts in prior periods rather than the current period. Due to our business model, decreases as well as increases in customer spending do not immediately affect our revenues in a significant way.

Our growth strategy is based on (1) building on our leadership in our EDA products, (2) expanding and proliferating our IP offerings, and (3) driving growth in the software security and quality market. As we continue to expand our product portfolio and our total addressable market, for instance in the software security and quality space, and as hardware product sales grow, we expect to experience increased variability in our total revenue. In addition, due to our adoption of ASC 606 in fiscal 2019, as further described in Note 2 of the *Notes to Unaudited Condensed Consolidated Financial Statements*, the way in which we are required to account for certain types of arrangements will increase the variability in our total revenue from period to period. We expect approximately 80% to 85% of non-hardware revenue to be time-based or recognized over time. The accounting impact of ASC 606 has not affected our cash generation or changed the way we operate our business. Based on our leading technologies, customer relationships, business model, diligent expense management, and acquisition strategy, we believe that we will continue to execute our strategies successfully.

Business Segments

Effective in fiscal 2019, we realigned our business to evaluate the results of our Software Integrity business separately from our traditional EDA and semiconductor IP business. The CODMs now regularly review disaggregated information for the following two reportable segments: (1) Semiconductor & System Design, which includes EDA tools, IP products, system integration solutions and associated services, and (2) Software Integrity, which includes security and quality solutions for software development across many industries. Our historical results have been recast to retrospectively reflect the change from one to two reportable segments.

As a result of the change in reporting structure, financial information provided to and used by the CODMs to assist in making operational decisions, allocating resources and assessing performance reflects consolidated financial information as well as revenue, adjusted operating income, and adjusted operating margin for the Semiconductor & System Design and Software Integrity segments, accompanied by disaggregated information relating to revenues by geographic region.

Semiconductor & System Design. This segment includes our advanced silicon design, verification products and services, and semiconductor IP portfolio, which encompasses products and services that serve companies primarily in the semiconductor and electronics industries. EDA includes digital, custom and Field Programmable Gate Array (FPGA) IC design software, verification products, and manufacturing software products. A large number of our EDA products are used by designers to automate the complex IC design process. For IP, we are a leading provider of high-quality, silicon-proven IP solutions for system-on-chips (SoCs). This includes IP that has been optimized to address specific application requirements for the mobile, automotive, digital home, internet of things, and cloud computing markets, enabling designers to quickly develop SoCs in these areas.

Software Integrity. This segment includes a broad portfolio of products and services such as leading testing technologies, automated analysis, and consulting experts. Beginning in fiscal 2019, we expect to deliver a secure, integrated platform that unites these elements to provide an even more valuable way for developers to better develop personalized approaches for open source license compliance and detect and remediate known security vulnerabilities and quality defects early in the development process, thereby minimizing risk and maximizing productivity.

Fiscal Year End

Our fiscal year ends on the Saturday nearest to October 31 and consists of 52 weeks, with the exception that every five or six years, we have a 53-week year. When a 53-week year occurs, we include the additional week in the first

quarter to realign fiscal quarters with calendar quarters. Fiscal 2019 is a 52-week year and will end on November 2, 2019. Fiscal 2018 was a 53-week year and ended on November 3, 2018.

Our results of operations for the first six months of fiscal 2019 and 2018 included 26 weeks and 27 weeks, respectively, and ended on May 4, 2019 and May 5, 2018, respectively. The extra week in the first quarter of fiscal 2018 resulted in approximately $46 million of additional revenue, and approximately $34 million of additional expenses. For presentation purposes, the unaudited condensed consolidated financial statements and accompanying notes refer to the closest calendar month end.

Financial Performance Summary

We adopted new revenue guidance, ASC 606, at the beginning of fiscal 2019 under the modified retrospective method which has limited the comparability of prior year results in revenue and commission expense. The comparative information for periods prior to the fiscal quarter ended January 31, 2019 has not been restated. Additional comparative information is provided in Note 2 of the *Notes to Unaudited Condensed Consolidated Financial Statements* for the adoption of ASC 606 and our pro-forma financial results under ASC 605 for the three and six months ended April 30, 2019.

The second quarter of fiscal 2019 compared to the same period of fiscal 2018:

- Revenues were $836.2 million, an increase of $59.4 million, or 8%, primarily due to our continued growth both organically and through prior year acquisitions.
- Total cost of revenue and operating expenses were $720.7 million, an increase of $70.9 million, or 11%, primarily due to increases in employee-related costs, resulting from increases in headcount to support business growth and an increase in restructuring charge of $12.3 million.
- Operating income was $115.5 million, a decrease of $11.5 million or 9%.
- The impact of the adoption of ASC 606, compared with ASC 605, decreased our net income by $11.8 million.

Critical Accounting Policies and Estimates

Our discussion and analysis of our financial results under the heading “Results of Operations” below are based on our unaudited condensed consolidated financial statements, which we have prepared in accordance with U.S. GAAP. In preparing these financial statements, we make assumptions, judgments and estimates that can affect the reported amounts of assets, liabilities, revenues and expenses, and net income. On an ongoing basis, we evaluate our estimates based on historical experience and various other assumptions we believe are reasonable under the circumstances. Our actual results may differ from these estimates.

The accounting policies that most frequently require us to make assumptions, judgments and estimates, and therefore are critical to understanding our results of operations, are:

- Revenue recognition;
- Business combinations; and
- Income taxes

Revenue Recognition

Our contracts with customers often include promises to transfer multiple products and services to a customer. Determining whether services and products are considered distinct performance obligations that should be accounted for separately versus together may require significant judgment. We have concluded that our EDA software licenses in TSL contracts are not distinct from our obligation to provide unspecified software updates to the licensed software throughout the license term, because those promises represent inputs to a single, combined performance obligation. Where unspecified additional software product rights are part of the contract with the customer, those rights are accounted for as part of the single performance obligation that includes the licenses, updates, and technical support, because such rights are provided during the same period of time and have the same time-based pattern of transfer to the customer. In reaching this conclusion, we considered the nature of our obligation to customers which is to provide an ongoing right to use the most up to date and relevant software. As EDA customers operate in a rapidly changing and competitive environment, satisfying the obligation requires providing critical updates to the existing software products, including ongoing iterative interaction with customers to make the software relevant to the customers' ability to meet the time to go to market with advanced products.

Business Combinations

We allocate the purchase price of acquired companies to the tangible and intangible assets acquired and liabilities assumed based upon their estimated fair values at the acquisition date. The purchase price allocation process requires management to make significant estimates and assumptions with respect to intangible assets. Although we believe the assumptions and estimates we have made are reasonable, they are based in part on historical experience, market conditions and information obtained from management of the acquired companies and are inherently uncertain. Examples of critical estimates in valuing certain of the intangible assets we have acquired or may acquire in the future include, but are not limited to:

- future expected cash flows from software license sales, subscriptions, support agreements, consulting contracts and acquired developed technologies and patents;
- historical and expected customer attrition rates and anticipated growth in revenue from acquired customers;
- the expected use of the acquired assets; and
- discount rates.

Unanticipated events and circumstances may occur which may affect the accuracy or validity of such assumptions, estimates or actual results.

Income Taxes

We use the asset and liability method of accounting for income taxes. Under this method, income tax expense is recognized for the amount of taxes payable or refundable for the current year. In addition, deferred tax assets and liabilities are recognized for the expected future tax consequences of temporary differences between the financial reporting and tax bases of assets and liabilities, and for operating losses and tax credit carryforwards. Management must make assumptions, judgments and estimates to determine our current provision for income taxes and also our deferred tax assets and liabilities.

Our assumptions, judgments and estimates relative to the current provision for income taxes take into account current tax laws, our interpretation of current tax laws and possible outcomes of current and future audits conducted by foreign and domestic tax authorities. We have established reserves for income taxes to address potential exposures involving tax positions that could be challenged by tax authorities. In addition, we are subject to the continual examination of our income tax returns by the U.S. Internal Revenue Service (IRS) and other domestic and foreign tax authorities. We regularly assess the likelihood of outcomes resulting from these examinations to determine the adequacy of our provision for income taxes and have reserved for potential adjustments that may result from such examinations. We believe such estimates to be reasonable; however, the final determination of any of these examinations could significantly impact the amounts provided for income taxes in our Unaudited Condensed Consolidated Financial Statements.

Results of Operations

We adopted new revenue guidance, ASC 606, at the beginning of fiscal 2019 under the modified retrospective method, which has limited the comparability of prior year results in revenue and commission expense. The comparative information for periods prior to the fiscal quarter ended January 31, 2019 has not been restated. Additional comparative information is provided in Note 2 of the *Notes to Unaudited Condensed Consolidated Financial Statements* for the adoption of ASC 606 and our pro-forma financial results under ASC 605 for the three and six months ended April 30, 2019.

Revenue

Our revenues are generated from two business segments: the Semiconductor & System Design segment and the Software Integrity segment. Refer to Note 12 of the *Notes to Unaudited Condensed Consolidated Financial Statements* for additional information about our reportable segments and revenue by geographic regions.

