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 JULY 31, 2022

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 (par value of $0.01 per share)	SNPS	Nasdaq Global Select Market

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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 August 17, 2022, there were 152,911,344 shares of the registrant's common stock outstanding.

SYNOPSYS, INC.

QUARTERLY REPORT ON FORM 10-Q
FOR THE FISCAL QUARTER ENDED JULY 31, 2022

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PART I. FINANCIAL INFORMATION

Item 1. *Financial Statements*

SYNOPSYS, INC.

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

	July 31, 2022	October 31, 2021*
ASSETS		
Current assets:		
Cash and cash equivalents	$ 1,383,559	$ 1,432,840
Short-term investments	147,599	147,949
Total cash, cash equivalents and short-term investments	1,531,158	1,580,789
Accounts receivable, net	682,647	568,501
Inventories	219,736	229,023
Prepaid and other current assets	465,487	430,028
Total current assets	2,899,028	2,808,341
Property and equipment, net	486,872	472,398
Operating lease right-of-use assets, net	574,501	493,251
Goodwill	3,854,889	3,575,785
Intangible assets, net	404,652	279,132
Deferred income taxes	617,429	612,655
Other long-term assets	492,176	510,698
Total assets	$ 9,329,547	$ 8,752,260
LIABILITIES, REDEEMABLE NON-CONTROLLING INTEREST AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable and accrued liabilities	$ 736,099	$ 741,191
Operating lease liabilities, current	54,170	79,678
Deferred revenue	1,755,594	1,517,623
Short-term debt	—	74,992
Total current liabilities	2,545,863	2,413,484
Operating lease liabilities, non-current	592,930	487,003
Long-term deferred revenue	164,964	136,303
Long-term debt	21,960	25,094
Other long-term liabilities	352,188	391,433
Total liabilities	3,677,905	3,453,317
Redeemable non-controlling interest	43,516	—
Stockholders' equity:		
Preferred stock, $0.01 par value: 2,000 shares authorized; none outstanding	—	—
Common stock, $0.01 par value: 400,000 shares authorized; 153,004 and 153,062 shares outstanding, respectively	1,530	1,531
Capital in excess of par value	1,415,244	1,576,363
Retained earnings	5,377,586	4,549,713
Treasury stock, at cost: 4,257 and 4,198 shares, respectively	(1,034,841)	(782,866)
Accumulated other comprehensive income (loss)	(155,493)	(49,604)
Total Synopsys stockholders' equity	5,604,026	5,295,137
Non-controlling interest	4,100	3,806
Total stockholders' equity	5,608,126	5,298,943
Total liabilities, redeemable non-controlling interest and stockholders' equity	$ 9,329,547	$ 8,752,260

*Derived from audited financial statements.

See accompanying notes to unaudited condensed consolidated financial statements.

SYNOPSYS, INC.

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

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
Revenue:				
Time-based products	$ 754,322	$ 665,563	$ 2,185,626	$ 1,945,647
Upfront products	268,584	203,301	973,483	586,798
Maintenance and service	224,860	188,266	638,141	519,329
Total revenue	1,247,766	1,057,130	3,797,250	3,051,774
Cost of revenue:				
Products	164,077	127,592	480,166	389,677
Maintenance and service	87,774	65,604	253,665	202,210
Amortization of intangible assets	19,330	11,870	47,145	35,164
Total cost of revenue	271,181	205,066	780,976	627,051
Gross margin	976,585	852,064	3,016,274	2,424,723
Operating expenses:				
Research and development	444,826	371,146	1,218,761	1,090,959
Sales and marketing	199,246	171,428	571,329	514,810
General and administrative	91,461	83,846	246,426	234,028
Amortization of intangible assets	7,124	8,570	23,036	25,273
Restructuring charges	—	15,151	12,057	15,151
Total operating expenses	742,657	650,141	2,071,609	1,880,221
Operating income	233,928	201,923	944,665	544,502
Other income (expense), net	2,426	11,414	(41,280)	61,934
Income before income taxes	236,354	213,337	903,385	606,436
Provision for income taxes	16,708	14,945	76,506	51,214
Net income	$ 219,646	$ 198,392	$ 826,879	$ 555,222
Net income (loss) attributed to non-controlling interest and redeemable non-controlling interest	(2,980)	(254)	(4,215)	(847)
Net income attributed to Synopsys	$ 222,626	$ 198,646	$ 831,094	$ 556,069
Net income per share attributed to Synopsys:				
Basic	$ 1.46	$ 1.30	$ 5.43	$ 3.64
Diluted	$ 1.43	$ 1.27	$ 5.31	$ 3.54
Shares used in computing per share amounts:				
Basic	152,938	152,635	153,082	152,619
Diluted	155,806	156,907	156,545	157,158

See accompanying notes to unaudited condensed consolidated financial statements.

SYNOPSYS, INC.

UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(in thousands)

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
Net income	$ 219,646	$ 198,392	$ 826,879	$ 555,222
Other comprehensive income (loss):				
Change in foreign currency translation adjustment	(23,378)	(5,905)	(63,989)	8,857
Changes in unrealized gains (losses) on available-for-sale securities, net of tax of $0 for periods presented	(1)	15	(1,674)	15
Cash flow hedges:				
Deferred gains (losses), net of tax $6,780 and $16,191, for the three and nine months ended July 31, 2022, respectively, and of $(909) and $(1,876) for each of the same periods in fiscal 2021, respectively.	(19,051)	3,664	(41,769)	8,971
Reclassification adjustment on deferred (gains) losses included in net income, net of tax of $(28) and $(499), for the three and nine months ended July 31, 2022, respectively, and of $1,460 and $3,808 for each of the same periods in fiscal 2021, respectively.	36	(4,830)	1,543	(12,180)
Other comprehensive income (loss), net of tax effects	(42,394)	(7,056)	(105,889)	5,663
Comprehensive income	177,252	191,336	720,990	560,885
Less: net income (loss) attributed to non-controlling interest and redeemable non-controlling interest	(2,980)	(254)	(4,215)	(847)
Comprehensive income attributed to Synopsys	$ 180,232	$ 191,590	$ 725,205	$ 561,732

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 April 30, 2022	152,955	$ 1,530	$1,517,481	$5,157,633	$ (999,234)	$ (113,099)	$ 5,564,311	$ 3,119	$ 5,567,430
Net income				222,626			222,626	(307)	222,319
Other comprehensive income (loss), net of tax						(42,394)	(42,394)		(42,394)
Purchases of treasury stock	(715)	(8)	8		(217,266)		(217,266)		(217,266)
Equity forward contract, net			(40,000)				(40,000)		(40,000)
Common stock issued, net of shares withheld for employee taxes	764	8	(188,562)		181,659		(6,895)		(6,895)
Stock-based compensation			126,317				126,317	1,288	127,605
Adjustments to redeemable non-controlling interest				(2,673)			(2,673)		(2,673)
Balance at July 31, 2022	153,004	$ 1,530	$1,415,244	$5,377,586	$ (1,034,841)	$ (155,493)	$ 5,604,026	$ 4,100	$ 5,608,126
Balance at October 31, 2021	153,062	$ 1,531	$1,576,363	$4,549,713	$ (782,866)	$ (49,604)	$ 5,295,137	$ 3,806	$ 5,298,943
Net income				831,094			831,094	(994)	830,100
Other comprehensive income (loss), net of tax						(105,889)	(105,889)		(105,889)
Purchases of treasury stock	(2,400)	(24)	24		(752,266)		(752,266)		(752,266)
Equity forward contract, net			(5,000)				(5,000)		(5,000)
Common stock issued, net of shares withheld for employee taxes	2,342	23	(488,292)		500,291		12,022		12,022
Stock-based compensation			332,149				332,149	1,288	333,437
Adjustments to redeemable non-controlling interest				(3,221)			(3,221)		(3,221)
Balance at July 31, 2022	153,004	$ 1,530	$1,415,244	$5,377,586	$ (1,034,841)	$ (155,493)	$ 5,604,026	$ 4,100	$ 5,608,126

	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 April 30, 2021	152,554	$ 1,526	$1,679,801	$4,149,620	$ (701,457)	$ (41,355)	$ 5,088,135	$ 4,370	$ 5,092,505
Net income				198,646			198,646	(254)	198,392
Other comprehensive income (loss), net of tax						(7,056)	(7,056)		(7,056)
Purchases of treasury stock	(521)	(5)	5		(140,000)		(140,000)		(140,000)
Equity forward contract, net			(35,000)				(35,000)		(35,000)
Common stock issued, net of shares withheld for employee taxes	564	5	(122,988)		84,116		(38,867)		(38,867)
Stock-based compensation			85,162				85,162		85,162
Balance at July 31, 2021	152,597	$ 1,526	$1,606,980	$4,348,266	$ (757,341)	$ (48,411)	$ 5,151,020	$ 4,116	$ 5,155,136
Balance at October 31, 2020	152,618	$ 1,528	$1,653,166	$3,795,397	$ (488,613)	$ (54,074)	$ 4,907,404	$ 4,963	$ 4,912,367
Net income				556,069			556,069	(847)	555,222
Retained earnings adjustment due to adoption of ASC 326[(1)]				(3,200)			(3,200)		(3,200)
Other comprehensive income (loss), net of tax						5,663	5,663		5,663
Purchases of treasury stock	(2,114)	(21)	21		(538,082)		(538,082)		(538,082)
Equity forward contract, net			(35,000)				(35,000)		(35,000)
Common stock issued, net of shares withheld for employee taxes	2,093	19	(259,737)		269,354		9,636		9,636
Stock-based compensation			248,530				248,530		248,530
Balance at July 31, 2021	152,597	$ 1,526	$1,606,980	$4,348,266	$ (757,341)	$ (48,411)	$ 5,151,020	$ 4,116	$ 5,155,136

[(1)] At the beginning of fiscal 2021, we adopted the Accounting Standards Codification (ASC) 326, Measurement of Credit Losses on Financial Instruments, issued by the Financial Accounting Standards Board (FASB). ASC 326 replaced the incurred loss methodology with an expected loss methodology.

See accompanying notes to unaudited condensed consolidated financial statements.

SYNOPSYS, INC.

UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Nine Months Ended July 31, 2022	Nine Months Ended July 31, 2021
Cash flows from operating activities:		
Net income attributed to Synopsys	$ 831,094	$ 556,069
Adjustments to reconcile net income to net cash provided by operating activities:		
Amortization and depreciation	169,708	151,274
Reduction of operating lease right-of-use assets	65,980	64,920
Amortization of capitalized costs to obtain revenue contracts	54,438	46,973
Stock-based compensation	333,437	248,530
Allowance for credit losses	(4,516)	13,813
Deferred income taxes	5,843	(33,116)
Other non-cash	6,141	2,936
Net changes in operating assets and liabilities, net of acquired assets and liabilities:		
Accounts receivable	(121,786)	188,996
Inventories	118	(51,448)
Prepaid and other current assets	(56,075)	(62,201)
Other long-term assets	(20,058)	(117,922)
Accounts payable and accrued liabilities	(46,356)	51,991
Operating lease liabilities	(66,187)	(61,666)
Income taxes	(60,739)	(29,414)
Deferred revenue	254,353	152,328
Net cash provided by operating activities	1,345,395	1,122,063
Cash flows from investing activities:		
Proceeds from sales and maturities of short-term investments	70,847	1,128
Purchases of short-term investments	(73,330)	(146,082)
Proceeds from sales of long-term investments	582	—
Purchases of long-term investments	(7,000)	(7,591)
Purchases of property and equipment	(102,934)	(66,957)
Cash paid for acquisitions, net of cash acquired	(416,323)	(164,053)
Capitalization of software development costs	(1,970)	(1,517)
Other	(1,200)	(800)
Net cash used in investing activities	(531,328)	(385,872)
Cash flows from financing activities:		
Repayment of debt	(76,838)	(21,637)
Issuances of common stock	161,416	113,976
Payments for taxes related to net share settlement of equity awards	(149,130)	(104,291)
Purchase of equity forward contract	(40,000)	(35,000)
Purchases of treasury stock	(717,266)	(538,082)
Other	(3,413)	(4,375)
Net cash used in financing activities	(825,231)	(589,409)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(38,155)	2,985
Net change in cash, cash equivalents and restricted cash	(49,319)	149,767
Cash, cash equivalents and restricted cash, beginning of year	1,435,183	1,237,970
Cash, cash equivalents and restricted cash, end of period	$ 1,385,864	$ 1,387,737

See accompanying notes to unaudited condensed consolidated financial statements.

SYNOPSYS, INC.

NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Description of Business

Synopsys, Inc. (Synopsys, we, our or us) provides products and services used 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 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. We also provide technical services and support to help our customers develop advanced chips and electronic systems. These products and services are part of our Semiconductor & System Design segment.

We are also a leading provider of software tools and services that improve the security, quality and compliance of software in a wide variety of industries, including electronics, financial services, automotive, medicine, energy and industrials. These tools and services are part of our Software Integrity segment.

Note 2. Summary of Significant Accounting Policies

We have 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, we have condensed or omitted certain information and footnote disclosures we normally include in our annual consolidated financial statements prepared in accordance with U.S. generally accepted accounting principles (U.S. GAAP). In management's opinion, we have made all adjustments (consisting only of normal, recurring adjustments, except as otherwise indicated) necessary to fairly present our unaudited condensed consolidated balance sheets, results of operations, comprehensive income, stockholders' equity and cash flows. Our 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 our Annual Report on Form 10-K for the fiscal year ended October 31, 2021 as filed with the SEC on December 13, 2021 (our Annual Report).

