



Labor Market Analysis for Program Recommendation

Software Development in C++ Occupations

East Bay Subregion

Prepared by the Bay Region Center of Excellence for Labor Market Research

Certificate Program

April 2026

Recommendation Based on Labor Market Data: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> With Reservations <input type="checkbox"/> No		
	Earning Wage Meets Living Wage	Meets Demand
Bay Region	Entry Level Hourly Wage- \$73 Mid-Career Hourly Wage- \$90 Mid-Career Hourly Wage at or above the Bay Living Wage (\$27)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Demand: 11,410 Supply: 114 (1% of Demand is Met) Gap: 11,296 In-Demand? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
East Bay Subregion	Entry Level Hourly Wage- \$63 Mid-Career Hourly Wage-\$73 Mid-Career Hourly Wage at or above the Subregion Living Wage (\$25)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Demand: 1,255 Supply: 0 (0% of Demand is Met) Gap: 1,255 In-Demand? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Note: An occupation is considered to provide a living wage if the mid-career wage is at or above the amount required for a single adult to be economically self-sufficient within a specified region. As a rule of thumb, an occupation will be considered **in-demand** when the supply is less than 75% of the demand **and** the labor market gap exceeds 40 openings (a reasonable regional threshold for starting a new program), but this approach may not apply in all cases. For definitions of demand, supply, and living wage, please scroll to the bottom of the report under **Definitions**.

Recommendation

Based on the labor market data, we recommend this proposed program. The occupations meet both the Bay Region and East Bay subregion living wage at the entry and mid-career levels. An additional 11,296 students are needed in

the Bay Region and 1,255 students in the East Bay subregion to complete their program. Lastly, only 1% of labor market demand is being met in the Bay Region, and 0% of demand is being met in the East Bay subregion overall.

Introduction

This report provides student outcomes data on employment and earnings for TOP 0707.00 - Computer Software Development programs in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at subregion in the state and region.

This report profiles Software Development in C++ Occupations in the 12 county Bay Region and in the East Bay subregion. This report includes occupations with two different skill levels. The occupations classified as middle-skill occupations require a certificate, or an associate degree, or it may require a bachelor's degree, but 33% or fewer of current workers in these roles hold one. In contrast, above middle-skill occupations require a bachelor's degree or higher.

- **Computer Network Support Specialists (15-1231):** Analyze, test, troubleshoot, and evaluate existing network systems, such as local area networks (LAN), wide area networks (WAN), cloud networks, servers, and other data communications networks. Perform network maintenance to ensure networks operate correctly with minimal interruption.
 - Typical Entry-Level Educational: Associate's degree
 - Skill Level: Middle-Skill
 - Work Experience Required: None
 - Percentage of individuals 25+ with an associate degree, certificate, or some postsecondary coursework as their highest level of education attainment: 38%
- **Software Developers (15-1252):** Research, design, and develop computer and network software or specialized utility programs. Analyze user needs and develop software solutions, applying principles and techniques of computer science, engineering, and mathematical analysis. Update software or enhance existing software capabilities. May work with computer hardware engineers to integrate hardware and software systems, and develop specifications and performance requirements. May maintain databases within an application area, working individually or coordinating database development as part of a team.
 - Typical Entry-Level Educational: Bachelor's degree
 - Skill Level: Above Middle-Skill
 - Work Experience Required: None
 - Percentage of individuals 25+ with an associate degree, certificate, or some postsecondary coursework as their highest level of education attainment: 11%
- **Web Developers (15-1254):** Develop and implement websites, web applications, application databases, and interactive web interfaces. Evaluate code to ensure that it is properly structured, meets industry standards, and is compatible with browsers and devices. Optimize website performance, scalability, and server-side code and processes. May develop website infrastructure and integrate websites with other computer applications.
 - Typical Entry-Level Educational: Bachelor's degree
 - Skill Level: Middle-Skill
 - Work Experience Required: None
 - Percentage of individuals 25+ with an associate degree, certificate, or some postsecondary coursework as their highest level of education attainment: 25%
- **Web and Digital Interface Designers (15-1255):** Design digital user interfaces or websites. Develop and test layouts, interfaces, functionality, and navigation menus to ensure compatibility and usability across browsers or devices. May use web framework applications as well as client-side code and processes. May evaluate web design following web and accessibility standards, and may analyze web use metrics and optimize websites for marketability and search engine ranking. May design and test interfaces that facilitate the human-computer interaction and maximize the usability of digital devices, websites, and software with a focus on aesthetics and