Further disaggregation of the revenues into various products and services within these two segments is summarized as follows:

Semiconductor & System Design Segment

This segment is comprised of the following:

- EDA software includes digital, custom and Field Programmable Gate Array (FPGA) IC design software, verification products and obligations to provide unspecified updates and support services. EDA products and services are typically sold through TSL arrangements that grant customers the right to access and use all of the licensed products at the outset of an arrangement and software updates are generally made available throughout the entire term of the arrangement, which is typically three years. Under ASC 606, we have concluded that the software licenses in TSL contracts are not distinct from the obligation to provide unspecified software updates to the licensed software throughout the license term, because the multiple software licenses represent inputs to a single, combined offering, and timely, relevant software updates are integral to maintaining the utility of the software licenses. We recognize revenue for the combined performance obligation under TSL contracts ratably over the term of the license. Under ASC 605, these arrangements were recognized ratably over the contract term.
- IP & System Integration includes our DesignWare® IP portfolio and system-level products and services. Under ASC 606, these arrangements generally have two performance obligations which consist of transferring of the licensed IP and providing related support, which includes rights to technical support and software updates that are provided over the support term and are transferred to the customer over a time. Revenue allocated to the IP licenses is recognized at a point in time upon the later of the delivery date or the beginning of the license period, and revenue allocated to support is recognized over the support term. Royalties are recognized as revenue in the quarter in which the applicable customer sells its products that incorporate our IP. Payments for IP contracts are generally received upon delivery of the IP. Revenue related to the customization of certain IP is recognized as “Professional Services.” Under ASC 605, we recognized revenues ratably for certain IP licensing and support arrangements.
- In the case of Hardware products, we generally have two performance obligations in arrangements involving the sale of hardware products. The first performance obligation is to transfer the hardware product, which includes software integral to the functionality of the hardware product. The second performance obligation is to provide maintenance on the hardware and its embedded software, which includes rights to technical support, hardware repairs and software updates that are all provided over the same term and have the same time-based pattern of transfer to the customer. The portion of the transaction price allocated to the hardware product is generally recognized as revenue at the time of delivery because the customer obtains control of the product at that point in time. We have concluded that control generally transfers at that point in time because the customer has title to the hardware, physical possession, and a present obligation to pay for the hardware. The portion of the transaction price allocated to the maintenance obligation is recognized as revenue ratably over the maintenance term. The adoption of ASC 606 did not change the timing of revenue recognition for hardware products.
- Revenue from Professional Service contracts is recognized over time, generally using costs incurred or hours expended to measure progress. We have a history of reasonably estimating project status and the costs necessary to complete projects. A number of internal and external factors can affect these estimates, including labor rates, utilization and efficiency variances and specification and testing

requirement changes. The adoption of ASC 606 did not change from ASC 605 the timing of revenue recognition for professional services.

Software Integrity Segment

- We sell Software Integrity products in arrangements that provide customers the right to software licenses, maintenance updates and technical support. Over the term of these arrangements, the customer expects us to provide integral maintenance updates to the software licenses, which help customer's protect their own software from new critical quality defects and potential security vulnerabilities. The licenses and maintenance updates serve together to fulfill our commitment to the customer as both work together to provide the functionality to the customer and represent a combined performance obligation. We will recognize revenue for the combined performance obligation over the term of the arrangement.

Most of our customer arrangements are complex, involving hundreds of products and various license rights, and our customers bargain with us over many aspects of these arrangements. For example, they often demand a broader portfolio of solutions, support and services and seek more favorable terms such as expanded license usage, future purchase rights and other unique rights at an overall lower total cost. No single factor typically drives our customers' buying decisions, and we compete on all fronts to serve customers in a highly competitive market. Customers generally negotiate the total value of the arrangement rather than just unit pricing or volumes.

Total Revenue

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended				
Semiconductor & System Design Segment	$ 753.0	$ 709.0	$ 44.0	6%
Software Integrity Segment	83.2	67.8	15.4	23%
Total	$ 836.2	$ 776.8	$ 59.4	8%
Six months ended				
Semiconductor & System Design Segment	$ 1,490.9	$ 1,414.4	$ 76.5	5%
Software Integrity Segment	165.7	131.9	33.8	26%
Total	$ 1,656.6	$ 1,546.3	$ 110.3	7%

The overall growth of our business, including contributions from acquisitions, has been the primary driver of the increase in our revenue. Our revenues are subject to fluctuations, primarily due to customer requirements, including payment terms and the timing and value of contract renewals. For example, we experience variability in our revenue due to factors such as the timing of IP consulting projects, royalties, variability in hardware sales, and due to certain contracts where revenue is recognized when customer installment payments are due. As revenue from hardware sales is recognized upfront, customer demand and timing requirements for such hardware may result in increased variability of our total revenue.

The increase in total revenue for the three and six months ended April 30, 2019 compared to the same periods in fiscal 2018 was primarily attributable to the business growth in all product categories. In addition, total revenue recognized under new revenue standard ASC 606 was slightly higher compared with revenue recognized under old revenue standard ASC 605 for the six months ended April 30, 2019. The increase for the six-month period was partially offset by one extra week of approximately $46 million additional revenue in the first quarter of fiscal 2018.

Time-Based Products Revenue

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended	$ 558.3	$ 556.8	$ 1.5	— %
Percentage of total revenue	67%	72%		
Six months ended	$ 1,112.0	$ 1,127.7	$ (15.7)	(1)%
Percentage of total revenue	67%	73%		

The time-based products revenue for the three months ended April 30, 2019 compared to the same period in fiscal 2018 increased slightly due to an increase in TSL license revenue from arrangements booked in prior periods, offset by the impact of lower revenue recognized under ASC 606 of $86.8 million.

The time-based products revenue for the six months ended April 30, 2019 compared to the same period in fiscal 2018 decreased by $15.7 million due to the impact of lower revenue recognized under ASC 606 of $102.6 million and the extra week of revenue in the first quarter of fiscal 2018, offset by an increase in TSL license revenue from arrangements booked in prior periods.

Upfront Products Revenue

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended	$ 143.4	$ 100.0	$ 43.4	43%
Percentage of total revenue	17%	13%		
Six months ended	$ 273.9	$ 191.6	$ 82.3	43%
Percentage of total revenue	17%	12%		

Changes in upfront products revenue are generally attributable to normal fluctuations in customer requirements, which can drive the amount of upfront orders and revenue in any particular period.

The increase in upfront products revenue for the three months ended April 30, 2019 compared to the same period in fiscal 2018 was primarily due to higher upfront revenue under ASC 606 of $61.1 million, partially offset by lower hardware shipments. The increase in upfront products revenue for the six months ended April 30, 2019 compared to the same period in fiscal 2018 was primarily due to higher upfront revenue under ASC 606 of $77.8 million and an increase in the sale of IP products.

Upfront products revenue as a percentage of total revenue will likely fluctuate based on the timing of IP products and hardware sales. Such fluctuations will continue to be impacted by the timing of shipments due to customer requirements.

Maintenance and Service Revenue

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended				
Maintenance revenue	$ 39.4	$ 24.2	$ 15.2	63 %
Professional services and other revenue	95.1	95.9	(0.8)	(1)%
Total maintenance and service revenue	$ 134.5	$ 120.1	$ 14.4	12 %
Percentage of total revenue	16%	15%		
Six months ended				
Maintenance revenue	$ 94.8	$ 49.5	$ 45.3	92 %
Professional services and other revenue	175.9	177.5	(1.6)	(1)%
Total maintenance and service revenue	$ 270.7	$ 227.0	$ 43.7	19 %
Percentage of total revenue	16%	15%		

The increase in maintenance revenue for the three and six months ended April 30, 2019 compared to the same periods in fiscal 2018 was primarily due to higher revenue under ASC 606 of $9.4 million and $30.8 million, respectively, and an increase in the volume of arrangements that include maintenance.

The decrease in professional services and other revenue for the three and six months ended April 30, 2019 compared to the same periods in fiscal 2018 was primarily due to the timing of IP customization and consulting projects that are accounted for using the percentage of completion method. The decrease for the six-month period was also attributable to the impact of the extra week in the first quarter of fiscal 2018.

Cost of Revenue

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended				
Cost of products revenue	$ 116.0	$ 108.2	$ 7.8	7 %
Cost of maintenance and service revenue	59.8	50.1	9.7	19 %
Amortization of intangible assets	14.9	20.5	(5.6)	(27)%
Total	$ 190.7	$ 178.8	$ 11.9	7 %
Percentage of total revenue	23%	23%		
Six months ended				
Cost of products revenue	$ 232.6	$ 219.6	$ 13.0	6 %
Cost of maintenance and service revenue	118.6	100.9	17.7	18 %
Amortization of intangible assets	32.3	39.5	(7.2)	(18)%
Total	$ 383.6	$ 360.0	$ 23.6	7 %
Percentage of total revenue	23%	23%		

We divide cost of revenue into three categories: cost of products revenue, cost of maintenance and service revenue, and amortization of intangible assets. We segregate expenses directly associated with consulting and training services from cost of products revenue associated with internal functions providing license delivery and post-customer contract support services. We then allocate these group costs between cost of products revenue and cost of maintenance and service revenue based on products and maintenance and service revenue reported.

Cost of products revenue. Cost of products revenue includes costs related to products sold and software licensed, allocated operating costs related to product support and distribution costs, royalties paid to third-party vendors, and the amortization of capitalized research and development costs associated with software products that had reached technological feasibility.

Cost of maintenance and service revenue. Cost of maintenance and service revenue includes operating costs related to maintaining the infrastructure necessary to operate our services and costs to deliver our consulting

services, such as hotline and on-site support, production services and documentation of maintenance updates. We expect our cost of maintenance and service revenue to increase in future periods because of recent acquisitions, but we do not expect the impact to be material to our total cost of revenue.

Amortization of intangible assets. Amortization of intangible assets, which is recorded to cost of revenue and operating expenses, includes the amortization of core/developed technology, trademarks, trade names, customer relationships, covenants not to compete related to acquisitions and certain contract rights related to acquisitions.

The increase in cost of revenue for the three months ended April 30, 2019 compared to the same period in fiscal 2018 was primarily due to an increase of $10.7 million in personnel-related costs as a result of headcount increases and an increase of $4.5 million in consulting arrangements; partially offset by a decrease of $2.9 million in hardware product costs due to timing of shipments.

The increase in cost of revenue for the six months ended April 30, 2019 compared to the same period in fiscal 2018 was primarily due to an increase of $18.0 million in personnel-related costs as a result of headcount increases including organic hiring and those from prior year acquisitions, and an increase of $8.1 million in consulting arrangements; partially offset by $4.5 million due to one additional week of costs in the first quarter of fiscal 2018.

Changes in other cost of revenue categories for the above-mentioned periods were not individually material.

Operating Expenses

Research and Development

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended	$ 290.3	$ 252.1	$ 38.2	15%
Percentage of total revenue	35%	32%		
Six months ended	$ 561.6	$ 516.5	$ 45.1	9%
Percentage of total revenue	34%	33%		

The increase in research and development expenses for the three months ended April 30, 2019 compared to the same period in fiscal 2018 was primarily due to an increase of $28.6 million in personnel-related costs as a result of headcount increases and an increase of $6.4 million in functionally allocated expenses.