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 our operating results and financial position.

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

Fiscal Year End. Our fiscal year generally ends on the Saturday nearest to October 31 and consists of 52 weeks, with the exception that approximately every five 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 2022 and 2021 are both 52-week years. Fiscal 2022 will end on October 29, 2022. Fiscal 2021 ended on October 30, 2021. For presentation purposes, the unaudited condensed consolidated financial statements and accompanying notes refer to the closest calendar month end.

Significant Accounting Policies. There have been no material changes to our significant accounting policies included in our Annual Report, other than our accounting policy for redeemable non-controlling interest.

Redeemable Non-controlling Interest. Non-controlling interest that is not solely redeemable within our control is reported as the temporary equity in our unaudited condensed consolidated balance sheets. The carrying value of the redeemable non-controlling interest equals the redemption value at the end of each reporting period, after giving effect to the change from the net income (loss) attributable to the redeemable non-controlling interest. We adjust the redemption value of the non-controlling interest on a quarterly basis and changes in the estimated redemption value are recorded with corresponding adjustments against retained earnings.

Recently Adopted Accounting Pronouncements

In December 2019, the FASB issued Accounting Standards Update (ASU) 2019-12, Simplifying the Accounting for Income Taxes, which simplifies the accounting for income taxes, eliminates certain exceptions within ASC 740, Income Taxes, and clarifies certain aspects of the current guidance to promote consistency among reporting entities. We adopted the standard as of the beginning of fiscal 2022 on a prospective basis and the adoption of this standard did not have a material impact on our unaudited condensed consolidated financial statements.

In October 2021, the FASB issued ASU 2021-08, Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers. The new guidance requires contract assets and contract liabilities acquired in a business combination to be recognized and measured by the acquirer on the acquisition date in accordance with ASC 606, Revenue from Contracts with Customers, as if the acquirer had originated the contracts. We early adopted the standard in the second quarter of fiscal 2022 and the adoption had no material impact on our unaudited condensed consolidated financial statements for acquisitions completed in the first two quarters of fiscal 2022. The adoption of ASU 2021-08 resulted in the recognition of deferred revenue at amounts consistent with those recorded by the acquiree immediately before the acquisition date rather than at fair value for the business acquisition completed in the third quarter of fiscal 2022. See Note 4. Business Combinations for further information.

Recently Issued Accounting Pronouncements

In June 2022, the FASB issued ASU 2022-03, Fair Value Measurement (Topic 820): Fair Value Measurement of Equity Securities Subject to Contractual Sale Restrictions (ASU 2022-03), which applies to all equity securities measured at fair value that are subject to contractual sale restrictions. This change prohibits entities from taking into account contractual restrictions on the sale of equity securities when estimating fair value and introduces required disclosures for such transactions. The standard will become effective for us beginning on November 1, 2024 and should be applied prospectively. Early adoption is permitted. The adoption of this guidance is not expected to have a material impact on our unaudited condensed consolidated financial statements.

Note 3. Revenue

Disaggregated Revenue

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

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
EDA	50.0 %	55.8 %	49.9 %	56.2 %
IP & System Integration	39.7 %	34.4 %	40.7 %	34.2 %
Software Integrity Products & Services	9.5 %	9.3 %	8.9 %	9.3 %
Other	0.8 %	0.5 %	0.5 %	0.3 %
Total	100.0 %	100.0 %	100.0 %	100.0 %

Contract Balances

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

Contract balances were as follows:

	As of	
	July 31, 2022	October 31, 2021
	(in thousands)	
Contract assets, net	$ 280,507	$ 284,574
Unbilled receivables	$ 41,863	$ 35,589
Deferred revenue	$ 1,920,558	$ 1,653,926

During the three and nine months ended July 31, 2022, we recognized revenue of $171.2 million and $1.1 billion, respectively, that was included in the deferred revenue balance as of October 31, 2021.

Contracted but unsatisfied or partially unsatisfied performance obligations were approximately $7.1 billion as of July 31, 2022, which includes $998.1 million in non-cancellable Flexible Spending Account (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. We have elected to exclude future sales-based royalty payments from the remaining performance obligations. Approximately 42% of the contracted but unsatisfied or partially unsatisfied performance obligations as of July 31, 2022, excluding non-cancellable FSA, are expected to be recognized over the next 12 months, with the remainder recognized thereafter.

During the three and nine months ended July 31, 2022, we recognized $33.9 million and $103.5 million, respectively, from performance obligations satisfied from sales-based royalties earned during the periods. During the three and nine months ended July 31, 2021, we recognized $27.9 million and $88.7 million, respectively, from performance obligations satisfied from sales-based royalties earned during the periods.

Costs of Obtaining a Contract with Customer

Capitalized commission costs, net of accumulated amortization, as of July 31, 2022 were $105.0 million and included in other long-term assets in our unaudited condensed consolidated balance sheets. Amortization of these assets was $19.9 million and $54.4 million during the three and nine months ended July 31, 2022, respectively, and included in sales and marketing expense in our unaudited condensed consolidated statements of income. Amortization of these assets was $16.5 million and $47.0 million during the three and nine months ended July 31, 2021, respectively, and included in sales and marketing expense in our unaudited condensed consolidated statements of income.

Note 4. Business Combinations

On June 22, 2022, we completed the acquisition of all outstanding shares of NTT Security AppSec Solutions Inc. (which has operated under the name WhiteHat Security, or WhiteHat), a provider of dynamic application security testing solutions, from NTT Security Corporation for an aggregate purchase price of $330.1 million in cash. With this acquisition, we have broadened our product offering in the application security testing market.

Preliminary Purchase Price Allocation

The aggregate purchase consideration was preliminarily allocated as follows:

	(in thousands)
Total purchase consideration	$ 330,112
Less: cash acquired	22,849
Total purchase consideration, net of cash acquired	$ 307,263
Allocations	
Goodwill	$ 247,734
Intangible assets	97,500
Deferred revenue	(40,367)
Other tangible assets, net	2,396
	$ 307,263

The goodwill was primarily attributed to increased synergies that are expected to be achieved from the integration of WhiteHat. The $247.7 million of goodwill was assigned to the Software Integrity reporting unit and the amount recognized was not deductible for tax purposes. The acquired identifiable intangible assets of $97.5 million were valued using the income or cost approach. The intangible assets are being amortized over their respective useful lives ranging from 5 to 10 years.

Other Fiscal 2022 Acquisitions

During the three months ended January 31, 2022, we completed an acquisition for purchase consideration of $20.0 million, net of cash acquired. The preliminary purchase price was allocated as follows: $4.3 million to identifiable intangible assets and $15.7 million to goodwill, which were attributable to the Semiconductor & System Design reporting unit. There was no tax-deductible goodwill related to the acquisition.

During the three months ended April 30, 2022, we acquired 75% equity interest in OpenLight Photonics, Inc. (OpenLight) for cash consideration of $90.0 million. The remaining 25% equity interest in OpenLight is held by Juniper Networks, Inc. (the Minority Investor) from their contribution of IP and certain tangible assets.

The agreement with the Minority Investor contains redemption features whereby the interest held by the Minority Investor is redeemable either (i) at the option of the Minority Investor on or after the third anniversary of the acquisition or sooner in certain circumstances or (ii) at our option beginning on the third anniversary of the acquisition. This option is exercisable at the greater of fair value at the time of redemption or $30.0 million and was valued at $10.1 million, resulting in a total consideration of $100.1 million.

The preliminary purchase price was allocated as follows: $94.0 million to identifiable intangible assets and $45.1 million to goodwill, which were attributable to the Semiconductor & System Design reporting unit. The goodwill was mainly attributable to the assembled workforce and planned growth in new markets. There was no tax-deductible goodwill related to the acquisition.

From the date of acquisition through July 31, 2022, OpenLight incurred a net loss of $12.9 million, of which $3.2 million was attributable to redeemable non-controlling interest. As of July 31, 2022, the carrying amount of the redeemable non-controlling interest was recorded at its estimated fair value of $43.5 million in the unaudited condensed consolidated balance sheets.

We have included the financial results of these acquisitions in our unaudited condensed consolidated financial statements from the date of acquisition. We do not consider these acquisitions to be material, individually or in the aggregate, to our unaudited condensed consolidated financial statements.

Preliminary Fair Value Estimates

For all acquisitions completed, the purchase price was allocated to tangible and identifiable intangible assets acquired and liabilities assumed based on their preliminary estimated fair values, which were determined using generally accepted valuation techniques based on estimates and assumptions made by management at the time of acquisition. These estimates and assumptions are subject to change as additional information becomes available during the respective measurement period, which is not expected to exceed 12 months from applicable acquisition date.

Acquisition-Related Transaction Costs

Transaction costs were $5.2 million and $11.3 million during the three and nine months ended July 31, 2022, respectively. Transaction costs were $5.7 million and $11.6 million during the three and nine months ended July 31, 2021, respectively. These costs mainly consisted of professional fees and administrative costs and were expensed as incurred in our unaudited condensed consolidated statements of income.

Note 5. Goodwill and Intangible Assets

Goodwill

The changes in the carrying amount of goodwill during the nine months ended July 31, 2022 were as follows:

	(in thousands)
Balance at October 31, 2021	$ 3,575,785
Additions	308,532
Adjustments	1,285
Effect of foreign currency translation	(30,713)
Balance at July 31, 2022	$ 3,854,889

During the nine months ended July 31, 2022, we finalized certain estimates impacting total purchase consideration for certain acquisitions and recorded the resulting measurement period adjustments which increased goodwill.

Intangible Assets

Intangible assets as of July 31, 2022 consisted of the following:

	Gross Carrying Amount	Accumulated Amortization	Net Amount
		(in thousands)	
Core/developed technology	$ 1,078,103	$ 793,937	$ 284,166
Customer relationships	423,739	328,459	95,280
Contract rights intangible	191,430	188,524	2,906
Trademarks and trade names	52,795	33,157	19,638
Capitalized software development costs	48,068	45,406	2,662
Total	$ 1,794,135	$ 1,389,483	$ 404,652

Intangible assets as of October 31, 2021 consisted of the following:

	Gross Carrying Amount	Accumulated Amortization	Net Amount
		(in thousands)	
Core/developed technology	$ 911,903	$ 748,759	$ 163,144
Customer relationships	404,571	308,355	96,216
Contract rights intangible	193,317	188,231	5,086
Trademarks and trade names	43,095	31,155	11,940
Capitalized software development costs	46,098	43,352	2,746
Total	$ 1,598,984	$ 1,319,852	$ 279,132

Amortization expense related to intangible assets consisted of the following:

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
		(in thousands)		
Core/developed technology	$ 18,603	$ 11,431	$ 45,180	$ 33,416
Customer relationships	6,322	7,960	20,819	23,443
Contract rights intangible	727	439	2,180	1,748
Trademarks and trade names	802	610	2,002	1,830
Capitalized software development costs(1)	619	1,010	2,052	3,120
Total	$ 27,073	$ 21,450	$ 72,233	$ 63,557

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

The following table presented the estimated future amortization of intangible assets as of July 31, 2022:

Fiscal year	(in thousands)
Remainder of fiscal 2022	$ 26,960
2023	98,039
2024	86,748
2025	70,102
2026	57,677
2027 and thereafter	65,126
Total	$ 404,652

Note 6. Balance Sheets Components

	As of	
	July 31, 2022	October 31, 2021
	(in thousands)	
Other long-term assets:		
Deferred compensation plan assets	$ 295,415	$ 343,820
Capitalized commission, net	105,036	92,249
Other long-term assets	91,725	74,629
Total	$ 492,176	$ 510,698
Accounts payable and accrued liabilities:		
Payroll and related benefits	$ 522,041	$ 581,687
Other accrued liabilities	142,060	132,091
Accounts payable	71,998	27,413
Total	$ 736,099	$ 741,191
Other long-term liabilities:		
Deferred compensation plan liabilities	$ 295,413	$ 343,820
Other long-term liabilities	56,775	47,613
Total	$ 352,188	$ 391,433

Note 7. Financial Assets and Liabilities

Short-term investments. Gross unrealized gains and losses on our available-for-sale debt securities as of July 31, 2022 were not significant. The stated maturities of our available-for-sale debt securities as of July 31, 2022 were as follows:

	Amortized Cost	Fair Value
	(in thousands)	
less than 1 year	$ 72,253	$ 71,567
1-5 years	71,480	70,403
5-10 years	4,176	4,102
>10 years	1,610	1,527
Total	$ 149,519	$ 147,599

As of July 31, 2022, the balances of our cash equivalents and short-term investments were as follows:

	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	$ 94,796	$ —	$ —	$ —	$ 94,796
Total:	$ 94,796	$ —	$ —	$ —	$ 94,796
Short-term investments:					
U.S. government agency & T-bills	$ 19,917	$ 6	$ (117)	$ —	$ 19,806
Municipal bonds	3,105	—	(79)	—	3,026
Corporate debt securities	98,318	30	(1,289)	(108)	96,951
Asset-backed securities	28,179	1	(328)	(36)	27,816
Total:	$ 149,519	$ 37	$ (1,813)	$ (144)	$ 147,599

[1] *See Note 8. Fair Value Measurements for further discussion on fair values of cash equivalents and short-term investments.*

As of October 31, 2021, the balances of our cash equivalents and short-term investments were as follows:

	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	$ 172,934	$ —	$ —	$ —	$ 172,934
Total:	$ 172,934	$ —	$ —	$ —	$ 172,934
Short-term investments:					
U.S. government agency & T-bills	$ 6,447	$ —	$ (5)	$ —	$ 6,442
Municipal bonds	4,588	—	(12)	—	4,576
Corporate debt securities	103,615	7	(170)	—	103,452
Asset-backed securities	33,545	6	(72)	—	33,479
Total:	$ 148,195	$ 13	$ (259)	$ —	$ 147,949

[1] *See Note 8. Fair Value Measurements for further discussion on fair values of cash equivalents and short-term investments.*

Restricted cash. We include 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 unaudited condensed consolidated statements of cash flows. Restricted cash is primarily associated with office leases.