design. May create graphics used in websites and manage website content and links.

Typical Entry-Level Educational: Bachelor's degree

Skill Level: Middle-Skill

Work Experience Required: None

Percentage of individuals 25+ with an associate degree, certificate, or some postsecondary coursework as their highest level of education attainment: 21%

Occupational Demand

Table 1. Employment Outlook for Software Development in C++ Occupations in the Bay Region

Occupation	2024 Jobs	2029 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	Entry Level Hourly	Mid-Career Hourly Wage
Computer Network Support Specialists	3,360	3,501	141	4%	1,236	247	\$35	\$46
Software Developers	170,720	176,635	5,915	3%	50,105	10,021	\$77	\$93
Web Developers	5,137	5,108	-28	-1%	1,547	309	\$43	\$70
Web and Digital Interface Designers	12,899	12,698	-201	-2%	4,163	833	\$48	\$76
Total	192,116	197,942	5,826	3%	57,051	11,410	\$73	\$90

Source: Lightcast 2026.1

The Bay Region includes: Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

Table 2. Employment Outlook for Software Development in C++ Occupations in the East Bay Subregion

Occupation	2024 Jobs	2029 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	Entry Level Hourly	Mid-Career Hourly Wage
Computer Network Support Specialists	690	671	-19	-3%	208	42	\$32	\$42
Software Developers	21,838	21,307	-531	-2%	5,162	1,032	\$68	\$75
Web Developers	900	850	-50	-6%	236	47	\$37	\$63
Web and Digital Interface Designers	2,234	2,164	-70	-3%	672	134	\$39	\$66
Total	25,662	24,992	-670	-3%	6,278	1,255	\$63	\$73

Source: Lightcast 2026.1

East Bay Subregion includes: Alameda, Contra Costa Counties

Job Postings in the Bay Region and East Bay Subregion

Table 3. Number of Job Postings by Occupation for the latest 12 months

Occupation	Bay Region	East Bay
Software Developers	53,768	6,966
Web and Digital Interface Designers	6,506	481
Web Developers	4,474	614
Computer Network Support Specialists	493	151

Source: Lightcast 2026.1; "Job Posting Analytics." Apr. 2025 - Mar. 2026

Table 4a. Top Job Titles in Job Postings for Software Development in C++ Occupations in the Bay Region

Title	Bay	Title	Bay
Software Engineers	6,041	DevOps Engineers	827
Staff Software Engineers	1,862	Software Development Engineers	789
Full Stack Engineers	1,558	Software Engineering Managers	698
Full Stack Software Engineers	1,305	Solutions Engineers	618
Back End Software Engineers	1,169	Embedded Software Engineers	602
Principal Software Engineers	1,100	Software Engineering Interns	562
Infrastructure Software Engineers	1,083	Artificial Intelligence Engineers	559
Back End Engineers	1,082	iOS Software Engineers	512
Solutions Architects	1,073	UX Designers	498

Source: Lightcast 2026.1; "Job Posting Analytics." Apr. 2025 - Mar. 2026

Table 4b. Top Job Titles in Job Posting for Software Development in C++ Occupations in the East Bay Subregion