The increase in research and development expenses for the six months ended April 30, 2019 compared to the same period in fiscal 2018 was primarily due to an increase of $44.7 million in personnel-related costs as a result of headcount increases, including organic hiring and those from prior year acquisitions, an increase of $10.6 million in functionally allocated expenses, and an increase of $5.8 million in consultants and contractor costs; partially offset by an additional week of expenses of approximately $19.3 million in the first quarter of fiscal 2018.

Changes in other research and development expense categories for the above-mentioned periods were not individually material.

Sales and Marketing

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended	$ 158.7	$ 147.2	$ 11.5	8%
Percentage of total revenue	19%	19%		
Six months ended	$ 314.6	$ 297.7	$ 16.9	6%
Percentage of total revenue	19%	19%		

The increase in sales and marketing expenses for the three and six months ended April 30, 2019 compared to the same periods in fiscal 2018 was primarily due to an increase of $8.8 million and $16.4 million, respectively, in personnel-related costs as a result of headcount increases. The increase for the six-month period was partially offset by an additional week of expenses of approximately $5.8 million in the first quarter of fiscal 2018. Adoption of

ASC 606 resulted in a lower commission expense of $1.9 million and 13.1 million, respectively, for the three and six months ended April 30, 2019.

Changes in other sales and marketing expense categories for the above-mentioned periods were not individually material.

General and Administrative

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended	$ 56.4	$ 58.8	$ (2.4)	(4)%
Percentage of total revenue	7%	8%		
Six months ended	$ 98.4	$ 115.2	$ (16.8)	(15)%
Percentage of total revenue	6%	7%		

The decrease in general and administrative expenses for the three months ended April 30, 2019 compared to the same period in fiscal 2018 was primarily due to an additional $11.7 million general and administrative expenses allocated to other functions, and a decrease of $4.2 million in professional services costs; partially offset by a $4.3 million increase in personnel-related costs, a $5.8 million increase in facility costs, and a $3.5 million increase in depreciation expenses.

The decrease in general and administrative expenses for the six months ended April 30, 2019 compared to the same period in fiscal 2018 was primarily due to an additional $19.5 million general and administrative expenses allocated to other functions, a legal settlement in our favor of $18.3 million, as well as an additional week of expenses of approximately $4.1 million in the first quarter of fiscal 2018. The decreases were partially offset by a $7.0 million increase in personnel-related costs, a $9.4 million increase in facility costs, and a $5.7 million increase in depreciation expenses.

Changes in other general and administrative expense categories for the above-mentioned periods were not individually material.

Amortization of Intangible Assets

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended				
Included in cost of revenue	$ 14.9	$ 20.5	$ (5.6)	(27)%
Included in operating expenses	10.3	10.7	(0.4)	(4)%
Total	$ 25.2	$ 31.2	$ (6.0)	(19)%
Percentage of total revenue	3%	4%		
Six months ended				
Included in cost of revenue	$ 32.3	$ 39.5	$ (7.2)	(18)%
Included in operating expenses	21.1	20.3	0.8	4 %
Total	$ 53.4	$ 59.8	$ (6.4)	(11)%
Percentage of total revenue	3%	4%		

Amortization of intangible assets for the three and six months ended April 30, 2019 compared to the same periods in fiscal 2018 decreased primarily due to intangible assets that were fully amortized, partially offset by additions of acquired intangible assets in fiscal 2018. See Note 3 of the *Notes to Unaudited Condensed Consolidated Financial Statements* for a schedule of future amortization amounts.

Restructuring Charges

In the second quarter of fiscal 2019, our management approved, committed and initiated a restructuring plan as part of a business reorganization. Total charges under this realignment are expected to be $35 million to $65 million and consist primarily of severance, termination, and retirement benefits under the 2019 Voluntary Retirement Program

(VRP). The actual total charges will depend, in part, on the number of eligible employees to accept offers of our VRP. Payments of these restructuring charges are anticipated to be completed by the second quarter of fiscal 2020. During the three and six months ended April 30, 2019, we incurred restructuring charges of approximately $14.4 million as part of a business realignment under both the 2019 VRP and the 2018 restructuring plan. The outstanding balance as of April 30, 2019 was $7.0 million recorded in accounts payable and accrued liabilities as payroll and related benefits.

During the three and six months ended April 30, 2018, we incurred restructuring charges of approximately $1.8 million as part of a business realignment under the 2018 restructuring plan. See Note 6 of the *Notes to Unaudited Condensed Consolidated Financial Statements* for additional information related to our restructuring charges.

Other Income (Expense), net

	April 30,			
	2019	2018	$ Change	% Change
	(dollars in millions)			
Three months ended				
Interest income	$ 1.9	$ 0.9	$ 1.0	111 %
Interest (expense)	(3.8)	(3.9)	0.1	(3)%
Gain (loss) on assets related to executive deferred compensation plan	16.2	(7.2)	23.4	(325)%
Foreign currency exchange gain (loss)	2.7	1.1	1.6	145 %
Other, net	1.4	1.4	—	— %
Total	$ 18.4	$ (7.7)	$ 26.1	(339)%
Six months ended				
Interest income	$ 3.5	$ 2.6	$ 0.9	35 %
Interest (expense)	(8.4)	(6.7)	(1.7)	25 %
Gain (loss) on assets related to executive deferred compensation plan	20.5	6.2	14.3	231 %
Foreign currency exchange gain (loss)	2.3	0.1	2.2	2,200 %
Other, net	0.2	2.5	(2.3)	(92)%
Total	$ 18.1	$ 4.7	$ 13.4	285 %

Other income (expense), net, for the three and six months ended April 30, 2019 were higher compared to the same periods in fiscal 2018, primarily due to higher gains in the market value of our executive deferred compensation plan assets and higher gains in foreign currency exchange.

Segment Operating Results

We do not allocate certain operating expenses managed at a consolidated level to our reportable segments. These unallocated expenses consist primarily of stock-based compensation expense, amortization of intangible assets, restructuring, litigation and acquisition-related costs. See Note 12 of the *Notes to Unaudited Condensed Consolidated Financial Statements* for more information.

Semiconductor & System Design Segment

	April 30,			
	2019	2018	Change	% Change
	(dollars in millions)			
Three months ended				
Adjusted operating income	$ 201.4	$ 195.7	$ 5.7	3 %
Adjusted operating margin	27%	28%	(1)%	(4)%
Six months ended				
Adjusted operating income	$ 396.7	$ 394.9	$ 1.8	— %
Adjusted operating margin	27%	28%	(1)%	(4)%

The increase in the adjusted operating income for the three and six months ended April 30, 2019 compared to the same periods in fiscal 2018 was primarily due to an increase in revenue. The increase for the three-month period was partially offset by the impact of lower revenue recognized under ASC 606 of $13.3 million. The increase for the six-month period was also due to ASC 606 impact of $4.8 million, partially offset by approximately $12.0 million due to an additional week of operating income in the first quarter of fiscal 2018.

Software Integrity Segment

	April 30,			
	2019	2018	Change	% Change
	(dollars in millions)			
Three months ended				
Adjusted operating income	$ 8.4	$ (5.6)	$ 14.0	(250)%
Adjusted operating margin	10%	(8)%	18%	(225)%
Six months ended				
Adjusted operating income	$ 14.1	$ (8.8)	$ 22.9	(260)%
Adjusted operating margin	8%	(7)%	15%	(214)%

The increase in adjusted operating income for the three and six months ended April 30, 2019 compared to the same periods in fiscal 2018 was primarily due to an increase in revenue. The increase for the three-month period was partially offset by the impact of lower revenue recognized under ASC 606 of $2.9 million. The increase for the six-month period was also due to ASC 606 impact of $1.3 million, partially offset by higher personnel-related costs as a result of the Black Duck acquisition in the first quarter of fiscal 2018.

Taxes

Our effective tax rate decreased in the three months ended April 30, 2019 as compared to the same period in fiscal 2018, primarily due to an increase in excess tax benefits from stock-based compensation offset by an increase in unrecognized foreign tax benefits. Our effective tax rate decreased in the six months ended April 30, 2019, as compared to the same period in fiscal 2018, primarily due to accounting for the effects of the Tax Act in fiscal 2018.

For further discussion of the provision for income taxes and impacts related to the Tax Act, see Note 14 of the *Notes to Unaudited Condensed Consolidated Financial Statements*.

Liquidity and Capital Resources

Our sources of cash and cash equivalents are funds generated from our business operations and funds that may be drawn down under our revolving credit and term loan facilities.

As of April 30, 2019, we held an aggregate of $175.3 million in cash and cash equivalents in the United States and an aggregate of $455.8 million in our foreign subsidiaries. As a result of the Tax Act, if we decide to repatriate the undistributed earnings of our foreign subsidiaries for use in the U.S. in the future, the earnings that are made after December 31, 2017 would not be subject to further U.S. federal tax. We have provided state and foreign deferred taxes on our undistributed earnings sufficient to address the incremental tax that would be due on future foreign earnings.

The following sections discuss changes in our unaudited condensed consolidated balance sheets and statements of cash flows, and other commitments of our liquidity and capital resources during the six months ended April 30, 2019.

Cash and Cash Equivalents

	April 30, 2019	October 31, 2018	$ Change	% Change
	(dollars in millions)			
Cash and cash equivalents	$ 631.2	$ 723.1	$ (91.9)	(13)%

Cash and cash equivalents decreased primarily due to repayment of debt, stock repurchases under our accelerated stock repurchase agreements (the February 2019 ASRs), annual variable compensation payouts, and purchases of

property and equipment. The decrease in cash and cash equivalents was partially offset by cash from our operations and net proceeds from our credit facilities.

Cash Flows

	Six Months Ended April 30,		
	2019	2018	$ Change
	(dollars in millions)		
Cash provided by operating activities	$ 208.8	$ 4.3	$ 204.5
Cash used in investing activities	(66.3)	(679.8)	613.5
Cash (used in) provided by financing activities	(237.6)	192.4	(430.0)

We expect cash from our operating activities to fluctuate as a result of a number of factors, including the timing of our billings and collections, our operating results, and the timing and amount of tax and other liability payments. Cash provided by or used in our operations is dependent primarily upon the payment terms of our license agreements. We generally receive cash from upfront arrangements much sooner than from time-based products revenue, in which the license fee is typically paid either quarterly or annually over the term of the license.