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

	As of	
	July 31, 2022	October 31, 2021
	(in thousands)	
Cash and cash equivalents	$ 1,383,559	$ 1,432,840
Restricted cash included in prepaid and other current assets	1,594	1,560
Restricted cash included in other long-term assets	711	783
Total cash, cash equivalents and restricted cash	$ 1,385,864	$ 1,435,183

Non-marketable equity securities. Our portfolio of non-marketable equity securities consists of strategic investments in privately held companies. There were no impairments of non-marketable equity securities during the three and nine months ended July 31, 2022. There were no impairments of non-marketable equity securities during the three and nine months ended July 31, 2021.

Derivatives

We recognize derivative instruments as either assets or liabilities in the unaudited condensed consolidated balance sheets at fair value and provide qualitative and quantitative disclosures about such derivatives. We operate internationally and are exposed to potentially adverse movements in foreign currency exchange rates. We enter into hedges in the form of foreign currency forward contracts to reduce our 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, the majority of which are short-term, ranges from approximately 1 month to 27 months at inception. We do not use foreign currency forward contracts for speculative or trading purposes. We enter into foreign exchange forward contracts with high credit quality financial institutions that are rated "A" or above and to date have not experienced nonperformance by counterparties. In addition, we mitigate credit risk in derivative transactions by permitting net settlement of transactions with the same counterparty and anticipate 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. The cash flow impact upon settlement of the derivative contracts will be included in net cash provided by operating activities in the unaudited condensed consolidated statements of cash flows.

Cash Flow Hedging Activities

Certain foreign exchange forward contracts are designated and qualify as cash flow hedges. These contracts have durations of approximately 27 months or less. Certain forward contracts are rolled over periodically to capture the full length of exposure to our 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 related 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 (loss) (OCI) in stockholders’ equity and reclassified into revenue or operating expenses, as appropriate, at the time the hedged transactions affect earnings. We expect a minority of the hedge balance in OCI to be reclassified to the statements of income within the next 12 months.

We did not record any gains or losses related to discontinuation of cash flow hedges during the nine months ended July 31, 2022 and 2021.

Non-designated Hedging Activities

Our 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 our balance sheet exposure is approximately one month.

We also have 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 our hedging program is to minimize the impact of currency fluctuations on the net income over the fiscal year.

The effects of the non-designated derivative instruments on our unaudited condensed consolidated statements of income were summarized as follows:

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Gains (losses) recorded in other income (expense), net	$ (5,182)	$ (837)	$ (10,443)	$ 1,420

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

	As of	
	July 31, 2022	October 31, 2021
	(in thousands)	
Total gross notional amounts	$ 1,295,726	$ 1,176,152
Net fair value	$ (13,289)	$ 13,404

Our exposure to the market gains or losses 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 represented the unaudited condensed consolidated balance sheets 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)	
Balance at July 31, 2022		
Other current assets	$ 11,232	$ 1,510
Accrued liabilities	$ 25,975	$ 55
Balance at October 31, 2021		
Other current assets	$ 15,455	$ 17
Accrued liabilities	$ 2,027	$ 42

The following table represented the location of the amount of gains and losses on derivative instrument fair values for designated hedge instruments, net of tax in the unaudited condensed consolidated statements of income:

	Location of gains (loss es) recognized in OCI on derivatives	Amount of gains (loss es) recognized in OCI on derivatives (effective portion)	Location of gains (losses) reclassified from OCI	Amount of gains (losses) reclassified from OCI (effective portion)
		(in thousands)		
Three months ended July 31, 2022				
Foreign exchange contracts	Revenue	$ (4,702)	Revenue	$ 3,651
Foreign exchange contracts	Operating expenses	(14,349)	Operating expenses	(3,687)
Total		$ (19,051)		$ (36)
Three months ended July 31, 2021				
Foreign exchange contracts	Revenue	$ 251	Revenue	$ 1,563
Foreign exchange contracts	Operating expenses	3,413	Operating expenses	3,267
Total		$ 3,664		$ 4,830
Nine months ended July 31, 2022				
Foreign exchange contracts	Revenue	$ (12,527)	Revenue	$ 3,309
Foreign exchange contracts	Operating expenses	(29,242)	Operating expenses	(4,852)
Total		$ (41,769)		$ (1,543)
Nine months ended July 31, 2021				
Foreign exchange contracts	Revenue	$ 1,892	Revenue	$ 2,597
Foreign exchange contracts	Operating expenses	7,079	Operating expenses	9,583
Total		$ 8,971		$ 12,180

Note 8. Fair Value Measurements

ASC 820-10, Fair Value Measurements and Disclosures, defines fair value, establishes guidelines and enhances disclosure requirements for fair value measurements. The accounting guidance requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The accounting guidance also establishes 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, we measure the fair value of certain of our assets and liabilities, which include cash equivalents, non-qualified deferred compensation plan assets, and foreign currency derivative contracts.

Our cash equivalents and short-term investments 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.

Our 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.

Our 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.

Our borrowings under the 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 for our debt with similar terms and maturities. See Note 10. Credit and Term Loan Facilities for more information on these borrowings.

Assets/Liabilities Measured at Fair Value on a Recurring Basis

Assets and liabilities measured at fair value on a recurring basis were summarized below as of July 31, 2022:

		Fair Value Measurement Using		
Description	Total	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	$ 94,796	94,796		
Short-term investments:				
U.S. government agency & T-bills	19,806		19,806	
Municipal bonds	3,026		3,026	
Corporate debt securities	96,951		96,951	
Asset-backed securities	27,816		27,816	
Prepaid and other current assets:				
Foreign currency derivative contracts	12,742		12,742	
Other long-term assets:				
Deferred compensation plan assets	295,415	295,415		
Total assets	$ 550,552	$ 390,211	$ 160,341	$ —
Liabilities				
Accounts payable and accrued liabilities:				
Foreign currency derivative contracts	$ 26,031		$ 26,031	
Other long-term liabilities:				
Deferred compensation plan liabilities	295,413	295,413		
Total liabilities	$ 321,444	$ 295,413	$ 26,031	$ —

Assets and liabilities measured at fair value on a recurring basis were summarized below as of October 31, 2021:

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	$ 172,934	$ 172,934		
Short-term investments:				
U.S. government agency & T-bills	6,442		6,442	
Municipal bonds	4,576		4,576	
Corporate debt securities	103,452		103,452	
Asset-backed securities	33,479		33,479	
Prepaid and other current assets:				
Foreign currency derivative contracts	15,472		15,472	
Other long-term assets:				
Deferred compensation plan assets	343,820	343,820		
Total assets	$ 680,175	$ 516,754	$ 163,421	$ —
Liabilities				
Accounts payable and accrued liabilities:				
Foreign currency derivative contracts	$ 2,068		$ 2,068	
Other long-term liabilities:				
Deferred compensation plan liabilities	343,820	343,820		
Total liabilities	$ 345,888	$ 343,820	$ 2,068	$ —

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

Non-Marketable Equity Securities

Non-marketable equity securities are classified within Level 3 as they are valued using significant unobservable inputs or data in an inactive market due to the absence of market price and inherent lack of liquidity.

Note 9. Restructuring Charges

In the third quarter of fiscal 2021, we initiated a restructuring plan for involuntary and voluntary employee termination and facility closure actions as part of a business reorganization (the 2021 Plan).

The 2021 Plan was substantially completed in the first quarter of fiscal 2022 and the total charges under the 2021 Plan were $45.5 million. During the three months ended July 31, 2022, we made payments of $0.9 million under the 2021 Plan. As of July 31, 2022, the outstanding restructuring related liabilities were immaterial and recorded in accounts payable and accrued liabilities in the unaudited condensed consolidated balance sheets.

Note 10. Credit and Term Loan Facilities

On January 22, 2021, we entered into a Fourth Extension and Amendment Agreement (the Fourth Amendment), which amended and restated our previous credit agreement, dated as of November 28, 2016 (as amended and restated, the Credit Agreement). Our outstanding borrowings under the previous credit agreement, which as of January 22, 2021 consisted of term loans in the aggregate principal amount of $97.5 million, were carried over under the Credit Agreement and fully repaid on November 26, 2021.

The Fourth Amendment extended the termination date of the existing $650.0 million senior unsecured revolving credit facility (the Revolver) from November 28, 2021 to January 22, 2024, which could be further extended at our option. The Credit Agreement also provides an uncommitted incremental loan facility of up to $150 million in the aggregate principal amount. The Credit Agreement contains financial covenants requiring us to maintain a maximum consolidated leverage ratio and a minimum consolidated interest coverage ratio, as well as other non-financial covenants. As of July 31, 2022, we were in compliance with all financial covenants.

There was no outstanding balance under the Revolver as of July 31, 2022 and October 31, 2021. We expect our borrowings, if any, 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 July 31, 2022, Revolver bore interest at 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.

In July 2018, we entered into a 12-year 220.0 million Renminbi (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 5 year Loan Prime Rate plus 0.74%. As of July 31, 2022, we had $22.0 million outstanding balance under the agreement.

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 11. Leases

We have operating lease arrangements for office space, data center, equipment and other corporate assets. These leases have various expiration dates through December 31, 2040, some of which include options to extend the leases for up to 10 years. Because we are not reasonably certain to exercise these renewal options, the options are not considered in determining the lease term and associated potential option payments are excluded from lease payments.

The components of our lease expense during the period presented were as follows:

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Operating lease expense [(1)]	$ 23,914	$ 23,843	$ 68,105	$ 70,818
Variable lease expense [(2)]	2,910	2,184	7,904	5,361
Total lease expense	$ 26,824	$ 26,027	$ 76,009	$ 76,179

[(1)] Operating lease expense includes immaterial amounts of short-term leases, net of sublease income.
[(2)] Variable lease expense includes payments to lessors that are not fixed or determinable at lease commencement date. These payments primarily consist of maintenance, property taxes, insurance and variable indexed based payments.

Supplemental cash flow information during the period presented was as follows:

	Nine Months Ended July 31,	
	2022	2021
	(in thousands)	
Cash paid for amounts included in the measurement of operating lease liabilities	$ 62,888	$ 64,516
ROU assets obtained in exchange for operating lease liabilities	$ 154,693	$ 92,149

Lease term and discount rate information related to our operating leases as of the end of the period presented were as follows:

	As of	
	July 31, 2022	October 31, 2021
Weighted-average remaining lease term (in years)	9.32	8.00
Weighted-average discount rate	2.18 %	2.01 %

The following represented the maturities of our future lease payments due under operating leases as of July 31, 2022:

Fiscal year	Lease Payments (in thousands)
Remainder of fiscal 2022	$ 18,637
2023	67,100
2024	90,806
2025	80,162
2026	70,782
2027 and thereafter	400,021
Total future minimum lease payments	727,508
Less: Imputed interest	80,408
Total lease liabilities	$ 647,100

In addition, certain facilities owned by us were leased to third parties under non-cancellable operating lease agreements. These leases have annual escalating payments and have expiration dates through March 31, 2031 in accordance with the terms and conditions of the existing agreement. The lease receipts from owned facilities, including sublease income from other facilities leased by us, due to us as of July 31, 2022 were as follows:

Fiscal year	Lease Receipts (in thousands)
Remainder of fiscal 2022	$ 4,274
2023	16,240
2024	24,591
2025	24,479
2026	25,333
2027 and thereafter	110,189
Total	$ 205,106

Note 12. Accumulated Other Comprehensive Income (Loss)

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

	As of	
	July 31, 2022	October 31, 2021
	(in thousands)	
Cumulative currency translation adjustments	$ (112,037)	$ (48,047)
Unrealized gains (losses) on derivative instruments, net of taxes	(41,536)	(1,311)
Unrealized gains (losses) on available-for-sale securities, net of taxes	(1,920)	(246)
Total	$ (155,493)	$ (49,604)

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

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Reclassifications:				
Gains (losses) on cash flow hedges, net of taxes				
Revenues	$ 3,651	$ 1,563	$ 3,309	$ 2,597
Operating expenses	(3,687)	3,267	(4,852)	9,583
Total	$ (36)	$ 4,830	$ (1,543)	$ 12,180

Note 13. Stock Repurchase Program

Our Board of Directors (the Board) approved a stock repurchase program (the Program) with authorization to purchase up to $1.0 billion of our common stock in December 2021. As of July 31, 2022, $242.7 million remained available for future repurchases under the Program.

In May 2022, we entered into an accelerated stock repurchase agreement (the May 2022 ASR) to repurchase an aggregate of $200.0 million of our common stock. Pursuant to the May 2022 ASR, we made a prepayment of $200.0 million to receive initial deliveries of shares valued at $160.0 million. The remaining balance of $40.0 million was settled in August 2022. Total shares purchased under the May 2022 ASR were approximately 0.6 million shares, at an average purchase price of $320.24 per share.