Title	East Bay	Title	East Bay
Software Engineers	802	iOS Developers	87
Full Stack Engineers	281	Full Stack Software Engineers	79
Solutions Architects	169	Embedded Software Engineers	79
DevOps Engineers	165	Back End Developers	79
Staff Software Engineers	160	Software Developers	77
Back End Engineers	139	Artificial Intelligence Engineers	73
Android Developers	99	Python Developers	71
Full Stack Developers	98	Infrastructure Software Engineers	71
Back End Software Engineers	93	Principal Software Engineers	70

Source: Lightcast 2026.1; "Job Posting Analytics." Apr. 2025 - Mar. 2026

Industry Concentration

Table 5. Industries Hiring for Software Development in C++ Occupations in the Bay Region

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2024)	Jobs in Industry (2029)	% Change (2024-29)	% Occupation Group in Industry (2024)
Custom Computer Programming Services	38,575	40,236	4%	20%
Software Publishers	22,706	24,517	8%	12%
Computer Systems Design Services	20,819	21,919	5%	11%

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2024)	Jobs in Industry (2029)	% Change (2024-29)	% Occupation Group in Industry (2024)
Web Search Portals and All Other Information Services	19,060	19,948	5%	10%
Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services	11,712	13,657	17%	6%
Corporate, Subsidiary, and Regional Managing Offices	7,972	9,086	14%	4%
Media Streaming Distribution Services, Social Networks, and Other Media Networks and Content Providers	6,148	5,460	-11%	3%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	5,361	5,913	10%	3%
Semiconductor and Related Device Manufacturing	3,117	3,505	12%	2%
Research and Development in Biotechnology (except Nanobiotechnology)	2,688	3,150	17%	1%

Source: Lightcast 2026.1

Table 6. Top Employers Posting Software Development in C++ Occupations in the Bay Region and the East Bay Subregion

Employer	Bay	Employer	East Bay
Google	3,067	Tesla	143
Apple	2,751	Fivetran	133
Amazon	1,402	Accenture	108
Meta	928	Robert Half	108
Nvidia	806	Acceler8 Talent	100
Tiktok	698	DataAnnotation	65

Source: Lightcast 2026.1; "Job Posting Analytics." Apr. 2025 - Mar. 2026

Educational Supply

There are four community colleges in the Bay Region issuing 55 awards on average annually (last 3 years ending 2023-24) on TOP 0707.00 - Computer Software Development. In the East Bay subregion, there are no community colleges that issued awards on average annually (last 3 years) on this TOP code.

There are two other CTE educational institutions in the Bay Region issuing 59 awards on average annually (last 3 years ending 2022-23) on CIP 11.0201- Computer Programming/Programmer, General.

Table 7a. Community College Awards on TOP 0707.00 - Computer Software Development in the Bay Region

College	Subregion	Associate Degree	High unit Certificate	Low unit Certificate	Total
Foothill	Silicon Valley	0	0	24	24

College	Subregion	Associate Degree	High unit Certificate	Low unit Certificate	Total
San Francisco	Mid-Peninsula	0	0	5	5
San Mateo	Mid-Peninsula	8	3	13	24
Solano	North Bay	0	0	2	2
Total	-	8	3	44	55

Source: Data Mart

Note: The annual average for awards is 2021-22 to 2023-24.

Table 7b. Other CTE Institutions Awards on CIP 11.0201- Computer Programming/Programmer, General. in the Bay Region

College	Subregion	Bachelor's degree	Certificates of less than 1 year	Total
Dominican University of California	North Bay	51	0	51
University of Silicon Valley	Silicon Valley	7	1	8
Total	-	58	1	59

Source: IPEDS

Note: The annual average for awards is 2020-21 to 2022-23.