Cash provided by operating activities. Cash provided by operating activities for the six months ended April 30, 2019 was higher compared to the same period in fiscal 2018, primarily driven by higher net income and higher cash collections, partially offset by higher disbursements for operations, including vendors.

Cash used in investing activities. Cash used in investing activities for the six months ended April 30, 2019 was lower compared to the same period in fiscal 2018, primarily due to higher cash paid for acquisitions in fiscal 2018 of $643.5 million.

Cash (used in) provided by financing activities. Cash used in financing activities for the six months ended April 30, 2019 was higher compared to the same period in fiscal 2018, primarily due to higher debt repayments of $296.9 million and lower proceeds of $261.2 million from credit facilities drawdowns, partially offset by lower stock repurchase activities of $125.8 million.

Accounts Receivable, net

	April 30, 2019	October 31, 2018	$ Change	% Change
	(dollars in millions)			
Accounts Receivable, net	$ 526.7	$ 554.2	$ (27.5)	(5)%

Changes in our accounts receivable balance are primarily driven by timing of customer billing, collection activities and to a lesser extent, customer receivables acquired through our acquisitions.

Working Capital

Working capital is comprised of current assets less current liabilities, as shown on our unaudited condensed consolidated balance sheets:

	April 30, 2019	October 31, 2018	$ Change	% Change
	(dollars in millions)			
Current assets	$ 1,643.9	$ 1,543.8	$ 100.1	6 %
Current liabilities	1,732.9	2,102.4	(369.5)	(18)%
Working capital deficit	$ (89.0)	$ (558.6)	$ 469.6	(84)%

Decreases in our working capital deficit were primarily due to a decrease in accounts payable and accrued liabilities of $212.5 million, an increase in prepaid and other current assets of $192.3 million, and a decrease in short-term debt of $178.1 million, partially offset by a decrease in cash and cash equivalents of $91.9 million.

Other Commitments—Credit Facility

In July 2018, we entered into a 220.0 million RMB (approximately $33.0 million) credit agreement with a lender in China to support our facilities expansion. Borrowings bear interest at a floating rate based on the Chinese Central Bank rate plus 10% of such rate. As of April 30, 2019, we had $14.6 million outstanding under the agreement.

On November 28, 2016, we entered into an amended and restated credit agreement with several lenders (the Credit Agreement) providing for (i) a $650.0 million senior unsecured revolving credit facility (the Revolver) and (ii) a $150.0 million senior unsecured term loan facility (the Term Loan). The Credit Agreement amended and restated our previous credit agreement dated May 19, 2015, in order to increase the size of the revolving credit facility from $500.0 million to $650.0 million, to provide a new $150.0 million senior unsecured term loan facility, and to extend the termination date of the revolving credit facility from May 19, 2020 to November 28, 2021. Subject to obtaining additional commitments from lenders, the principal amount of the loans provided under the Credit Agreement may be increased by us by up to an additional $150.0 million. The Credit Agreement contains financial covenants requiring us to operate within a maximum leverage ratio and a minimum interest coverage ratio, as well as other non-financial covenants. As of April 30, 2019, we were in compliance with all financial covenants.

As of April 30, 2019, we had $127.3 million outstanding balance, net of debt issuance costs, under the Term Loan, of which $111.6 million was classified as long-term liabilities. Outstanding principal payments under the Term Loan are due as follows:

Fiscal year	**(in thousands)**
Remainder of fiscal 2019	$ 7,500
2020	17,813
2021	27,187
2022	75,000
Total	$ 127,500

As of October 31, 2018, we had $133.8 million outstanding balance, net of debt issuance costs, under the Term Loan, of which $120.0 million was classified as long-term liabilities, and $330.0 million outstanding balance under the Revolver.

The total outstanding balance of the Revolver as of April 30, 2019 was $150.0 million, which was included in short-term liabilities. We expect the borrowings under the Revolver will fluctuate from quarter to quarter. Borrowings bear interest at a floating rate based on a margin over our choice of market observable base rates as defined in the Credit Agreement. As of April 30, 2019, borrowings under the Term Loan bore interest at LIBOR +1.125% and the applicable interest rate for the Revolver was LIBOR +1.000%. In addition, commitment fees are payable on the Revolver at rates between 0.125% and 0.200% per year based on our leverage ratio on the daily amount of the revolving commitment.

Other

As of April 30, 2019, our cash equivalents consisted of taxable money market mutual funds. We follow an established investment policy and set of guidelines to monitor, manage and limit our exposure to interest rate and credit risk.

We proactively manage our cash equivalents balances and closely monitor our capital and stock repurchase expenditures to ensure ample liquidity. Additionally, we believe the overall credit quality of our portfolio is strong, with our global excess cash equivalents invested in banks and securities with a weighted-average credit rating exceeding AA. The majority of our investments are classified as Level 1 or Level 2 investments, as measured under fair value guidance. See Notes 4 and 5 of the *Notes to Unaudited Condensed Consolidated Financial Statements*.

We believe that our current cash and cash equivalents, cash generated from operations, and available credit under our Revolver will satisfy our routine business requirements for at least the next 12 months and the foreseeable future.

Contractual Obligations

The following table summarizes our contractual obligations as of April 30, 2019:

	Total	Remainder of Fiscal 2019	Fiscal 2020/ Fiscal 2021	Fiscal 2022/ Fiscal 2023	Thereafter	Other
			(in thousands)			
Operating Leases	$ 511,908	$ 30,674	$ 114,536	$ 85,435	$ 281,263	$ —
Purchase Obligations(1)	418,355	173,851	244,228	276	—	—
Other Obligations(2)	279,410	157,685	46,725	75,000	—	—
Long term accrued income taxes(3)	34,667	—	1,429	1,429	5,357	26,452
Total	$1,244,340	$ 362,210	$ 406,918	$ 162,140	$ 286,620	$ 26,452

(1) Purchase obligations represent an estimate of all open purchase orders and contractual obligations in the ordinary course of business as of April 30, 2019. Although open purchase orders are considered enforceable and legally binding, the terms generally allow us the option to cancel, reschedule or adjust our requirements based on our business needs prior to the delivery of goods or performance of services.

(2) These other obligations include our Term Loan, Revolver, a credit facility, and associated fees.

(3) Long-term accrued income taxes represent uncertain tax benefits and transition tax liability as of April 30, 2019. Currently, a reasonably reliable estimate of timing of payments related to uncertain tax benefits in individual years beyond fiscal 2019 cannot be made due to uncertainties in timing of the commencement and settlement of potential tax audits.

The expected timing of payments of the obligations discussed above is estimated based on current information. Timing of payment and actual amounts paid may be different depending on the time of receipt of goods or services or changes to agreed-upon amounts for certain obligations.

Item 3. *Quantitative and Qualitative Disclosures about Market Risk*

See Other Commitments—Credit Facility, Item 2. *Management's Discussion and Analysis of Financial Condition and Results of Operations*, regarding borrowings under our senior unsecured revolving credit facility.

As of April 30, 2019, our exposure to market risk has not changed materially since October 31, 2018. For more information on financial market risks related to changes in interest rates, reference is made to Item 7A. *Quantitative and Qualitative Disclosure about Market Risk* contained in Part II of our Annual Report on Form 10-K for the fiscal year ended October 31, 2018, filed with the SEC on December 17, 2018.

Item 4. *Controls and Procedures*

(a) *Evaluation of Disclosure Controls and Procedures.* As of April 30, 2019, Synopsys carried out an evaluation under the supervision and with the participation of Synopsys' management, including the co-Chief Executive Officers and Chief Financial Officer, of the effectiveness of the design and operation of Synopsys' disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act). There are inherent limitations to the effectiveness of any system of disclosure controls and procedures. Accordingly, even effective disclosure controls and procedures can only provide reasonable, not absolute, assurance of achieving their control objectives. Our co-Chief Executive Officers and Chief Financial Officer have concluded that, as of April 30, 2019, Synopsys' disclosure controls and procedures were effective to provide reasonable assurance that information required to be disclosed in the reports Synopsys files and submits under the Exchange Act is recorded, processed, summarized and reported as and when required, and that such information is accumulated and communicated to Synopsys' management, including the co-Chief Executive Officers and Chief Financial Officer, to allow timely decisions regarding its required disclosure.

(b) *Changes in Internal Control over Financial Reporting.* On November 4, 2018, Synopsys implemented new and modified existing internal controls for the adoption of the new revenue recognition accounting standard, ASC 606. There were no additional changes in Synopsys' internal control over financial reporting during the three months ended April 30, 2019 that have materially affected, or are reasonably likely to materially affect, Synopsys' internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1. *Legal Proceedings*

We are subject to routine legal proceedings, as well as demands, claims and threatened litigation that arise in the normal course of our business. The ultimate outcome of any litigation is often uncertain and unfavorable outcomes could have a negative impact on our results of operations and financial condition. Regardless of outcome, litigation can have an adverse impact on Synopsys because of the defense costs, diversion of management resources and other factors.

We regularly review the status of each significant matter and assess its potential financial exposure. If the potential loss from any claim or legal proceeding is considered probable and the amount is estimable, we accrue a liability for the estimated loss. Legal proceedings are inherently uncertain and as circumstances change, it is possible that the amount of any accrued liability may increase, decrease, or be eliminated.