During the three months ended July 31, 2022, we also repurchased on the open market approximately 0.2 million shares of our common stock at an average price of $298.50 per share for an aggregate purchase price of $57.3 million.

Stock repurchase activities as well as the reissuance of treasury stock for employee stock-based compensation purposes were as follows:

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022 [(1)]	2021[(2)]	2022[(1)]	2021[(2)]
	(in thousands)			
Total shares repurchased	715	521	2,400	2,114
Total cost of the repurchased shares	$ 217,266	$ 140,000	$ 752,266	$ 538,082
Reissuance of treasury stock	764	564	2,342	2,093

[(1)] *Excluded the 101,821 shares and $40.0 million equity forward contract from the May 2022 ASR settled in August 2022.*
[(2)] *Excluded the 99,573 shares and $35.0 million equity forward contract from the June 2021 ASR settled in August 2021.*

Note 14. Stock-Based Compensation

The compensation cost recognized in the unaudited condensed consolidated statements of income for our stock compensation arrangements was as follows:

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Cost of products	$ 15,318	$ 9,582	$ 39,603	$ 28,238
Cost of maintenance and service	6,859	3,446	17,335	10,192
Research and development expense	68,243	42,430	175,892	124,231
Sales and marketing expense	22,998	15,330	60,090	45,040
General and administrative expense	14,187	14,374	40,517	40,829
Stock-based compensation expense before taxes[(1)]	127,605	85,162	333,437	248,530
Income tax benefit	(20,940)	(13,277)	(54,717)	(38,746)
Stock-based compensation expense after taxes	$ 106,665	$ 71,885	$ 278,720	$ 209,784

[(1)] During the three and nine months ended July 31, 2022, we recognized stock-based compensation expense relating to restricted stock units (RSUs), granted to senior executives in February 2022 with certain market, performance and service conditions (market-based RSUs). Under the award agreements, the vesting of the market-based RSUs is contingent on achieving total stockholder return (TSR) relative to a peer index as well as revenue growth metrics. The performance period during which the achievement goals will be measured is fiscal 2022 and fiscal 2023. The maximum potential awards that may be earned are 187.5% of the target number of the initial awards. The awards will vest in equal increments in December 2023 and December 2024 if the TSR target, revenue growth metrics, and service conditions are achieved. The grant date fair value for the market-based RSUs of $280.82 was determined using a Monte Carlo simulation model with the following assumptions: expected volatility of 33.01%, risk-free interest rate of 1.33% and an expected term of 1.69 years.

As of July 31, 2022, we had $1,057.7 million of total unrecognized stock-based compensation expense relating to options, RSUs and restricted stock awards, which is expected to be recognized over a weighted-average period of 2.4 years. As of July 31, 2022, we had $59.7 million of unrecognized stock-based compensation expense relating to our Employee Stock Purchase Plan (ESPP), which is expected to be recognized over a period of approximately 2.0 years.

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

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Intrinsic value of awards exercised	$ 86,080	$ 30,896	$ 245,468	$ 143,100

Note 15. Net Income Per Share

We compute 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 RSUs and awards during the period using the treasury stock method.

The table below reconciled 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 July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands, except per share amounts)			
Numerator:				
Net income attributed to Synopsys	$ 222,626	$ 198,646	$ 831,094	$ 556,069
Denominator:				
Weighted average common shares for basic net income per share	152,938	152,635	153,082	152,619
Dilutive effect of common share equivalents	2,868	4,272	3,463	4,539
Weighted average common shares for diluted net income per share	155,806	156,907	156,545	157,158
Net income per share attributed to Synopsys:				
Basic	$ 1.46	$ 1.30	$ 5.43	$ 3.64
Diluted	$ 1.43	$ 1.27	$ 5.31	$ 3.54
Anti-dilutive employee stock-based awards excluded	336	355	268	405

Note 16. Segment Disclosure

Segment reporting is based upon the “management approach,” i.e., how management organizes our operating segments for which separate financial information is (1) available and (2) evaluated regularly by the Chief Operating Decision Maker (CODM) in deciding how to allocate resources and in assessing performance. Until the second quarter of fiscal 2022, we had two CODMs, our two Co-Chief Executive Officers. One of our Co-Chief Executive Officers transitioned out of this role effective May 1, 2022. In the third quarter of fiscal 2022, our CODM was our Chief Executive Officer.

We have two reportable segments: (1) Semiconductor & System Design, which includes EDA tools, IP products, system integration solutions and other associated revenue categories, and (2) Software Integrity, which includes a comprehensive solution for building integrity—security, quality and compliance testing—into the customers’ software development lifecycle and supply chain.

The financial information provided to and used by the CODM 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 revenue by geographic region.

Information by reportable segment was as follows:

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Total Segments:				
Revenue	$ 1,247,766	$ 1,057,130	$ 3,797,250	$ 3,051,774
Adjusted operating income	392,127	337,396	1,321,671	941,456
Adjusted operating margin	31 %	32 %	35 %	31 %
Semiconductor & System Design:				
Revenue	$ 1,129,427	$ 959,155	$ 3,458,499	$ 2,767,950
Adjusted operating income	380,871	328,742	1,285,391	916,434
Adjusted operating margin	34 %	34 %	37 %	33 %
Software Integrity:				
Revenue	$ 118,339	$ 97,975	$ 338,751	$ 283,824
Adjusted operating income	11,256	8,654	36,280	25,022
Adjusted operating margin	10 %	9 %	11 %	9 %

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-based compensation and certain other operating expenses, were presented in the table below to provide a reconciliation of the total adjusted operating income from segments to our consolidated operating income:

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Total segment adjusted operating income	$ 392,127	$ 337,396	$ 1,321,671	$ 941,456
Reconciling items:				
Amortization of intangible assets	(26,454)	(20,440)	(70,181)	(60,437)
Stock-based compensation expense	(127,605)	(85,162)	(333,437)	(248,530)
Other	(4,140)	(29,871)	26,612	(87,987)
Total operating income	$ 233,928	$ 201,923	$ 944,665	$ 544,502

The CODM does 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.

In allocating revenue to particular geographic areas, the CODM considers where individual “seats” or licenses to our products are located. Revenue is defined as revenue from external customers. Revenue related to operations in the United States and other geographic areas were:

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Revenue:				
United States	$ 575,326	$ 477,218	$ 1,763,541	$ 1,417,636
Europe	127,288	112,877	376,195	324,212
China	189,138	164,172	617,524	405,460
Korea	125,307	110,536	358,871	314,178
Other	230,707	192,327	681,119	590,288
Consolidated	$ 1,247,766	$ 1,057,130	$ 3,797,250	$ 3,051,774

Geographic revenue data for multi-regional, multi-product transactions reflect internal allocations and are therefore subject to certain assumptions and to our methodology.

Note 17. Other Income (Expense), Net

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

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Interest income	$ 2,735	$ 657	$ 4,876	$ 1,413
Interest expense	(439)	(757)	(1,339)	(2,301)
Gains (losses) on assets related to deferred compensation plan	(1,092)	10,473	(50,001)	62,697
Foreign currency exchange gains (losses)	(376)	2,756	3,452	5,283
Other, net	1,598	(1,715)	1,732	(5,158)
Total	$ 2,426	$ 11,414	$ (41,280)	$ 61,934

Note 18. Income Taxes

Effective Tax Rate

We estimate our annual effective tax rate at the end of each fiscal quarter. The effective tax rate takes into account our 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 presented the provision for income taxes and the effective tax rates:

	Three Months Ended July 31,		Nine Months Ended July 31,	
	2022	2021	2022	2021
	(in thousands)			
Income before income taxes	$ 236,354	$ 213,337	$ 903,385	$ 606,436
Provision for income taxes	$ 16,708	$ 14,945	$ 76,506	$ 51,214
Effective tax rate	7.1 %	7.0 %	8.5 %	8.4 %

Our effective tax rate for the nine months ended July 31, 2022 is lower than the statutory federal corporate tax rate of 21.0% primarily due to U.S. federal research tax credits, foreign-derived intangible income deduction, excess tax benefits from stock-based compensation, and U.S. foreign tax credits, partially offset by state taxes, the effect of non-deductible stock-based compensation, and higher taxes on certain foreign earnings.

Our effective tax rates for the three months and nine months ended July 31, 2022 are consistent with the same periods in fiscal 2021.

The timing of the resolution of income tax examinations, and the amounts and timing of various tax payments that are part of the settlement process, are highly uncertain. Variations in such amounts and/or timing could cause large fluctuations in the balance sheet classification of current and non-current assets and liabilities. We believe that in the coming 12 months, it is reasonably possible that either certain audits and ongoing tax litigation 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 $33 million.

Non-U.S. Examinations

Hungarian Tax Authority

In 2017, the Hungarian Tax Authority (the HTA) assessed withholding taxes of approximately $25.0 million and interest and penalties of $11.0 million, against our Hungary subsidiary (Synopsys Hungary). Synopsys Hungary contested the assessment with the Hungarian Administrative Court (Administrative Court). As required under Hungarian law, Synopsys Hungary paid the assessment and recorded a tax expense due to an unrecognized tax benefit of $17.4 million, which is net of estimated U.S. foreign tax credits. The Administrative Court found against

Synopsys Hungary, and we appealed to the Hungarian Supreme Court. During 2021, the Hungarian Supreme Court heard our appeal and remanded the case to the Administrative Court for further proceedings. The Administrative Court once again ruled against Synopsys Hungary and we filed another appeal with the Hungarian Supreme Court. The Hungarian Supreme Court heard our appeal on January 27, 2022, vacated the lower court's decision and remanded the case back to the Administrative Court for further proceedings. A hearing with the Administrative Court was held on June 30, 2022; the next hearing is scheduled for September 22, 2022.

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

Legislative Developments

On August 16, 2022, the Inflation Reduction Act of 2022 (the IR Act) was enacted in the United States. The IR Act introduces a 15% minimum tax based primarily on global consolidated U.S. GAAP profits with a minimum threshold of $1 billion. The tax takes effect in Synopsys' 2024 fiscal year, with the $1 billion threshold measured as an average over three years commencing in the current fiscal year. Computation of the tax includes adjustments which, among others, provide for offset of income taxes paid or accrued in non-U.S. jurisdictions. The details of the computation will be subject to regulations to be issued by the Department of the Treasury. Synopsys will monitor regulatory developments and will continue to evaluate the impact, if any, of the minimum tax.

The IR Act includes provisions intended to mitigate climate change by, among others, providing tax credit incentives for reductions in greenhouse gas emissions. The details of implementation of these incentives are subject to regulations to be released by the Department of the Treasury. Synopsys is monitoring these developments and will continue to evaluate opportunities to utilize these incentives in the future.

The IR Act imposes a 1% excise tax on the fair market value of stock repurchases made by covered corporations after December 31, 2022. The total taxable value of shares repurchased is reduced by the fair market value of any newly issued shares during the taxable year. We are assessing the potential impact of the stock repurchase excise tax, but based on our preliminary assessment, we do not expect a material impact on our consolidated financial statements.

On August 9, 2022, the CHIPS and Science Act of 2022 (CHIPS Act) was enacted in the United States. The CHIPS Act will provide financial incentives to the semiconductor industry which are primarily directed at manufacturing activities within the United States. We are evaluating potential opportunities related to the CHIPS Act.

Note 19. Contingencies

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. We regularly review the status of each significant matter and assess our 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.

We have determined that, except as set forth below, no disclosure of estimated loss is required for a claim against us 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.

Legal Settlement

There have been no changes to the disclosure related to Mentor Graphics Corporation (now part of Siemens AG) since our Annual Report. See Note 9. Contingencies of our Annual Report for further information.

Tax Matters

We undergo 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 are 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, we would accrue a liability for the estimated expense.

In addition to the foregoing, we are, from time to time, party to various other claims and legal proceedings in the ordinary course of our business, including with tax and other governmental authorities. For a description of certain of these other matters, see Note 18. Income Taxes.

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, which involve risks, uncertainties and other factors that could cause our actual results, time frames or achievements to differ materially from those expressed or implied in such forward-looking statements. Readers are urged to carefully review and consider the various disclosures regarding these risks and uncertainties made in this Quarterly Report on Form 10-Q, including those identified below in Part II, Item 1A, Risk Factors, and in other documents we file from time to time with the Securities and Exchange Commission (SEC). Forward-looking statements include any statements that are not statements of historical fact and include, but are not limited to, statements concerning strategies related to our products and technology; business and market outlook, opportunities and strategies; customer demand and market expansion; our planned product releases and capabilities; industry growth rates; software trends; planned acquisitions and stock repurchases; our expected tax rate; the expected impact of U.S. and foreign government actions and regulatory changes on our financial results; and the continued impact of the COVID-19 pandemic. Forward-looking statements may be identified by words including, but not limited to, "may," "will," "could," "would," "can," "should," "anticipate," "expect," "intend," "believe," "estimate," "project," "continue," "forecast," "likely," "potential," "seek," or the negatives of such terms and similar expressions. 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, Inc. (Synopsys, we, our or us) or persons acting on our behalf are expressly qualified in their entirety by these cautionary statements.

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 Quarterly Report on Form 10-Q 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, 2021, as filed with the SEC on December 13, 2021 (our Annual Report).

Overview

Business Summary

Synopsys provides products and services used across the entire Silicon to Software spectrum, from engineers creating advanced semiconductors to product teams developing advanced electronic systems to software developers seeking to ensure the security and quality of their code. We are a global leader in 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. We also provide technical services and support to help our customers develop advanced chips and electronic systems. These products and services are part of our Semiconductor & System Design segment.

We are also a leading provider of software tools and services that improve the security, quality and compliance of software in a wide variety of industries, including electronics, financial services, automotive, medicine, energy and industrials. These tools and services are part of our Software Integrity segment.

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.

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.

We have consistently grown our revenue since 2005, despite periods of global economic uncertainty. We achieved these results because of our solid execution, leading technologies and strong customer relationships, and because we generally recognize our revenue for software licenses over the arrangement period, which typically approximates three years. See Note 2 of the Notes to Consolidated Financial Statements in our Annual Report for a discussion on our revenue recognition policy. The revenue we recognize in a particular period generally results from selling efforts in prior periods rather than the current period. As a result, decreases as well as increases in customer spending do not immediately affect our revenues in a significant way.

Our growth strategy is based on maintaining and building on our leadership in our EDA products, expanding and proliferating our IP offerings, driving growth in the software security and quality market and continuing to expand our product portfolio and our total addressable market. Our revenue growth from period to period is expected to vary based on the mix of our time-based and upfront products. 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.

COVID-19 Pandemic and Other Trends

While the COVID-19 pandemic has changed the physical working environment of the majority of our workforce to working from home, it otherwise caused only minor disruptions to our business operations with a limited impact on our operating results thus far. Given the unpredictable nature of the COVID-19 pandemic’s impact on the global economy, our historical results may not be an indication of future performance. The extent to which the COVID-19 pandemic impacts our business operations in future periods will depend on multiple uncertain factors, including the duration and scope of the pandemic, its overall negative impact on the global economy generally and the semiconductor and electronics industries specifically, continued responses by governments and businesses to COVID-19 and its variants, and acceptance and effectiveness of vaccines. We have not identified trends that we expect will materially impact our future operating results at this time. As we generally recognize our revenue for software licenses over the arrangement period, any potential impact related to COVID-19 may be delayed.

We have not observed material changes in the design activity of customers. We have not received any significant requests from our customers to either delay payments or modify arrangements due to COVID-19. However, this situation could change in future periods and the extent that these requests may impact our business is uncertain. We have also experienced minor disruptions in our hardware supply chain, including those related to the global semiconductor shortage. These minor disruptions have had an immaterial effect on certain hardware components in our IP business, which we have been able to address with minimal impact to our business operations to date. Further, although we have not experienced any material adverse effects on our business due to increasing inflation, it has raised operating costs for many businesses and, in the future, could impact demand or pricing of our products, foreign exchange rates or employee wages. We are actively monitoring the effects these disruptions and increasing inflation could have on the semiconductor and electronics industries as a whole.

We will continue to consider the potential impact of the COVID-19 pandemic, global semiconductor shortage and increasing inflation on our business operations. Although no material impairment or other material adverse effects have been identified to date related to such factors, there is substantial uncertainty in the nature and degree of their continued effects over time. That uncertainty could affect management’s accounting estimates and assumptions, which could result in greater variability in a variety of areas that depend on these estimates and assumptions as additional events and information become known.

See Part II, Item 1A, *Risk Factors* for further discussion of the possible impact of the COVID-19 pandemic, global semiconductor shortage and increasing inflation on our business, operations and financial condition.

Business Segments

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. Designers use these products to automate the highly complex IC design process and to reduce defects that could lead to expensive design or manufacturing re-spins or suboptimal end products. 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 to intelligently address software risks across the customer's portfolio and at all stages of the application lifecycle. The testing tools, services, and programs enable our customers to manage open source license compliance and detect, prioritize, and remediate security vulnerabilities and defects across their entire software development lifecycle. Our offerings include security and quality testing products, managed services, programs and professional services, and training.

Fiscal Year End

Our fiscal year ends on the Saturday nearest to October 31 and consists of 52 weeks, with the exception that approximately every five 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 2022 and 2021 are 52-week years ending on October 29, 2022 and October 30, 2021, respectively.

Our results of operations for the three and nine months of fiscal 2022 and 2021 ended on July 30, 2022 and July 31, 2021, respectively. For presentation purposes, this Form 10-Q refers to the closest calendar month end.

Russia-Ukraine Conflict

Due to the ongoing conflict between Russia and Ukraine and the related sanctions and other penalties imposed on Russia and Belarus by the United States, the European Union, the United Kingdom and other countries, we suspended all Synopsys business operations in Russia commencing in the second quarter of fiscal 2022. We do not have operations or employees in Ukraine. The suspension of our business operations in Russia has not had a material impact on our business, financial condition, or results of operations as our operations in Russia and our sales to customers in Russia and Belarus do not constitute a material portion of our business. Further, unless and until the U.S. government lifts its sanctions on Russia and Belarus, which are restricting the export of a broad range of U.S. technologies to those countries, we will continue to be unable to ship such technologies or provide support to anyone in Russia or Belarus. We are actively monitoring the Russia-Ukraine conflict and the potential impact it could have on our business, employees and our ability to sell our products and services to our customers. See Part II, Item 1A, *Risk Factors* for further discussion of the possible impact of the Russia-Ukraine Conflict on our business, operations and financial condition.

Critical Accounting Policies and Estimates

Our discussion and analysis of our financial results under *Results of Operations* below are based on our unaudited condensed consolidated financial statements, which we have prepared in accordance with United States Generally Accepted Accounting Principles (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. See Note 2 of the Notes to Unaudited Condensed Consolidated Financial Statements for further information on our significant accounting policies.

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;
- Valuation of business combinations; and
- Income taxes.

See Critical Accounting Policies and Estimates in our Annual Report for further information.

Results of Operations

Financial Performance Summary

In the third quarter of fiscal 2022 compared to the same period of fiscal 2021, our financial performance reflected the following:

- Revenues were $1,247.8 million, an increase of $190.6 million or approximately 18%, primarily due to higher revenue resulting from growth across all product groups and geographies.

- Total cost of revenue and operating expenses were $1,013.8 million, an increase of $158.6 million or 19%, primarily due to increases of $112.4 million in employee-related costs resulting from headcount increases through organic growth and acquisitions.
- Operating income was $233.9 million, an increase of $32.0 million or 16% as revenue growth exceeded the growth of costs and expenses.

Revenue

Our revenues are generated from two business segments: the Semiconductor & System Design segment and the Software Integrity segment. See Note 16 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 FPGA IC design software, verification products and obligations to provide unspecified updates and support services. EDA products and services are typically sold through Time-based Subscription License (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. The duration of our TSL contracts is generally 3 years, though it may vary for specific arrangements. 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 and support 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.
- IP & System Integration includes our DesignWare® IP portfolio and system-level products and services. 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 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.”
- In the case of arrangements involving the sale of hardware products, we generally have two performance obligations. 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 shipment 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 the ability to direct the use of the asset and an 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.
- 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.

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 customers 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 functionality to the customer and represent a combined performance obligation. We recognize revenue for the combined performance obligation over the term of the arrangement.

Our customer arrangements can involve multiple products and various license rights, and our customers negotiate with us over many aspects of these arrangements. For example, they generally request 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 highly competitive markets. Customers generally negotiate the total value of the arrangement rather than just unit pricing or volumes.

Total Revenue

	July 31,			
	2022	2021	$ Change	% Change
		(dollars in millions)		
Three months ended				
Semiconductor & System Design Segment	$ 1,129.5	$ 959.1	$ 170.4	18 %
Software Integrity Segment	118.3	98.0	20.3	21 %
Total	$ 1,247.8	$ 1,057.1	$ 190.7	18 %
Nine months ended				
Semiconductor & System Design Segment	$ 3,458.5	$ 2,768.0	$ 690.5	25 %
Software Integrity Segment	338.8	283.8	55.0	19 %
Total	$ 3,797.3	$ 3,051.8	$ 745.5	24 %

Our revenues are subject to fluctuations, primarily due to customer requirements including the timing and value of contract renewals. For example, we experience fluctuations in our revenues due to factors such as the timing of IP product sales, consulting projects, Flexible Spending Account (FSA) drawdowns, royalties, and hardware sales. As revenues from IP products sales and hardware sales are recognized upfront, customer demand and timing requirements for such IP products and hardware could result in increased variability of our total revenues.

Contracted but unsatisfied or partially unsatisfied performance obligations as of July 31, 2022 were $7.1 billion. For more information regarding our revenue as of July 31, 2022, including our contract balances as of such date, see Note 3 of the Notes to Unaudited Condensed Consolidated Financial Statements.

The increase in total revenues for the three and nine months ended July 31, 2022 compared to the same periods in fiscal 2021 was primarily due to the continued organic growth of our business in all product groups and geographies.

For a discussion of revenue by geographic areas, see Note 16 of the Notes to Unaudited Condensed Consolidated Financial Statements.

Time-Based Products Revenue

	July 31, 2022	July 31, 2021	$ Change	% Change
	(dollars in millions)			
Three months ended	$ 754.3	$ 665.6	$ 88.7	13 %
Percentage of total revenue	60 %	63 %		
Nine months ended	$ 2,185.6	$ 1,945.6	$ 240.0	12 %
Percentage of total revenue	57 %	64 %		

The increase in time-based products revenue for the three and nine months ended July 31, 2022 compared to the same periods in fiscal 2021 was primarily attributable to an increase in TSL license revenue and higher renewals from arrangements booked in prior periods.

Upfront Products Revenue

	July 31, 2022	July 31, 2021	$ Change	% Change
	(dollars in millions)			
Three months ended	$ 268.6	$ 203.3	$ 65.3	32 %
Percentage of total revenue	22 %	19 %		
Nine months ended	$ 973.5	$ 586.8	$ 386.7	66 %
Percentage of total revenue	26 %	19 %		

Changes in upfront products revenue are generally attributable to normal fluctuations in the extent and timing of 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 and nine months ended July 31, 2022 compared to the same periods in fiscal 2021 was primarily due to an increase in the sale of IP products and hardware products driven by higher demand from customers.

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 or FSA drawdowns due to customer requirements.

Maintenance and Service Revenue

	July 31, 2022	July 31, 2021	$ Change	% Change
	(dollars in millions)			
Three months ended				
Maintenance revenue	$ 74.4	$ 61.0	$ 13.4	22 %
Professional services and other revenue	150.5	127.3	23.2	18 %
Total	$ 224.9	$ 188.3	$ 36.6	19 %
Percentage of total revenue	18 %	18 %		
Nine months ended				
Maintenance revenue	$ 212.5	$ 172.6	$ 39.9	23 %
Professional services and other revenue	425.6	346.7	78.9	23 %
Total maintenance and service revenue	$ 638.1	$ 519.3	$ 118.8	23 %
Percentage of total revenue	17 %	17 %		

The increase in maintenance revenue for the three and nine months ended July 31, 2022 compared to the same periods in fiscal 2021 was primarily due to an increase in the volume of hardware and IP arrangements that include maintenance.

The increase in professional services and other revenue for the three and nine months ended July 31, 2022 compared to the same periods in fiscal 2021 was primarily due to an increase in the volume of IP consulting projects.

Cost of Revenue

	July 31, 2022	July 31, 2021	$ Change	% Change
	(dollars in millions)			
Three months ended				
Cost of products revenue	$ 164.1	$ 127.6	$ 36.5	29 %
Cost of maintenance and service revenue	87.8	65.6	22.2	34 %
Amortization of intangible assets	19.3	11.9	7.4	62 %
Total	$ 271.2	$ 205.1	$ 66.1	32 %
Percentage of total revenue	22 %	19 %		
Nine months ended				
Cost of products revenue	$ 480.2	$ 389.7	$ 90.5	23 %
Cost of maintenance and service revenue	253.7	202.2	51.5	25 %
Amortization of intangible assets	47.1	35.2	11.9	34 %
Total	$ 781.0	$ 627.1	$ 153.9	25 %
Percentage of total revenue	21 %	21 %		

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 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, hardware related direct costs, allocated operating costs related to product support and distribution costs, royalties paid to third-party vendors, and the amortization of capitalized software development costs.

Cost of maintenance and service revenue. Cost of maintenance and service revenue includes costs to deliver our maintenance and consulting services, such as hotline and on-site support, production services and documentation of maintenance updates.

Amortization of intangible assets. Amortization of intangible assets included within cost of revenue consists of the amortization of core/developed technology and certain contract rights intangible.

The increase in cost of revenue for the three months ended July 31, 2022 compared to the same period in fiscal 2021, was primarily due to increases of $30.9 million in personnel-related costs as a result of headcount increases from hiring and acquisitions, $13.6 million in hardware-related costs, $7.4 million in amortization of technology-related intangible assets, $7.1 million in costs to fulfill IP consulting arrangements, and $4.9 million in facility expenses. These increases were partially offset by a decrease of $1.1 million in the fair value of our executive deferred compensation plan assets.

The increase in cost of revenue for the nine months ended July 31, 2022 compared to the same period in fiscal 2021, was primarily due to increases of $78.3 million in personnel-related costs as a result of headcount increases from hiring and acquisitions, $48.8 million in hardware-related costs, $11.9 million in amortization of technology-related intangible assets, $9.4 million in costs to fulfill IP consulting arrangements, and $8.3 million in facility expenses. These increases were partially offset by a decrease of $9.4 million in the fair value of our executive deferred compensation plan assets.