In July 2017, the Hungarian Tax Authority (HTA) issued a final assessment against Synopsys' Hungarian subsidiary (Synopsys Hungary) for fiscal years 2011 through 2013. The HTA has disallowed Synopsys Hungary's tax positions taken during these years regarding the timing of the deduction of research expenses and applied withholding taxes on certain payments made to affiliates, resulting in an aggregate tax assessment of approximately $44.5 million and interest and penalties of $18.0 million. On August 2, 2017, Synopsys Hungary filed a claim contesting the final assessment with the Hungarian Administrative Court. On November 16, 2017, Synopsys Hungary paid the assessment as required by law, while continuing its challenge to the assessment in court. Hearings were held in February and July 2018, February 26, 2019 and April 30, 2019. On December 10, 2018, Synopsys withdrew its claim contesting the final assessment with regard to the timing of the deduction of research expenses, resulting in a remaining disputed tax assessment of approximately $25.0 million and interest and penalties of $11.0 million. On April 30, 2019, the Hungarian Administrative Court (Court) ruled against Synopsys Hungary. The Court's opinion was received on May 16, 2019. The Court ruling may be appealed to the Hungarian Supreme Court within 60 days of receipt of the Court's opinion. Synopsys Hungary is evaluating whether to appeal. In the second quarter of 2019, as a result of the Court's decision, the Company recorded a tax expense due to an unrecognized tax benefit of $17.4 million, which is net of estimated U.S. foreign tax credits for the tax assessments.

For further discussion of the Hungary audit, see Note 14 of the *Notes to Unaudited Condensed Consolidated Financial Statements* under the heading "Non-U.S. Examinations."

Item 1A. *Risk Factors*

We describe our risk factors below.

The growth of our business depends primarily on the semiconductor and electronics industries.

The growth of the electronic design automation (EDA) industry as a whole, our EDA and intellectual property (IP) product sales, and to some extent our Software Integrity platform sales, is dependent on the semiconductor and electronics industries. A substantial portion of our business and revenue depends upon the commencement of new design projects by semiconductor manufacturers and their customers. The increasing complexity of designs of systems-on-chips and integrated circuits, and customers' concerns about managing costs, have previously led and in the future could lead to a decrease in design starts and design activity in general, with some customers focusing more on one discrete phase of the design process or opting for less advanced, but less risky, manufacturing processes that may not require the most advanced EDA products. Demand for our products and services could decrease and our financial condition and results of operations could be adversely affected if growth in the semiconductor and electronics industries slows or stalls. Additionally, as the EDA industry matures, consolidation may result in stronger competition from companies better able to compete as sole source vendors. This increased competition may cause our revenue growth rate to decline and exert downward pressure on our operating margins, which may have an adverse effect on our business and financial condition.

Furthermore, the semiconductor and electronics industries have become increasingly complex ecosystems. Many of our customers outsource the manufacture of their semiconductor designs to foundries. Our customers also frequently incorporate third-party IP, whether provided by us or other vendors, into their designs to improve the efficiency of their design process. We work closely with major foundries to ensure that our EDA, IP, and manufacturing solutions are compatible with their manufacturing processes. Similarly, we work closely with other major providers of semiconductor IP, particularly microprocessor IP, to optimize our EDA tools for use with their IP designs and to assure that their IP and our own IP products, which may each provide for the design of separate components on the same chip, work effectively together. If we fail to optimize our EDA and IP solutions for use with major foundries' manufacturing processes or major IP providers' products, or if our access to such foundry processes or third-party IP products is hampered, then our solutions may become less desirable to our customers, resulting in an adverse effect on our business and financial condition.

Consolidation among our customers and within the industries in which we operate, as well as our dependence on a relatively small number of large customers, may negatively impact our operating results.

A number of business combinations, including mergers, asset acquisitions and strategic partnerships, among our customers in the semiconductor and electronics industries have occurred over the last several years, and more could occur in the future. Consolidation among our customers could lead to fewer customers or the loss of customers, increased customer bargaining power, or reduced customer spending on software and services. Furthermore, we depend on a relatively small number of large customers, and on such customers continuing to renew licenses and purchase additional products from us, for a large portion of our revenue. Reduced customer spending or the loss of a small number of customers, particularly our large customers, could adversely affect our business and financial condition. In addition, we and our competitors from time to time acquire businesses and technologies to complement and expand our respective product offerings. If any of our competitors consolidate or acquire businesses and technologies which we do not offer, they may be able to offer a larger technology portfolio, additional support and service capability, or lower prices, which could negatively impact our business and operating results.

Uncertainty in the global economy, and its potential impact on the semiconductor and electronics industries in particular, may negatively affect our business, operating results and financial condition.

While the global economy has shown improvement in recent years, there are still uncertainties surrounding the prospects for growth in many regions. Uncertainty caused by challenging global economic conditions could lead some of our customers to postpone their decision-making, decrease their spending and/or delay their payments to us. Such caution by customers could, among other things, limit our ability to maintain or increase our sales or recognize revenue from committed contracts.

We cannot predict the stability of the economy as a whole or the industries in which we operate. Further economic instability could adversely affect the banking and financial services industry and result in credit downgrades of the banks we rely on for foreign currency forward contracts, credit and banking transactions, and deposit services, or cause them to default on their obligations. There is uncertainty regarding how proposed, contemplated or future changes to the complex laws and regulations governing our industry, the banking and financial services industry,

and the economy could affect our business. In addition, economic conditions could deteriorate in the future, and, in particular, the semiconductor and electronics industries could fail to grow, including as the result of any disruption of international trade relationships. In the event of future improvements in economic conditions for our customers, the positive impact on our revenues and financial results may be deferred due to our business model. Any of the foregoing could cause adverse effects on our business, operating results and financial condition, and could cause our stock price to decline.

Our operating results may fluctuate in the future, which may adversely affect our stock price.

Our operating results are subject to quarterly and annual fluctuations, which may adversely affect our stock price. Our historical results should not be viewed as indicative of our future performance due to these periodic fluctuations.

Many factors may cause our revenue or earnings to fluctuate, including:

- Changes in demand for our products-especially products, such as hardware, generating upfront revenue-due to fluctuations in demand for our customers' products and due to constraints in our customers' budgets for research and development, EDA products and services, and Software Integrity solutions;
- Product competition in the semiconductor and electronics industries, which can change rapidly due to industry or customer consolidation and technological innovation;
- Our ability to innovate and introduce new products and services or effectively integrate products and technologies that we acquire;
- Failures or delays in completing sales due to our lengthy sales cycle, which often includes a substantial customer evaluation and approval process because of the complexity of our products and services;
- Our ability to implement effective cost control measures;
- Our dependence on a relatively small number of large customers, and on such customers continuing to renew licenses and purchase additional products from us, for a large portion of our revenue;
- Changes to the amount, composition and valuation of, and any impairments to or write-offs of, our inventory;
- Changes in the mix of our products sold, as increased sales of our products with lower gross margins, such as our hardware products, may reduce our overall margins;
- Expenses related to our acquisition and integration of businesses and technology;
- Changes in tax rules, as well as changes to our effective tax rate, including the tax effects of infrequent or unusual transactions and tax audit settlements;
- Delays, increased costs or quality issues resulting from our reliance on third parties to manufacture our hardware products, which includes a sole supplier for certain hardware components;
- General economic and political conditions that affect the industries in which we operate, such as disruptions to international trade relationships, including tariffs, export licenses, or other trade barriers affecting our or our suppliers' products; and
- Changes in accounting standards, such as ASC 606, as discussed in Note 2 of the *Notes to Unaudited Condensed Consolidated Financial Statements*, which, for example, could impact the expected realization of our backlog.

The timing of revenue recognition may also cause our revenue and earnings to fluctuate. The timing of revenue recognition is affected by factors that include:

- Cancellations or changes in levels of orders or the mix between upfront products revenue and time-based products revenue;
- Delay of one or more orders for a particular period, particularly orders generating upfront products revenue, such as hardware;
- Delay in the completion of professional services projects that require significant modification or customization and are accounted for using the percentage of completion method;
- Delay in the completion and delivery of IP products in development as to which customers have paid for early access;
- Customer contract amendments or renewals that provide discounts or defer revenue to later periods;
- The levels of our hardware revenues, which are recognized upfront and are primarily dependent upon our ability to provide the latest technology and meet customer requirements, and which may also impact our levels of excess and obsolete inventory expenses;

- Changes in accounting standards, such as ASC 606, as discussed in Note 2 of the *Notes to Unaudited Condensed Consolidated Financial Statements*; and
- Changes in our revenue recognition model.

These factors, or any other factors or risks discussed herein, could negatively impact our revenue or earnings and cause our stock price to decline. Additionally, our results may fail to meet or exceed the expectations of securities analysts and investors, or such analysts may change their recommendation regarding our stock, which could cause our stock price to decline. Our stock price has been, and may continue to be, volatile, which may make it more difficult for our stockholders to sell their shares at a time or a price that is favorable to them.

We operate in highly competitive industries, and if we do not continue to meet our customers' demand for innovative technology at lower costs, our products may become uncompetitive and obsolete, and our business and financial condition may be harmed.

We compete against EDA vendors that offer a variety of products and services, such as Cadence Design Systems, Inc. and Mentor Graphics Corporation (now part of Siemens AG). We also compete with other EDA vendors, including new entrants to the marketplace, that offer products focused on one or more discrete phases of the IC design process. Moreover, our customers internally develop design tools and capabilities that compete with our products, including internal designs that compete with our IP products.

In the area of IP products, we compete against numerous other IP providers as well as our customers' internally developed IP. In the area of software integrity solutions, we compete with numerous other solution providers, many of which focus on specific aspects of software security or quality analysis. We also compete with frequent new entrants, which include start-up companies and more established software companies.

The industries in which we operate are highly competitive and the demand for our products and services is dynamic and depends on a number of factors, including demand for our customers' products, design starts and our customers' budgetary constraints. Technology in these industries evolves rapidly and is characterized by frequent product introductions and improvements as well as changes in industry standards and customer requirements. For example, semiconductor device functionality requirements continually increase while feature widths decrease, substantially increasing the complexity, cost and risk of chip design and manufacturing. At the same time, our customers and potential customers continue to demand an overall lower total cost of design, which can lead to the consolidation of their purchases with one vendor. In order to succeed in this environment, we must successfully meet our customers' technology requirements and increase the value of our products, while also striving to reduce their overall costs and our own operating costs.

We compete principally on the basis of technology, product quality and features (including ease-of-use), license or usage terms, post-contract customer support, interoperability among products, and price and payment terms. Specifically, we believe the following competitive factors affect our success:

- Our ability to anticipate and lead critical development cycles and technological shifts, innovate rapidly and efficiently, improve our existing products, and successfully develop or acquire new products;
- Our ability to offer products that provide both a high level of integration into a comprehensive platform and a high level of individual product performance;
- Our ability to enhance the value of our offerings through more favorable terms such as expanded license usage, future purchase rights, price discounts and other differentiating rights, such as multiple tool copies, post-contract customer support, "re-mix" rights that allow customers to exchange the software they initially licensed for other Synopsys products, and the ability to purchase pools of technology;
- Our ability to compete on the basis of payment terms; and
- Our ability to provide engineering and design consulting for our products.

If we fail to successfully manage these competitive factors, fail to successfully balance the conflicting demands for innovative technology and lower overall costs, or fail to address new competitive forces, our business and financial condition will be adversely affected.

The global nature of our operations exposes us to increased risks and compliance obligations that may adversely affect our business.

We derive roughly half of our revenue from sales outside the United States, and we expect our orders and revenue to continue to depend on sales to customers outside the U.S. In addition, we have continually expanded our non-U.S. operations in the past several years. This strategy requires us to recruit and retain qualified technical and managerial employees, manage multiple remote locations performing complex software development projects and ensure intellectual property protection outside of the U.S. Our international operations and sales subject us to a number of increased risks, including:

- Ineffective or weaker legal protection of intellectual property rights;
- Uncertain economic and political conditions in countries where we do business;
- Difficulties in adapting to cultural differences in the conduct of business, which may include business practices in which we are prohibited from engaging by the Foreign Corrupt Practices Act or other anti-corruption laws;
- Financial risks such as longer payment cycles and difficulty in collecting accounts receivable;
- Inadequate local infrastructure that could result in business disruptions;
- Government trade restrictions, including tariffs, export licenses, or other trade barriers, and changes to existing trade arrangements between various countries;
- Additional taxes, interest, and potential penalties, and uncertainty around changes in tax laws of various countries; and
- Other factors beyond our control such as natural disasters, terrorism, civil unrest, war and infectious diseases.

If any of the foreign economies in which we do business deteriorate or if we fail to effectively manage our global operations, our business and results of operations will be harmed.

As our business volume increases in the Asia Pacific region, there is inherent risk, based on the complex relationships between certain Asian countries and the United States, that political, diplomatic, or military events could result in trade disruptions, including tariffs, trade embargoes, and other trade barriers. A significant trade disruption or the establishment or increase of any trade barrier in any area where we do business could increase the cost of our products, which could adversely impact the margin that we earn on sales; make our products more expensive for customers, which could make our products less competitive and reduce consumer demand; adversely restrict or delay our suppliers of hardware components and products, which could adversely impact our future revenues and financial results; or otherwise have a materially adverse impact on our future revenue and profits, our and our customers' and suppliers' businesses, and our results of operations.

For example, in May 2019, the United States government placed certain entities on the "Entity List," restricting the sale of U.S. technologies to the named entities. As a result of this government action, we are not able to book new business with these entities, and revenue associated with these entities is put "on hold" until either the contract expires, or the restriction is lifted. In response to that action or similar actions taken by the United States, other countries may adopt tariffs and trade barriers that could limit our ability to offer our products and services. Current and potential customers who are concerned by such tariffs or restrictions may respond by developing their own products or replacing our solutions, which would have an adverse effect on our business. Additionally, further political uncertainty surrounding international trade disputes could have a negative impact on consumer confidence and spending, which could adversely impact our business operations.

In addition to tariffs and other trade barriers, our global operations are subject to numerous U.S. and foreign laws and regulations, including those related to anti-corruption, tax, corporate governance, imports and exports, financial and other disclosures, privacy and labor relations. These laws and regulations are complex and may have differing or conflicting legal standards, making compliance difficult and costly. In addition, there is uncertainty regarding how proposed, contemplated or future changes to these complex laws and regulations could affect our business. We may incur substantial expense in complying with the new obligations to be imposed by these laws and regulations, and we may be required to make significant changes in our business operations, all of which may adversely affect our revenues and our business overall. If we violate these laws and regulations we could be subject to fines, penalties or criminal sanctions, and may be prohibited from conducting business in one or more countries. Although we have implemented policies and procedures to help ensure compliance with these laws and regulations, there can be no assurance that our employees, contractors, agents or partners will not violate such laws and regulations. Any violation individually or in the aggregate could have a material adverse effect on our operations and financial condition.

Our financial results are also affected by fluctuations in foreign currency exchange rates. A weakening U.S. dollar relative to other currencies increases expenses of our foreign subsidiaries when they are translated into U.S. dollars in our consolidated statement of operations. Likewise, a strengthening U.S. dollar relative to other currencies, especially the Japanese Yen, reduces revenue of our foreign subsidiaries upon translation and consolidation.

Exchange rates are subject to significant and rapid fluctuations, and therefore we cannot predict the prospective impact of exchange rate fluctuations. Although we engage in foreign currency hedging activity, we may be unable to hedge all of our foreign currency risk, which could have a negative impact on our results of operations.

Cybersecurity threats or other security breaches could compromise sensitive information belonging to us or our customers and could harm our business and our reputation, particularly that of our Software Integrity solutions.

We store sensitive data, including intellectual property, our proprietary business information and that of our customers, and confidential employee information, in our data centers and on our networks. Despite our security measures, our information technology and infrastructure may be vulnerable to attacks by hackers or breached due to employee error, malfeasance or other disruptions that could result in unauthorized disclosure or loss of sensitive information.

For example, in October 2015, we discovered unauthorized third-party access, which had begun in July 2015, to our products and product license files hosted on our SolvNet customer license and product delivery system. We determined that no customer project or design data had been accessed. No personally identifiable information or payment card information is stored on the system. While we identified and closed the method used to gain access, it is possible that our security measures may be circumvented again in the future, and such a breach could harm our business and reputation. The techniques used to obtain unauthorized access to networks, or to sabotage systems, change frequently and generally are not recognized until launched against a target. We may be unable to anticipate these techniques or to implement adequate preventative measures. Furthermore, in the operation of our business we also use third-party vendors that store certain sensitive data, including confidential information about our employees, and these third parties are subject to their own cybersecurity threats. While our standard vendor terms and conditions include provisions requiring the use of appropriate security measures to prevent unauthorized use or disclosure of our data, as well as other safeguards, a breach may still occur. Any security breach of our own or a third-party vendor’s systems could cause us to be non-compliant with applicable laws or regulations, subject us to legal claims or proceedings, disrupt our operations, damage our reputation, and cause a loss of confidence in our products and services, any of which could adversely affect our business.

Our software products, including our hosted solutions as well as our Software Integrity solutions, may also be vulnerable to cyber attack. An attack could disrupt the proper functioning of our software, cause errors in the output of our customers’ work, allow unauthorized access to our or our customers’ proprietary information, and other destructive outcomes. As a result, our reputation could suffer, customers could stop buying our products, we could face lawsuits and potential liability, and our financial performance could be negatively impacted.

We offer Software Integrity solutions. If we fail to identify new and increasingly sophisticated methods of cyber attack, or fail to invest sufficient resources in research and development regarding new threat vectors, our solutions may fail to detect vulnerabilities in our customers’ software code. An actual or perceived failure to identify security flaws may harm the perceived reliability of our solutions, and could result in a loss of customers or sales, or an increased cost to remedy a problem. Furthermore, our growth in the software security and quality testing space may increase our visibility as a security-focused company and may make us a more attractive target for attacks on our own information technology infrastructure. Successful attacks could damage our reputation as a security-focused company and lead to a loss in our customers' or potential customers' confidence in our products.

If we fail to protect our proprietary technology, our business will be harmed.

Our success depends in part upon protecting our proprietary technology. Our efforts to protect our technology may be costly and unsuccessful. We rely on agreements with customers, employees and other third-parties as well as intellectual property laws worldwide to protect our proprietary technology. These agreements may be breached, and we may not have adequate remedies for any breach. Additionally, despite our measures to prevent piracy, other parties may attempt to illegally copy or use our products, which could result in lost revenue. Some foreign countries do not currently provide effective legal protection for intellectual property and our ability to prevent the unauthorized use of our products in those countries is therefore limited. Our trade secrets may also be stolen, otherwise become known, or be independently developed by competitors.

We may need to commence litigation or other legal proceedings, or otherwise incur significant expense, in order to:

- Assert claims of infringement of our intellectual property;
- Defend our products from piracy;
- Protect our trade secrets or know-how; or
- Determine the enforceability, scope and validity of the propriety rights of others.

If we do not obtain or maintain appropriate patent, copyright or trade secret protection, for any reason, or cannot fully defend our intellectual property rights in certain jurisdictions, our business and operating results would be harmed. In addition, intellectual property litigation is lengthy, expensive and uncertain. Legal fees related to such litigation and other expenses to protect our intellectual property will increase our operating expenses and may reduce our net income.

We may not be able to realize the potential financial or strategic benefits of the acquisitions we complete, or find suitable target businesses and technology to acquire, which could hurt our ability to grow our business, develop new products or sell our products.

Acquisitions are an important part of our growth strategy. We have completed a significant number of acquisitions in recent years. We expect to make additional acquisitions in the future, but we may not find suitable acquisition targets or we may not be able to consummate desired acquisitions due to unfavorable credit markets, commercially unacceptable terms, or other risks, which could harm our operating results. Acquisitions are difficult, time-consuming, and pose a number of risks, including:

- Potential negative impact on our earnings per share;
- Failure of acquired products to achieve projected sales;
- Problems in integrating the acquired products with our products;
- Difficulties entering into new markets in which we are not experienced or where competitors may have stronger positions;
- Potential downward pressure on operating margins due to lower operating margins of acquired businesses, increased headcount costs and other expenses associated with adding and supporting new products;
- Difficulties in retaining and integrating key employees;
- Substantial reductions of our cash resources and/or the incurrence of debt;
- Failure to realize expected synergies or cost savings;
- Difficulties in integrating or expanding sales, marketing and distribution functions and administrative systems, including information technology and human resources systems;
- Dilution of our current stockholders through the issuance of common stock as part of the merger consideration;
- Assumption of unknown liabilities, including tax and litigation, and the related expenses and diversion of resources;
- Disruption of ongoing business operations, including diversion of management's attention and uncertainty for employees and customers, particularly during the post-acquisition integration process;
- Potential negative impacts on our relationships with customers, distributors and business partners;
- Exposure to new operational risks, regulations, and business customs to the extent acquired businesses are located in regions where we are not currently conducting business;
- The need to implement controls, processes and policies appropriate for a public company at acquired companies that may have lacked such controls, processes and policies;
- Negative impact on our net income resulting from acquisition-related costs; and
- Requirements imposed by government regulators in connection with their review of an acquisition, including required divestitures, required out-licenses of our intellectual property, or restrictions on the conduct of our business or the acquired business.