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

Operating Expenses

Research and Development

	July 31,						
	2022		2021		$ Change		% Change
			(dollars in millions)				
Three months ended	$	444.8	$	371.1	$	73.7	20 %
Percentage of total revenue		36 %		35 %			
Nine months ended	$	1,218.8	$	1,091.0	$	127.8	12 %
Percentage of total revenue		32 %		36 %			

The increase in research and development expenses for the three months ended July 31, 2022 compared to the same period in fiscal 2021 was primarily due to higher personnel-related costs of $58.4 million as a result of headcount increases from hiring and acquisitions as we continue to expand and enhance our product portfolio, increases of $9.3 million in facility expenses, and $3.3 million in consultant and contractor costs. These increases were partially offset by a decrease of $6.8 million in the fair value of our executive deferred compensation plan assets.

The increase in research and development expenses for the nine months ended July 31, 2022 compared to the same period in fiscal 2021 was primarily due to higher personnel-related costs of $156.6 million as a result of headcount increases from hiring and acquisitions as we continue to expand and enhance our product portfolio, increases of $13.5 million in facility expenses, and $11.3 million in consultant and contractor costs. These increases were partially offset by a decrease of $68.9 million in the fair value of our executive deferred compensation plan assets.

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

Sales and Marketing

	July 31,						
	2022		2021		$ Change		% Change
			(dollars in millions)				
Three months ended	$	199.2	$	171.4	$	27.8	16 %
Percentage of total revenue		16 %		16 %			
Nine months ended	$	571.3	$	514.8	$	56.5	11 %
Percentage of total revenue		15 %		17 %			

The increase in sales and marketing expenses for the three months ended July 31, 2022 compared to the same period in fiscal 2021 was primarily due to increases of $21.1 million in personnel-related costs due to headcount increases from hiring and higher sales commissions, $3.5 million in travel and marketing expenses, and $2.3 million in facility expenses. These increases were partially offset by a decrease of $2.4 million in the fair value of our executive deferred compensation plan assets.

The increase in sales and marketing expenses for the nine months ended July 31, 2022 compared to the same period in fiscal 2021 was primarily due to increases of $60.2 million in personnel-related costs due to headcount increases from hiring and higher sales commissions, $7.2 million in travel and marketing expenses, and $2.3 million in facility expenses. These increases were partially offset by a decrease of $20.8 million in the fair value of our executive deferred compensation plan assets.

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

General and Administrative

	July 31, 2022	July 31, 2021	$ Change	% Change
		(dollars in millions)		
Three months ended	$ 91.5	$ 83.8	$ 7.7	9 %
Percentage of total revenue	7 %	8 %		
Nine months ended	$ 246.4	$ 234.0	$ 12.4	5 %
Percentage of total revenue	6 %	8 %		

The increase in general and administrative expenses for the three months ended July 31, 2022 compared to the same period in fiscal 2021 was primarily due to increases of $8.9 million in legal, consulting and other professional fees, $2.0 million in personnel-related costs due to headcount increases from hiring, and $1.2 million in maintenance and depreciation expenses. These increases were partially offset by a decrease of $1.3 million in the fair value of our executive deferred compensation plan assets.

The increase in general and administrative expenses for the nine months ended July 31, 2022 compared to the same period in fiscal 2021 was primarily due to increases of $23.1 million in legal, consulting and other professional fees, $12.9 million in maintenance and depreciation expenses, and $8.1 million in personnel-related costs due to headcount increases from hiring. These increases were partially offset by bad debt recoveries of $15.9 million and a decrease of $13.4 million in the fair value of our executive deferred compensation plan assets.

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

Amortization of Intangible Assets

Amortization of intangible assets included within operating expenses consists of the amortization of trademarks, trade names and customer relationships related to acquisitions completed in prior years.

	July 31, 2022	July 31, 2021	$ Change	% Change
		(dollars in millions)		
Three months ended	7.1	8.6	(1.5)	(17)%
Percentage of total revenue	1 %	1 %		
Nine months ended	23.0	25.3	(2.3)	(9)%
Percentage of total revenue	1 %	1 %		

The decrease in amortization of intangible assets for the three and nine months ended July 31, 2022 compared to the same periods in fiscal 2021 was primarily due to certain intangible assets becoming fully amortized, partially offset by amortization expenses related to acquired intangible assets during the three and nine months ended July 31, 2022.

Restructuring Charges

In the third quarter of fiscal 2021, our management approved, committed and initiated a restructuring plan (the 2021 Plan) as part of a business reorganization. Total charges under the Plan consisting primarily of severance, retirement benefits, and lease abandonment costs, were $45.5 million, of which $12.1 million was incurred during the nine months ended July 31, 2022. The 2021 Plan was substantially completed in the first quarter of fiscal 2022.

See Note 9 of the Notes to Unaudited Condensed Consolidated Financial Statements for additional information.

Other Income (Expense), Net

	July 31, 2022	July 31, 2021	$ Change	% Change
	(dollars in millions)			
Three months ended				
Interest income	$ 2.7	$ 0.7	$ 2.0	286 %
Interest expense	(0.4)	(0.8)	0.4	(50)%
Gains (losses) on assets related to executive deferred compensation plan	(1.1)	10.5	(11.6)	(110)%
Foreign currency exchange gains (losses)	(0.4)	2.8	(3.2)	(114)%
Other, net	1.6	(1.8)	3.4	(189)%
Total	$ 2.4	$ 11.4	$ (9.0)	(79)%
Nine months ended				
Interest income	$ 4.9	$ 1.4	$ 3.5	250 %
Interest expense	(1.3)	(2.3)	1.0	(43)%
Gains (losses) on assets related to executive deferred compensation plan	(50.0)	62.7	(112.7)	(180)%
Foreign currency exchange gains (losses)	3.5	5.3	(1.8)	(34)%
Other, net	1.6	(5.2)	6.8	(131)%
Total	$ (41.3)	$ 61.9	$ (103.2)	(167)%

The decrease in other income (expense) for the three and nine months ended July 31, 2022 as compared to the same periods in fiscal 2021 was primarily due to the decrease in the fair value of our executive deferred compensation plan assets.

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, and acquisition-related costs. See Note 16 of the Notes to Unaudited Condensed Consolidated Financial Statements for more information.

Semiconductor & System Design Segment

	July 31, 2022	July 31, 2021	Change	% Change
	(dollars in millions)			
Three months ended				
Adjusted operating income	$ 380.8	$ 328.7	$ 52.1	16 %
Adjusted operating margin	34 %	34 %	— %	— %
Nine months ended				
Adjusted operating income	$ 1,285.4	$ 916.4	$ 369.0	40 %
Adjusted operating margin	37 %	33 %	4 %	12 %

The increase in adjusted operating income for the three and nine months ended July 31, 2022 compared to the same periods in fiscal 2021 was primarily due to an increase in revenue from arrangements booked in prior periods.

Software Integrity Segment

	July 31, 2022	July 31, 2021	Change	% Change
	(dollars in millions)			
Three months ended				
Adjusted operating income	$ 11.3	$ 8.7	$ 2.6	30 %
Adjusted operating margin	10 %	9 %	1 %	11 %
Nine months ended				
Adjusted operating income	$ 36.3	$ 25.0	$ 11.3	45 %
Adjusted operating margin	11 %	9 %	2 %	22 %

The increase in the adjusted operating income for the three and nine months ended July 31, 2022 compared to the same periods in fiscal 2021 was primarily due to an increase in revenue from arrangements booked in prior periods.

Income Taxes

Our effective tax rates for the three months and nine months ended July 31, 2022 are consistent with the same periods in fiscal 2021.

See Note 18 of the Notes to Unaudited Condensed Consolidated Financial Statements for further discussion.

Liquidity and Capital Resources

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

As of July 31, 2022, we held $1,531.2 million in cash, cash equivalents and short-term investments. Our cash equivalents consisted primarily of taxable money market mutual funds, time deposits and highly liquid investments with maturities of three months or less. Our short-term investments include U.S. government and municipal obligations, investment-grade available-for-sale debt and asset backed securities. We believe that the overall credit quality of our portfolio is strong, with our global excess cash, and our cash equivalents, invested in banks and securities with a weighted-average credit rating exceeding AA.

As of July 31, 2022, approximately $780.0 million of our cash and cash equivalents were domiciled in various foreign jurisdictions. We have provided for foreign withholding taxes on the undistributed earnings of certain of our foreign subsidiaries to the extent such earnings are no longer considered to be indefinitely reinvested in the operations of those subsidiaries.

We believe that our existing cash, cash equivalents and short-term investments and sources of liquidity will be sufficient to satisfy our cash requirements and capital return program over the next 12 months and beyond. Our future cash requirements will depend on many factors, including our rate of revenue growth, the expansion of our sales and marketing activities, and the timing and extent of our spending to support our research and development efforts. We also may invest in or acquire businesses, applications or technologies, or may further expand our board-authorized stock repurchase program, which may require the use of significant cash resources and/or additional financing.

During the nine months ended July 31, 2022, there were no significant changes to our material cash requirements, including contractual and other obligations, as presented in Part II, Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations* included in our Annual Report.

The following sections discuss changes in our unaudited condensed consolidated statements of cash flows and other commitments of our liquidity and capital resources during the nine months ended July 31, 2022.

Cash Flows

	Nine Months Ended July 31,		
	2022	2021	$ Change
	(dollars in millions)		
Cash provided by operating activities	$ 1,345.4	$ 1,122.1	$ 223.3
Cash used in investing activities	(531.3)	(385.9)	(145.4)
Cash used in financing activities	(825.2)	(589.4)	(235.8)

Cash Provided by Operating Activities

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 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.

The increase in cash provided by operating activities for the nine months ended July 31, 2022 compared to the same period in fiscal 2021 was primarily due to higher net income and higher AR collection, partially offset by timing of customer billings and higher disbursements for operations, including vendor and tax payments.

Cash Used in Investing Activities

The increase in cash used in investing activities for the nine months ended July 31, 2022 compared to the same period in fiscal 2021 was primarily due to higher cash paid for acquisitions of $252.3 million and higher purchases of property and equipment of $36.0 million, partially offset by lower purchases of short-term investments of $72.8 million and higher proceeds from the sales and maturities of short-term investments of $69.7 million.

Cash Used in Financing Activities

The increase in cash used in financing activities for the nine months ended July 31, 2022 compared to the same period in fiscal 2021 was primarily due to higher stock repurchases of $184.2 million and higher income taxes paid for net share settlements of $44.8 million.

Credit and Term Loan Facilities

On November 28, 2016, we entered into an amended and restated credit agreement with several lenders (as amended and restated, 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). On January 22, 2021, the Credit Agreement was amended (Credit Agreement) to extend the termination date of the existing $650 million senior unsecured revolving credit facility from November 28, 2021 to January 22, 2024, which may be further extended at our option. Further, the Credit Agreement was also amended to provide an uncommitted incremental loan facility of up to $150.0 million in the aggregate principal amount. Our outstanding term loan borrowings under the previous credit agreement carried over under the Credit Agreement. The outstanding term loans under the Credit Agreement continued to amortize in quarterly installments with the balance repaid in full on November 26, 2021. There was no outstanding balance under the Revolver and the Term Loan as of July 31, 2022.

In July 2018, we entered into a 12-year 220.0 million Renminbi (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 5 year Loan Prime Rate plus 0.74%. As of July 31, 2022, we had $22.0 million outstanding balance under the agreement.

See Note 10 of the Notes to Unaudited Condensed Consolidated Financial Statements for additional information.

Stock Repurchase Program

In December 2021, our Board approved a stock repurchase program (the Program) with authorization to purchase up to $1.0 billion of our common stock.

In May 2022, we entered into an accelerated stock repurchase agreement (the May 2022 ASR) to repurchase an aggregate of $200.0 million of our common stock. Pursuant to the May 2022 ASR, we made a prepayment of $200.0 million to receive initial deliveries of shares valued at $160.0 million. The remaining balance of $40.0 million was settled in August 2022. Total shares purchased under the May 2022 ASR were approximately 0.6 million shares, at an average purchase price of $320.24 per share.

During the three months ended July 31, 2022, we also repurchased on the open market approximately 0.2 million shares of our common stock at an average price of $298.50 per share for an aggregate purchase price of $57.3 million.

As of July 31, 2022, $242.7 million remained available for future repurchases under the Program. The pace of our repurchase activity will depend on factors such as our working capital needs, our cash requirements for acquisitions, our debt repayment obligations, our stock price, and economic and market conditions.

The IR Act was enacted in the United States on August 16, 2022. The IR Act imposes a 1% excise tax on the fair market value of stock repurchases made by covered corporations after December 31, 2022. The total taxable value of shares repurchased is reduced by the fair market value of any newly issued shares during the taxable year. We are assessing the potential impact of the stock repurchase excise tax, but based on our preliminary assessment, we do not expect a material impact on our consolidated financial statements.

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

See Other Commitments — Credit and Term Loan Facilities, 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 July 31, 2022, our exposure to market risk has not changed materially since October 31, 2021. For more information on financial market risks related to changes in interest rates and foreign currency rates, reference is made to Item 7A, *Quantitative and Qualitative Disclosures About Market Risk* contained in Part II of our Annual Report.