If we are unable to fully manage the foregoing risks, the acquisitions that we complete may have an adverse effect on our business and financial condition.

We pursue new product and technology initiatives from time to time, and if we fail to successfully carry out these initiatives, our business, financial condition, or results of operations could be adversely impacted.

As part of the evolution of our business, we have made substantial investments to develop new products and enhancements to existing products through our acquisitions and research and development efforts. If we are unable to anticipate technological changes in our industry by introducing new or enhanced products in a timely and cost-effective manner, or if we fail to introduce products that meet market demand, we may lose our competitive position, our products may become obsolete, and our business, financial condition or results of operations could be adversely affected.

Additionally, from time to time, we invest in expansion into adjacent markets. Most recently, we have focused our investment on expansion in the software quality, testing, and security solutions markets. Our success in any new markets into which we invest depends on a variety of factors, including the following:

- Our ability to attract a new customer base, including in industries in which we have less experience;
- Our successful development of new sales and marketing strategies to meet customer requirements;
- Our ability to accurately predict, prepare for, and promptly respond to technological developments in new fields;
- Our ability to compete with new and existing competitors in these new industries, many of which may have more financial resources, industry experience, brand recognition, relevant intellectual property rights, or established customer relationships than we currently do, and could include free and open source solutions that provide similar software quality, testing, and security tools without fees;
- Our ability to skillfully balance our investment in adjacent markets with investment in our existing products and services;
- Our ability to attract and retain employees with expertise in new fields;
- Our ability to sell and support consulting services at profitable margins; and
- Our ability to manage our revenue model in connection with hybrid sales of licensed products and consulting services or other sales methods.

Difficulties in any of our new product development efforts or our efforts to enter adjacent markets could adversely affect our operating results and financial condition.

We may have to invest more resources in research and development than anticipated, which could increase our operating expenses and negatively affect our operating results.

We devote substantial resources to research and development. New competitors, technological advances by our competitors or in the industries in which we operate, our acquisitions, our entry into new markets, or other competitive factors may require us to invest significantly greater resources than we anticipate. If we are required to invest significantly greater resources than anticipated without a corresponding increase in revenue, our operating results could decline. Additionally, our periodic research and development expenses may be independent of our level of revenue, which could negatively impact our financial results. Finally, there can be no guarantee that our research and development investments will result in products that create additional revenue.

Our hardware products, which primarily consist of prototyping and emulation systems, subject us to distinct risks.

The growth in sales of our hardware products subjects us to several risks, including:

- Increased dependence on a sole supplier for certain hardware components, which may reduce our control over product quality and pricing and may lead to delays in production and delivery of our hardware products, should our supplier fail to deliver sufficient quantities of acceptable components in a timely fashion;
- Increasingly variable revenue and decreasingly accurate revenue forecasts, due to fluctuations in hardware revenue, which is recognized upfront upon shipment, as opposed to most sales of software products for which revenue is recognized over time;
- Overall reductions in margins, as the gross margin for our hardware products is typically lower than those of our software products;
- Longer sales cycles, which create risks of insufficient, excess or obsolete inventory and variations in inventory valuation, which can adversely affect our operating results;
- Decreases or delays in customer purchases in favor of next-generation releases, which may lead to excess or obsolete inventory or require us to discount our older hardware products; and
- Longer warranty periods than those of our software products, which may require us to replace hardware components under warranty, thus increasing our costs.

Changes in United States Generally Accepted Accounting Principles (U.S. GAAP) could adversely affect our financial results and may require significant changes to our internal accounting systems and processes.

We prepare our consolidated financial statements in conformity with U.S. GAAP. These principles are subject to interpretation by the Financial Accounting Standards Board (FASB), the Securities and Exchange Commission (SEC) and various bodies formed to interpret and create appropriate accounting principles and guidance.

The FASB periodically issues new accounting standards on a variety of topics, including, for example, revenue recognition and accounting for leases. For information regarding new accounting standards, please refer to Note 2 under the heading "Summary of Significant Accounting Policies" and Note 16 under the heading "Effect of New Accounting Pronouncements" in the *Notes to Unaudited Condensed Consolidated Financial Statements.* These and other such standards generally result in different accounting principles, which may significantly impact our reported results or could result in variability of our financial results. For example, the new revenue recognition standard is applicable to us in fiscal 2019 and could lead to increased volatility in our total revenue, as some of our revenue may be recognized in different periods and with less predictability than is the case under current accounting standards.

Our results could be adversely affected by a change in our effective tax rate as a result of tax law changes and related new or revised guidance and regulations, changes in our geographical earnings mix, unfavorable government reviews of our tax returns, material differences between our forecasted and actual annual effective tax rates, future changes to our tax structure, or by evolving enforcement practices.

Our operations are subject to income and transaction taxes in the United States and in multiple foreign jurisdictions. Because we have a wide range of statutory tax rates in the multiple jurisdictions in which we operate, any changes in our geographical earnings mix, including those resulting from our intercompany transfer pricing or from changes in the rules governing transfer pricing, could materially impact our effective tax rate. Furthermore, a change in the tax law of the jurisdictions where we do business, including an increase in tax rates or an adverse change in the treatment of an item of income or expense, could result in a material increase in our tax expense and impact our financial position and cash flows.

On December 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act (Tax Act), which significantly changed prior U.S. tax law and includes numerous provisions that affect our business. The Tax Act includes certain new provisions that began to affect our income from foreign operations in the first quarter of fiscal 2019. The applicability and impact of these new tax provisions is dependent in part on changes to our tax structure that were implemented in response to the Tax Act at the end of fiscal 2018. The net impact of such changes is uncertain, and could adversely affect our tax rate and cash flow in future years. In the first quarter of fiscal 2019, the U.S. Treasury Department issued proposed regulations that, if finalized as written, would have a material impact on our ability to claim certain tax benefits related to the Tax Act. While the Company continues to evaluate the potential impact on its estimated annual tax rate, certain of these regulations have not been finalized and are subject to change. As additional regulations and guidance evolve with respect to the Tax Act, and as we gather more information and perform more analysis, our results may materially differ from previous estimates, and those differences may materially affect our financial position.

Further changes in the tax laws of foreign jurisdictions could arise as a result of the base erosion and profit shifting (BEPS) project undertaken by the Organisation for Economic Co-operation and Development (OECD), which represents a coalition of member countries. On October 5, 2015, the OECD issued a series of reports recommending changes to numerous long-standing tax principles. Many of these recommendations have been adopted by various countries in which we do business and may increase our taxes in these countries. Changes to these and other areas in relation to international tax reform, including future actions taken by foreign governments in response to the Tax Act, could increase uncertainty and may adversely affect our tax rate and cash flow in future years.

Our income and non-income tax filings are subject to review or audit by the Internal Revenue Service and state, local and foreign taxing authorities. We exercise significant judgment in determining our worldwide provision for income taxes and, in the ordinary course of our business, there may be transactions and calculations where the ultimate tax determination is uncertain. We are also liable for potential tax liabilities of businesses we acquire, including future taxes payable related to the transition tax on earnings from their foreign operations, if any, under the Tax Act. Although we believe our tax estimates are reasonable, the final determination in an audit may be materially different than the treatment reflected in our historical income tax provisions and accruals. An assessment of additional taxes because of an audit could adversely affect our income tax provision and net income in the periods for which that determination is made.

In July 2017, the Hungarian Tax Authority (HTA) issued a final assessment against our Hungarian subsidiary (Synopsys Hungary) for fiscal years 2011 through 2013. The HTA has applied withholding taxes on certain payments made to affiliates, resulting in an aggregate tax assessment of approximately $25.0 million and interest and penalties of $11.0 million. We paid the tax assessments, penalties and interest in the first quarter of fiscal 2018 as required by law and recorded these amounts as prepaid taxes on our balance sheet. On April 30, 2019, the Hungarian Administrative Court ruled against Synopsys Hungary. For further discussion of the Hungary audit, see

Note 14 of the *Notes to Unaudited Condensed Consolidated Financial Statements* under the heading "Non-U.S. Examinations."

We maintain significant deferred tax assets related to certain tax credits. Our ability to use these credits is dependent upon having sufficient future taxable income in the relevant jurisdiction and in the case of foreign tax credits, how such credits are treated under provisions of the Tax Act. Changes in our forecasts of future income could result in an adjustment to the deferred tax asset and a related charge to earnings that could materially affect our financial results.

Liquidity requirements in our U.S. operations may require us to raise cash in uncertain capital markets, which could negatively affect our financial condition.

As of April 30, 2019, approximately 72% of our worldwide cash and cash equivalents balance is held by our international subsidiaries. We intend to meet our U.S. cash spending needs through our existing U.S. cash balances, ongoing U.S. cash flows, and available credit under our term loan and revolving credit facilities. Should our cash spending needs in the U.S. rise and exceed these liquidity sources, we may be required to incur additional debt at higher than anticipated interest rates or access other funding sources, which could negatively affect our results of operations, capital structure or the market price of our common stock.

From time to time we are subject to claims that our products infringe on third-party intellectual property rights.

We are from time to time subject to claims alleging our infringement of third-party intellectual property rights, including patent rights. Under our customer agreements and other license agreements, we agree in many cases to indemnify our customers if our products infringe a third party's intellectual property rights. Infringement claims can result in costly and time-consuming litigation, require us to enter into royalty arrangements, subject us to damages or injunctions restricting our sale of products, invalidate a patent or family of patents, require us to refund license fees to our customers or to forgo future payments or require us to redesign certain of our products, any one of which could harm our business and operating results.

We may be subject to litigation proceedings that could harm our business.