Item 4. *Controls and Procedures*

(a) *Evaluation of Disclosure Controls and Procedures.* As of July 31, 2022, Synopsys carried out an evaluation under the supervision and with the participation of Synopsys' management, including the Chief Executive Officer 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 Securities Exchange Act of 1934, as amended (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 Chief Executive Officer and Chief Financial Officer have concluded that, as of July 31, 2022, 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 Chief Executive Officer and Chief Financial Officer, to allow timely decisions regarding its required disclosure.

(b) *Changes in Internal Control over Financial Reporting.* There were no changes in Synopsys' internal control over financial reporting during the fiscal quarter ended July 31, 2022 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 2017, the Hungarian Tax Authority (the HTA) assessed withholding taxes of approximately $25.0 million and interest and penalties of $11.0 million, against our Hungary subsidiary (Synopsys Hungary). Synopsys Hungary contested the assessment with the Hungarian Administrative Court (Administrative Court). As required under Hungarian law, Synopsys Hungary paid the assessment and recorded a tax expense due to an unrecognized tax benefit of $17.4 million, which is net of estimated U.S. foreign tax credits. The Administrative Court found against Synopsys Hungary, and we appealed to the Hungarian Supreme Court. During 2021, the Hungarian Supreme Court heard our appeal and remanded the case to the Administrative Court for further proceedings. The Administrative Court once again ruled against Synopsys Hungary and we filed another appeal with the Hungarian Supreme Court. The Hungarian Supreme Court heard our appeal on January 27, 2022, vacated the lower court's decision and remanded the case back to the Administrative Court for further proceedings. A hearing with the Administrative Court was held on June 30, 2022; the next hearing is scheduled for September 22, 2022.

For further discussion of the Hungary audit, see Note 18 of the Notes to Unaudited Condensed Consolidated Financial Statements under the heading “Non-U.S. Examinations.”

Item 1A. *Risk Factors*

A description of the risk factors associated with our business is set forth below. The risks and uncertainties described below could cause our actual results to differ materially from the results contemplated by the forward-looking statements contained in this Quarterly Report on Form 10-Q. Investors should carefully consider these risks and uncertainties before investing in our common stock.

COVID-19 Pandemic Risks

The COVID-19 pandemic could have a material adverse effect on our business, operations and financial condition.

The COVID-19 pandemic has caused minor disruptions to our business operations to date and could have a material adverse effect on our business, operations and financial condition in the future. For example, we have previously experienced limited hardware supply chain and logistical challenges as well as a slowdown in customer commitments in our Software Integrity segment. In response to the COVID-19 pandemic, governments and businesses have taken unprecedented actions to contain the virus, including requiring social distancing, implementing travel restrictions, instituting shelter-in-place orders and various other restrictions on non-essential businesses. These restrictions have significantly curtailed global, regional and national economic activity and have caused substantial volatility and disruption in global financial markets. We are continuing to transition employees back into offices worldwide in conformity with local guidelines and regulations, as applicable, including affirmative health measures in compliance with applicable local, state and national requirements. Although we have been able to navigate workplace restrictions and limitations with minimal disruptions to our business operations to date, we cannot be certain that these measures will continue to be successful and we may need to further modify our business practices and real estate needs in response to the risks and negative impacts caused by the continuing COVID-19 pandemic.

The extent to which the COVID-19 pandemic impacts our business operations in future periods will depend on multiple uncertain factors, including the duration and scope of the pandemic, its overall negative impact on the global economy and, in some cases, the regional and national economies of areas experiencing localized surges in COVID-19 cases, continued responses by governments and businesses to COVID-19 and its variants, acceptance and effectiveness of vaccines, the ability to secure timely payment from customers, the ability to accurately estimate customer demand, reduced willingness of current and potential customers to purchase our products and services due to their own business and market uncertainties, the ability of our business partners and third-party providers to fulfill their responsibilities and commitments, the ability to secure adequate and timely supply of equipment and materials from suppliers for our hardware products, and the ability to develop and deliver our products. While our operations have experienced minor disruptions to date, a continued and sustained increase in the amount of COVID-19 cases, or the emergence of additional variants, in countries or regions where we have operations could have a material adverse effect on our or our customers' businesses, operations and financial conditions. In addition, continued weak economic conditions may result in impairment in value of our tangible and intangible assets. The impact of the COVID-19 pandemic may also have the effect of heightening many of the other risks and uncertainties described in this “Risk Factors” section.

Industry Risks

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.

Uncertainty caused by the recent challenging global economic conditions, including due to the effects of the continuing COVID-19 pandemic and the recent rise in global inflation and interest rates, 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.

Outside of a slowdown in customer commitments in our Software Integrity segment, we have not seen evidence of impacts on customer orders from the COVID-19 pandemic to date. We cannot predict the stability of the economy as a whole or the industries in which we operate. Economic conditions could deteriorate in the future, and, in particular, the semiconductor and electronics industries could fail to grow, including as a result of the effects of, among other things, the COVID-19 pandemic, a sustained global semiconductor shortage, increasing inflation and global interest rates, supply chain disruptions or delays, and any disruption of international trade relationships such as tariffs, export licenses or other government trade restrictions. Furthermore, China’s stated policy of becoming a global leader in the semiconductor industry may lead to increased competition and further disruption of international trade relationships, including, but not limited to, additional government trade restrictions. For more on risks related to government trade restrictions such as the U.S. government's "Entity List," see "*Business Operations Risks–The global nature of our operations exposes us to increased risks and compliance obligations that may adversely affect our business*."

Adverse economic conditions affect demand for devices that our products help create, such as the ICs incorporated in personal computers, smartphones, automobiles and servers. Longer-term reduced demand for these or other products could result in reduced demand for design solutions and significant decreases in our average selling prices and product sales over time. Future downturns could also adversely affect our business. In addition, if our customers or distributors build elevated inventory levels, we could experience a decrease in short-term and/or long-term demand for our products. If any of these events or disruptions were to occur, the bookings for our products and services could be adversely affected along with our business, operating results and financial condition. Further, the negative impact of these events or disruptions may be deferred due to our business model. Similarly, 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.

Further economic instability could also 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. Additionally, the banking and financial services industries are subject to complex laws and are heavily regulated. There is uncertainty regarding how proposed, contemplated or future changes to the laws, policies and regulations governing our industry, the banking and financial services industry and the economy could affect our business, including rising global interest rates. A deterioration of conditions in worldwide credit markets could limit our ability to obtain external financing to fund our operations and capital expenditures. In addition, difficult economic conditions may also result in a higher rate of losses on our accounts receivable due to credit defaults. Any of the foregoing could cause adverse effects on our business, operating results and financial condition, and could cause our stock price to decline.

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

The growth of the EDA industry as a whole, our Semiconductor & System Design segment product sales, and, to some extent, our Software Integrity segment product sales, are 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, systems companies and their customers. The increasing complexity of designs of SoCs, ICs, electronic systems and customers' concerns about managing costs have previously led to, and in the future could lead to, a decrease in design starts and design activity in general. For example, in response to this increasing complexity, some customers may choose to focus on one discrete phase of the design process or opt 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, including due to the impact of the COVID-19 pandemic, a sustained global supply chain disruption or increasing inflation and global interest rates. Additionally, as the EDA industry has matured, consolidation has resulted 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 manufacturing 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 work effectively together, as we may each provide for the design of separate components on the same chip. 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.

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 not be competitive or may become obsolete, and our business and financial condition may be harmed.

In our Semiconductor & System Design segment, we compete against EDA vendors that offer a variety of products and services, such as Cadence Design Systems, Inc. and Siemens EDA. 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 a growing number of IP providers as well as our customers' internally developed IP.

In our Software Integrity segment, 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, with new competitors entering these markets both domestically and internationally. 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, the adoption of cloud computing and artificial intelligence technologies can bring new demands and also challenges in terms of disruption to both business models and our existing technology offerings. 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 software and hardware products and successfully develop or acquire such 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 manage an efficient supply chain to ensure availability of hardware products;
- 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.

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 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 revenues. Consolidation among our customers could also reduce the demand for our products and services if customers streamline research and development or operations, reduce purchases or delay purchasing decisions.

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. Consolidated competitors could have considerable financial resources and channel influence as well as broad geographic reach, which would enable them to engage in competition on the basis of product differentiation, pricing, marketing, services, support and more. If any of our competitors consolidate or acquire businesses and technologies that 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.

Business Operations Risks

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. We have also continually expanded our non-U.S. operations. 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, legal and political conditions in China, Europe and other regions where we do business, including, for example, changes in China-Taiwan relations, the military conflict between Russia and Ukraine and the related sanctions and other penalties imposed on Russia by the United States, the European Union, the United Kingdom and other countries;
- Economic recessions or uncertainty in financial markets, including the impact of inflation and rising global interest rates;
- Government trade restrictions, including tariffs, export controls, or other trade barriers, and changes to existing trade arrangements between various countries such as China;
- 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, changes in currency exchange rates and difficulty in collecting accounts receivable;
- Inadequate local infrastructure that could result in business disruptions;
- 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 and pandemics, including COVID-19 and its variants.

Furthermore, 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.

There is inherent risk, based on the complex relationships between certain Asian countries such as China, where we derive a growing percentage of our revenue, and the United States, that political, diplomatic or military events could result in trade disruptions, including tariffs, trade embargoes, export restrictions and other trade barriers. A significant trade disruption, export restriction, or the establishment or increase of any trade barrier in any area where we do business could reduce customer demand and cause customers to search for substitute products and services, make our products and services more expensive or unavailable for customers, increase the cost of our products and services, have a negative impact on customer confidence and spending, make our products less competitive, or otherwise have a materially adverse impact on our future revenue and profits, our customers' and suppliers' businesses, and our results of operations.

For example, the U.S. government has placed certain entities on the Entity List, restricting the sale of U.S. technologies to those named entities. As a result of this government action, unless and until the restriction is lifted, we are not able to ship technologies subject to the U.S. Export Administration Regulations (the Export Regulations) or provide support to these entities. Furthermore, any company with knowledge that a customer will use certain U.S. technologies to design or produce any item for a Huawei-affiliated company on the Entity List must obtain a license prior to any export of such technologies. The Bureau of Industry and Security (BIS) also added a military end user list, where they identified more than one hundred Chinese companies that are considered to be military end users. We believe that the restrictions imposed by the U.S. government thus far will not materially impact our business at this time, but cannot predict the impact that additional regulatory changes may have on our business in the future. Due to the nature of our business and technology, governmental authorities have and may continue to inquire into transactions between us and certain foreign entities. For example, we have received administrative subpoenas from BIS requesting production of information relating to transactions with certain Chinese entities. We believe we are in full compliance with all applicable regulations and are currently working with BIS to respond to its subpoenas. However, inquiries such as these are subject to a number of uncertainties, and we cannot predict the outcome of the inquiries or their potential effect on our operations or financial condition.

The United States government also placed significant sanctions on Russia and Belarus restricting the export of a broad set of U.S. technologies to those countries. As a result, unless and until these restrictions are lifted, we are not able to ship a broad range of technologies subject to the Export Regulations or provide support to anyone in Russia or Belarus. Furthermore, any company with knowledge that a customer will use certain U.S. technologies to design or produce any item for a Russian or Belarussian company must obtain a license prior to any export of such technologies. We believe that these restrictions will not materially impact our business at this time.

In response to 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 or affected 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. In addition, government or customer efforts, attitudes, laws, or policies regarding technology independence may lead to non-U.S. customers favoring their domestic technology solutions that could compete with or replace our products, which would also have an adverse effect on our business.

In addition to tariffs and other trade barriers, our global operations are subject to numerous U.S. and foreign laws and regulations such as 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 statements of income. Likewise, a strengthening U.S. dollar relative to other currencies, including the renminbi or 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.

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 and EDA products and services;
- Changes in demand for our products due to customers reducing their expenditures, whether as a cost-cutting measure or a result of their insolvency or bankruptcy, and whether due to the COVID-19 pandemic, a sustained global semiconductor shortage, inflationary pressures, rising global interest rates or other reasons;
- Product competition in the EDA industry, 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 technologies;
- 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;
- Natural variability in the timing of IP drawdowns, which can be difficult to predict;
- General economic and political conditions that affect the semiconductor and electronics industries, such as disruptions to international trade relationships, including tariffs, export licenses, or other trade barriers affecting our or our suppliers' products, as well as impacts due to the COVID-19 pandemic; and
- Changes in accounting standards, which may impact the way we recognize our revenue and costs and impact our earnings.

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; and
- The levels of our hardware and IP revenues, which are recognized upfront and are primarily dependent upon our ability to provide the latest technology and meet customer requirements.

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.

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 security testing 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, on our networks or on the cloud. 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. As a result of the continuing COVID-19 pandemic and shelter-in-place orders, most of our employees in affected areas are working remotely, which magnifies the importance of the integrity of our remote access security measures.

For example, we discovered unauthorized third-party access to our products and product license files hosted on our SolvNet Plus customer license and product delivery system in 2015. While we identified and remediated the incident, it is possible that our security measures may be circumvented again in the future, and any such 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. In addition, if we select a vendor that uses cloud storage of information as part of their service or product offerings, or if we are selected as a vendor for our cloud-based solutions, our proprietary information could be misappropriated by third parties despite our attempts to validate the security of such services. 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, our hosted solutions as well as our software security and quality testing solutions, may also be vulnerable to attacks, including traditional computer hackers, malicious code (such as viruses and worms), distributed denial-of-service attacks, sophisticated attacks conducted or sponsored by nation-states, advanced persistent threat intrusions, ransomware and other malware. Furthermore, the risk of state-supported and geopolitical-related cybersecurity incidents may increase due to the Russia-Ukraine conflict. 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 or cause other destructive outcomes.