We may be subject to legal claims or regulatory matters involving stockholder, consumer, employment, customer, supplier, competition, and other issues on a global basis. Litigation is subject to inherent uncertainties, and unfavorable rulings could occur. An unfavorable ruling could include monetary damages or, in cases for which injunctive relief is sought, an injunction prohibiting us from manufacturing or selling one or more products. If we were to receive an unfavorable ruling on a matter, our business and results of operations could be materially harmed. Further information regarding certain of these matters is contained in Part II, Item 1, *Legal Proceedings*.

Product errors or defects could expose us to liability and harm our reputation and we could lose market share.

Software products frequently contain errors or defects, especially when first introduced, when new versions are released, or when integrated with technologies developed by acquired companies. Product errors, including those resulting from third-party suppliers, could affect the performance or interoperability of our products, could delay the development or release of new products or new versions of products and could adversely affect market acceptance or perception of our products. In addition, allegations of manufacturability issues resulting from use of our IP products could, even if untrue, adversely affect our reputation and our customers' willingness to license IP products from us. Any such errors or delays in releasing new products or new versions of products or allegations of unsatisfactory performance could cause us to lose customers, increase our service costs, subject us to liability for damages and divert our resources from other tasks, any one of which could materially and adversely affect our business and operating results.

We may not be able to continue to obtain licenses to third-party software and intellectual property on reasonable terms or at all, which may disrupt our business and harm our financial results.

We license third-party software and other intellectual property for use in product research and development and, in several instances, for inclusion in our products. We also license third-party software, including the software of our competitors, to test the interoperability of our products with other industry products and in connection with our professional services. These licenses may need to be renegotiated or renewed from time to time, or we may need to obtain new licenses in the future. Third parties may stop adequately supporting or maintaining their technology, or they or their technology may be acquired by our competitors. If we are unable to obtain licenses to these third-party software and intellectual property on reasonable terms or at all, we may not be able to sell the affected products, our customers' use of the products may be interrupted, or our product development processes and

professional services offerings may be disrupted, which could in turn harm our financial results, our customers, and our reputation.

The inclusion of third-party intellectual property in our products can also subject us and our customers to infringement claims. Although we seek to mitigate this risk contractually, we may not be able to sufficiently limit our potential liability. Regardless of outcome, infringement claims may require us to use significant resources and may divert management's attention.

Some of our products and technology, including those we acquire, may include software licensed under open source licenses. Some open source licenses could require us, under certain circumstances, to make available or grant licenses to any modifications or derivative works we create based on the open source software. Although we have tools and processes to monitor and restrict our use of open source software, the risks associated with open source usage may not be eliminated and may, if not properly addressed, result in unanticipated obligations that harm our business.

If we fail to timely recruit and retain senior management and key employees, our business may be harmed.

We depend in large part upon the services of key members of our senior management team to drive our future success. If we were to lose the services of any member of our senior management team, our business could be adversely affected. To be successful, we must also attract and retain key technical, sales and managerial employees, including those who join us in connection with acquisitions. There are a limited number of qualified EDA and IC design engineers, security experts, and software development engineers, and competition for these individuals is intense and has increased. Our employees are often recruited aggressively by our competitors and our customers. Any failure to recruit and retain key technical, sales and managerial employees could harm our business, results of operations and financial condition. Additionally, efforts to recruit and retain qualified employees could be costly and negatively impact our operating expenses.

We issue equity awards from employee equity plans as a key component of our overall compensation. We face pressure to limit the use of such equity-based compensation due to its dilutive effect on stockholders. If we are unable to grant attractive equity-based packages in the future, it could limit our ability to attract and retain key employees.

Our business is subject to evolving corporate governance and public disclosure regulations that have increased both our compliance costs and the risk of noncompliance, which could have an adverse effect on our stock price.

We are subject to changing rules and regulations promulgated by a number of governmental and self-regulatory organizations, including the SEC, the Nasdaq Stock Market, and the FASB. These rules and regulations continue to evolve in scope and complexity and many new requirements have been created in response to laws enacted by Congress, making compliance more difficult and uncertain. For example, our efforts to comply with the Dodd-Frank Wall Street Reform and Consumer Protection Act and other regulations, including "conflict minerals" regulations affecting our hardware products, have resulted in, and are likely to continue to result in, increased general and administrative expenses and a diversion of management time and attention from revenue-generating activities to compliance activities.

There are inherent limitations on the effectiveness of our controls and compliance programs.

Regardless of how well designed and operated it is, a control system can provide only reasonable assurance that its objectives will be met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. Moreover, although we have implemented compliance programs and compliance training for employees, such measures may not prevent our employees, contractors or agents from breaching or circumventing our policies or violating applicable laws and regulations. Failure of our control systems and compliance programs to prevent error, fraud or violations of law could have a material adverse impact on our business.

Our investment portfolio may be impaired by any deterioration of capital markets.

From time to time, our cash equivalent and short-term investment portfolio consists of investment-grade U.S. government agency securities, asset-backed securities, corporate debt securities, commercial paper, certificates of deposit, money market funds, municipal securities and other securities, and bank deposits. Our investment portfolio carries both interest rate risk and credit risk. Fixed rate debt securities may have their market value adversely impacted due to a credit downgrade or a rise in interest rates, while floating rate securities may produce less income than expected if interest rates fall or a credit downgrade occurs. As a result of capital pressures on certain banks, especially in Europe, and the continuing low interest rate environment, some of our financial instruments may become impaired.

Our future investment income may fall short of expectations due to changes in interest rates or if the decline in fair value of investments held by us is judged to be other-than-temporary. In addition, we may suffer losses in principal if we are forced to sell securities that decline in market value due to changes in the issuer's credit quality or changes in interest rates.

In preparing our financial statements we make certain assumptions, judgments and estimates that affect amounts reported in our consolidated financial statements, which, if not accurate, may significantly impact our financial results.

We make assumptions, judgments and estimates for a number of items, including the fair value of financial instruments, goodwill, long-lived assets and other intangible assets, the realizability of deferred tax assets, the recognition of revenue and the fair value of stock awards. We also make assumptions, judgments and estimates in determining the accruals for employee-related liabilities, including commissions and variable compensation, and in determining the accruals for uncertain tax positions, valuation allowances on deferred tax assets, allowances for doubtful accounts, and legal contingencies. These assumptions, judgments and estimates are drawn from historical experience and various other factors that we believe are reasonable under the circumstances as of the date of the consolidated financial statements. Actual results could differ materially from our estimates, and such differences could significantly impact our financial results.

Catastrophic events may disrupt our business and harm our operating results.

Due to the global nature of our business, our operating results may be negatively impacted by catastrophic events throughout the world. We rely on a global network of infrastructure applications, enterprise applications and technology systems for our development, marketing, operational, support and sales activities. A disruption or failure of these systems in the event of a major earthquake, fire, telecommunications failure, cybersecurity attack, terrorist attack, epidemic, or other catastrophic event could cause system interruptions, delays in our product development and loss of critical data and could prevent us from fulfilling our customers' orders. Moreover, our corporate headquarters, a significant portion of our research and development activities, our data centers, and certain other critical business operations are located in California, near major earthquake faults. A catastrophic event that results in the destruction or disruption of our data centers or our critical business or information technology systems would severely affect our ability to conduct normal business operations and, as a result, our operating results would be adversely affected.

Item 2. *Unregistered Sales of Equity Securities and Use of Proceeds*

In February 2019, we entered into an accelerated share repurchase agreement (the February 2019 ASR) to repurchase an aggregate of $100.0 million of our common stock. Pursuant to the February 2019 ASR, we made a prepayment of $100.0 million and received initial share deliveries valued at $80.0 million. The remaining balance of $20.0 million was settled in May 2019. Total shares repurchased under the February 2019 ASR were approximately 0.9 million shares, at an average purchase price of $114.01 per share.

The table below sets forth information regarding our repurchases of our common stock during the three months ended April 30, 2019:

Period (1)	Total number of shares purchased	Average price paid per share	Total number of shares purchased as part of publicly announced programs	Maximum dollar value of shares that may yet be purchased under the programs (1)
Month #1				
February 3, 2019 through March 9, 2019 (2)	779,500	$ 102.63	779,500	$ 195,815,184
Month #2				
March 10, 2019 through April 6, 2019	—	$ —	—	$ 195,815,184
Month #3				
April 7, 2019 through May 4, 2019	—	$ —	—	$ 195,815,184
Total	779,500	$ 102.63	779,500	$ 195,815,184

(1) As of April 30, 2019, $195.8 million remained available for future repurchases under the program.

(2) The number of shares purchased and average purchase price paid per share does not include the 97,601 shares and $20.0 million equity forward contract, respectively, from the February 2019 ASR settled in May 2019.

See Note 9 of the *Notes to Unaudited Condensed Consolidated Financial Statements* for further information regarding our stock repurchase program.

Item 6. *Exhibits*

Exhibit Number	Exhibit Description	Incorporated By Reference				Filed Herewith
		Form	File No.	Exhibit	Filing Date	
3.1	Amended and Restated Certificate of Incorporation	10-Q	000-19807	3.1	9/15/2003	
3.2	Amended and Restated Bylaws	10-K	000-19807	3.2	12/17/2018	
4.1	Specimen Common Stock Certificate(P)	S-1	33-45138	4.3	2/24/92 (effective date)	
10.1	2006 Employee Equity Incentive Plan, as amended	8-K	000-19807	10.4	4/9/2019	X
31.1	Certification of Co-Principal Executive Officer furnished pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Exchange Act					X
31.2	Certification of Co-Principal Executive Officer furnished pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Exchange Act					X
31.3	Certification of Principal Financial Officer furnished pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Exchange Act					X
32.1	Certification of Co-Principal Executive Officers and Principal Financial Officer furnished pursuant to Rule 13a-14(b) or Rule 15d-14(b) of the Exchange Act and Section 1350 of Chapter 63 of Title 18 of the United States Code					X
101.INS	XBRL Instance Document					X
101.SCH	XBRL Taxonomy Extension Schema Document					X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document					X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document					X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document					X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document					X

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

SYNOPSYS, INC.

Date: May 24, 2019

By: /s/ TRAC PHAM

Trac Pham
Chief Financial Officer
(Principal Financial Officer)