We also offer software security and quality testing solutions. If we fail to identify new and increasingly sophisticated methods of cyber-attacks, or fail to invest sufficient resources in research and development regarding new threat vectors, our security testing products and services 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 security testing products and services, and could result in a loss of customers or sales, or an increased cost to remedy a problem. Furthermore, our growth and recent acquisitions 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. As a result, if any of the foregoing were to occur, we could experience negative publicity and 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.

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 if their efforts are successful. 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.

From time to time, we may need to commence litigation or other legal proceedings 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 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 and strategic investments 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 and strategic investments in the future, but we may not find suitable acquisition or investment targets, or we may not be able to consummate desired acquisitions or investments due to unfavorable credit markets, commercially unacceptable terms or other risks, which could harm our operating results. Acquisitions and strategic investments 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;

- Difficulties in negotiating, governing and realizing value from strategic investments;
- Assumption of unknown liabilities, including tax, litigation, cybersecurity and commercial-related risks, and the related expenses and diversion of resources;
- Incurrence of costs and use of additional resources to remedy issues identified prior to or after an acquisition;
- 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 previously lacked such controls, processes and policies in areas such as cybersecurity, information technology, privacy and more;
- Negative impact on our net income resulting from acquisition or investment-related costs; and
- Requirements imposed by government regulators in connection with their review of an acquisition, including required divestitures or restrictions on the conduct of our business or the acquired business.

If we do not manage the foregoing risks, the acquisitions or strategic investments 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 may invest in efforts to expand into adjacent markets, including, for example, software security and quality testing solutions. Although we believe these solutions are complementary to our EDA tools, we have less experience and a more limited operating history in offering software quality testing and security products and services, and our efforts in this area may not be successful. Our success in these and other new markets 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, including, in the case of our software quality testing and security tools and services, identifying new security vulnerabilities in software code and ensuring support for a growing number of programming languages;
- 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.

Difficulties in any of our new product development efforts or our efforts to enter adjacent markets, including delays or disruptions as a result of the COVID-19 pandemic, 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 in the semiconductor industry or by competitors, 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. If customers reduce or slow the need to upgrade or enhance their product offerings, our revenue and operating results may be adversely affected. Additionally, our periodic research and development expenses may be independent of our level of revenue, which could negatively impact our financial results. New products may not adequately address the changing needs of the marketplace. New software products may contain undetected errors, defects, or vulnerabilities. The occurrence of any defects or errors in our products could result in lost or delayed market acceptance and sales of our products, delays in payment by customers, loss of customers or market share, product returns, damage to our reputation, diversion of our resources, increased service and warranty expenses or financial concessions, increased insurance costs and potential liability for damages. Finally, there can be no guarantee that our research and development investments will result in products that create additional revenue.

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, any 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.

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 less predictable 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;
- Potential reductions in overall 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;
- Longer warranty periods than those of our software products, which may require us to replace hardware components under warranty, thus increasing our costs; and
- Potential impacts on our supply chain, including due to the effects of the COVID-19 pandemic and a sustained global semiconductor shortage.

If we fail to timely recruit and retain senior management and key employees globally, 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 employees who join us organically and through acquisitions. There are a limited number of qualified engineers and competition for these individuals and other qualified employees is intense and has increased globally, including in major markets such as Asia. Our employees are often recruited aggressively by our competitors and our customers worldwide. Any failure to recruit and retain key employees could harm our business, results of operations and financial condition, and our recruiting and retention efforts may be negatively impacted by restrictions on travel and business activity due to the COVID-19 pandemic. 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.

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 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 from the operation of our business.

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.

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 credit losses, 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. In addition, we cannot predict the full impact of the COVID-19 pandemic on our business operations. The uncertainty affects management's estimates and assumptions, which could result in greater variability in a variety of areas that depend on these estimates and assumptions.

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 July 31, 2022, approximately 51% of our worldwide cash and cash equivalents balance is held by our international subsidiaries. We intend to meet our U.S. cash spending needs primarily 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, due to the impact of the COVID-19 pandemic or otherwise, 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.

Legal and Regulatory Risks

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, an adverse change in the treatment of an item of income or expense or limitations on our ability to utilize tax credits, could result in a material increase in our tax expense and impact our financial position and cash flows. For example, in response to the fiscal impact of the COVID-19 pandemic, the State of California enacted legislation on June 29, 2020 that suspends the use of certain corporate research and development tax credits for a three-year period beginning in our fiscal 2021, which resulted in an impact in our tax expense. On February 9, 2022, California Governor Newsom signed into law 2022 CA SB 113, which shortens the previously enacted suspension on the use of research and development tax credits to a two-year period covering our fiscal 2021 and 2022.

On December 22, 2017, the Tax Cuts and Jobs Act (Tax Act) was enacted, which significantly changed prior U.S. tax law and includes numerous provisions that affect our business. The Tax Act includes certain provisions that began to affect our income in the first quarter of fiscal 2019, while other sections of the Tax Act and related regulations will begin to affect our business in the first quarter of fiscal 2023. There are various proposals in Congress to amend certain provisions of the Tax Act. The state of these proposals and other future legislation remains uncertain and, if enacted, may materially affect our financial position.

On August 16, 2022, the Inflation Reduction Act of 2022 (IR Act) was enacted in the United States and includes a minimum tax rate of 15%, as well as tax credit incentives for reductions in greenhouse gas emissions. The details of the computation of the tax and implementation of the incentives will be subject to regulations to be issued by the U.S. Department of the Treasury. On August 9, 2022, the CHIPS and Science Act of 2022 (CHIPS Act) was enacted in the United States to provide certain financial incentives to the semiconductor industry, primarily for manufacturing activities within the United States. We are continuing to monitor the IR Act and CHIPS Act and related regulatory developments to evaluate their potential impact on our business and operating results. For further discussion of the IR Act and CHIPS Act, see Note 18 of the Notes to Unaudited Condensed Consolidated Financial Statements under the heading “Legislative Developments.”

On October 8, 2021 the Organization for Economic Co-operation and Development (OECD) announced the OECD/G20 Inclusive Framework on Base Erosion and Profit Shifting (Framework) which agreed to a two-pillar solution to address tax challenges arising from the digitalization of the economy. Pillar one provides a framework for the reallocation of certain residual profits of multinational enterprises to market jurisdictions using a revenue-based allocation key to source to the end market jurisdictions where goods or services are used or consumed. Pillar two consists of two interrelated rules referred to as Global Anti-Base Erosion Rules, which operate to impose a minimum tax rate of 15% calculated on a jurisdictional basis. On December 20, 2021, the OECD released Pillar Two Model Rules which define the global minimum tax rules. The OECD continues to release additional guidance on these rules and the Framework calls for law enactment by OECD and G20 members in 2022 to take effect in 2023 and 2024. These changes, when enacted, by various countries in which we do business 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 may also be 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 2017, the HTA assessed withholding taxes of approximately $25.0 million and interest and penalties of $11.0 million, against Synopsys Hungary. Synopsys Hungary contested the assessment with the Administrative Court. As required under Hungarian law, Synopsys Hungary paid the assessment and recorded a tax expense due to an unrecognized tax benefit of $17.4 million, which is net of estimated U.S. foreign tax credits. The Administrative Court found against Synopsys Hungary, and we appealed to the Hungarian Supreme Court. During 2021, the Hungarian Supreme Court heard our appeal and remanded the case to the Administrative Court for further proceedings. The Administrative Court once again ruled against Synopsys Hungary and we filed another appeal with the Hungarian Supreme Court. The Hungarian Supreme Court heard our appeal on January 27, 2022, vacated the lower court's decision and remanded the case back to the Administrative Court for further proceedings. A hearing with the Administrative Court was held on June 30, 2022; the next hearing is scheduled for September 22, 2022. For further discussion of the Hungary audit, see Note 18 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 current and potential future tax law. Changes to the Tax Act, other regulatory changes, and 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.

Changes in 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 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. 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 became applicable to us at the beginning of fiscal 2019 and there is an increased volatility in our total revenue with less predictability than under the prior accounting standard.

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*.

Our business is subject to evolving corporate governance and public disclosure regulations and expectations 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. In addition, increasingly regulators, customers, investors, employees and other stakeholders are focusing on environmental, social and governance (ESG) matters and related disclosures. These changing rules, regulations and stakeholder expectations have resulted in, and are likely to continue to result in, increased general and administrative expenses and increased management time and attention spent complying with or meeting such regulations and expectations. For example, developing and acting on ESG initiatives, and collecting, measuring, and reporting ESG information and metrics can be costly, difficult and time consuming and is subject to evolving reporting standards, including the SEC's recently proposed climate-related reporting requirements. These initiatives and related reporting requirements may present operational, reputational, financial, legal and other risks, which could have a material impact on us.

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 and may be negatively impacted by the economic effects of the COVID-19 pandemic and rising global interest rates. 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.

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.

General Risks

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, extreme temperatures, drought, flood, telecommunications failure, cybersecurity attack, terrorist attack, epidemic or pandemic (including the COVID-19 pandemic), or other catastrophic events or climate change-related risks could cause system interruptions, delays in our product development and loss of critical data and could prevent us from fulfilling our customers' orders. In particular, our sales and infrastructure are vulnerable to regional or worldwide health conditions, including the effects of the outbreak of contagious diseases such as the COVID-19 pandemic. 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 and sites of recent wildfires. 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 May 2022, we entered into an accelerated stock repurchase agreement (the May 2022 ASR) to repurchase an aggregate of $200.0 million of our common stock. Pursuant to the May 2022 ASR, we made a prepayment of $200.0 million to receive initial deliveries of shares valued at $160.0 million. The remaining balance of $40.0 million was settled in August 2022. Total shares purchased under the May 2022 ASR were approximately 0.6 million shares at an average purchase price of $320.24 per share.

During the three months ended July 31, 2022, we also repurchased on the open market approximately 0.2 million shares of our common stock at an average price of $298.50 per share for an aggregate purchase price of $57.3 million.

The table below sets forth information regarding our repurchases of our common stock during the three months ended July 31, 2022:

Period [(1)]	Total number of shares purchased [(2)]	Average price paid per share [(2)]	Total number of shares purchased as part of publicly announced programs [(2)]	Maximum approximate dollar value of shares that may yet be purchased under the programs[(1)]
Month #1				
May 1, 2022 through June 4, 2022	522,704	$ 306.10	522,704	$ 300,000,550
Month #2				
June 5, 2022 through July 2, 2022	151,204	$ 298.00	—	$ 254,941,129
Month #3				
July 3, 2022 through July 30, 2022	40,642	$ 300.33	—	$ 242,734,961
Total	714,550	$ 304.06	522,704	$ 242,734,961

(1) *As of July 31, 2022, $242.7 million remained available for future repurchases under the Program.*
(2) *Amounts are calculated based on the settlement date.*

See Note 13 of the Notes to Unaudited Condensed Consolidated Financial Statements for further information on the 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	12/15/2020	
4.1	Specimen Common Stock Certificate	S-1	33-45138	4.3	2/24/1992 (effective date)	
31.1	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Exchange Act					X
31.2	Certification of Chief Financial Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Exchange Act					X
32.1*	Certification of Chief Executive Officer and Chief 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	Inline XBRL Instance Document					X
101.SCH	Inline XBRL Taxonomy Extension Schema Document					X
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document					X
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document					X
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document					X
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document					X
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)					

* This exhibit is furnished with this Quarterly Report on Form 10-Q and is not deemed filed with the Securities and Exchange Commission and is not incorporated by reference in any filing of Synopsys, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date hereof and irrespective of any general incorporation language contained in such filing.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this Quarterly Report on Form 10-Q to be signed on its behalf by the undersigned thereunto duly authorized.

SYNOPSYS, INC.

Date: August 19, 2022	By:	/s/ TRAC PHAM
		Trac Pham **Chief Financial Officer** **(Principal Financial Officer)**

Exhibit 31.1

CERTIFICATION

I, Aart J. de Geus, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Synopsys, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 19, 2022

/s/ Aart J. de Geus

Aart J. de Geus
Chief Executive Officer and Chairman
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION

I, Trac Pham, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Synopsys, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 19, 2022

/s/ Trac Pham

Trac Pham
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

Certification Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (Subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code)

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”) and Section 1350, Chapter 63 of Title 18 of the United States Code (18 U.S.C-§1350), each of Aart J. de Geus, Chief Executive Officer and Chairman of Synopsys, Inc., a Delaware corporation (the “Company”) and Trac Pham, Chief Financial Officer of the Company, does hereby certify, to such officer’s knowledge that:

The Quarterly Report on Form 10-Q for the fiscal quarter ended July 31, 2022 (the “Form 10-Q”) to which this Certification is attached as Exhibit 32.1 fully complies with the requirements of Section 13(a) or 15(d) of the Exchange Act. The information contained in the Form 10-Q fairly presents, in all material respects, the financial condition and results of operations of the Company.

IN WITNESS WHEREOF, the undersigned have set their hands hereto as of August 19, 2022.

/s/ Aart J. de Geus

Aart J. de Geus
Chief Executive Officer and Chairman

/s/ Trac Pham

Trac Pham
Chief Financial Officer

The foregoing certification is being furnished solely pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code) and is not deemed filed with the Securities and Exchange Commission as part of the Form 10-Q or as a separate disclosure document and is not to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Form 10-Q), irrespective of any general incorporation language contained in such filing.