Gap Analysis

Based on the data included in this report, there is a labor market gap in the Bay Region with 11,410 annual openings for the Software Development in C++ occupational cluster and 114 annual (3-year average) awards for an annual undersupply of 11,296 students. In the East Bay subregion, there is also a gap with 1,255 annual openings and no annual (3-year average) awards for an annual undersupply of 1,255 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0707.00 - Computer Software Development

Metric Outcomes	Bay All CTE Program	State 0707.00	Bay 0707.00	East Bay 0707.00
Students with a Job Closely Related to Their Field of Study	75%	68%	68%	
Median Annual Earnings for SWP Exiting Students	\$58,379	\$56,481	\$68,133	\$93,464
Median Change in Earnings for SWP Exiting Students	31%	31%	28%	
Exiting Students Who Attained the Living Wage	50%	52%	61%	

Source: DataVista Program Median of 2020 to 2022.

Skills, Certifications and Education

Table 9. Top Skills in Job Postings for Software Development in C++ Occupations in the Bay Region

Skill	Posting	Skill	Posting
Computer Science	26,262	Java (Programming Language)	11,714
Software Engineering	26,141	JavaScript (Programming Language)	11,419

Skill	Posting	Skill	Posting
Scalability	23,116	C++ (Programming Language)	11,095
Python (Programming Language)	22,226	Debugging	11,087
Artificial Intelligence	19,815	Automation	10,577
Software Development	16,922	CI/CD	10,465
Application Programming Interface (API)	16,332	React.js (Javascript Library)	10,366
Workflow Management	13,422	Full Stack Development	8,813
Amazon Web Services	12,665	Kubernetes	8,799
Machine Learning	12,033	Agile Methodology	8,467

Source: Lightcast 2026.1; "Job Posting Analytics." Apr. 2025 - Mar. 2026

Table 10. Certifications in Job Postings for Software Development in C++ Occupations in the Bay Region

Certification	Posting	Certification	Posting
Microsoft Certified Professional	685	Salesforce Certified Platform Developer II	124
Security Clearance	382	Advanced Cardiovascular Life Support (ACLS) Certification	109
Salesforce Certification	360	Automotive Service Excellence (ASE) Certification	98
Master Of Business Administration (MBA)	331	Salesforce Certified Administrator	93
Secret Clearance	203	Cisco Certified Network Associate	93
Valid Driver's License	197	ServiceNow Certified System Administrator (CSA)	88
Top Secret-Sensitive Compartmented Information (TS/SCI Clearance)	174	Internet And Computing Core Certification	87
Certified Information Systems Security Professional	167	AWS Certified Solutions Architect	86
CompTIA Security+	156	CompTIA A+	83
Salesforce Certified Platform Developer I	126	ServiceNow Certified Application Developer	72

Source: Lightcast 2026.1; "Job Posting Analytics." Apr. 2025 - Mar. 2026

Table 11. Education Requirements for Software Development in C++ Occupations in the Bay Region

Education Level	Job Postings	% of Total
High school or GED	379	1%
Associate degree	542	1%
Bachelor's degree & higher	53,623	98%

Source: Lightcast 2026.1; "Job Posting Analytics." Apr. 2025 - Mar. 2026

Note: 48% of records have been excluded because they do not include a degree level. As a result, the chart above may not be representative of the full sample.

Methodology

Occupations for this report were identified by use of job descriptions and skills listed in O*Net. Labor demand data is sourced from Lightcast occupation and job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CCCC Data Mart and CTE Launchboard.

Definitions

Demand refers to average annual openings which includes a combination of both [new jobs and replacement jobs](#) between 2024 to 2029. New jobs represent the total number of additional workers required in an occupation, calculated as the difference between the current number of workers and the projected number of unfilled positions. Replacements are jobs that will need to be filled by [new hires](#) due to existing workers leaving the occupation. The average annual openings figure is derived by dividing total openings (2024 to 2029) by five years.

Supply refers to the average number of [graduates](#) between academic years 2021–2022 and 2023–2024. Graduates include students from community colleges, other two-year private and public institutions, as well as four-year institutions.

Living wage refers to the amount of income required for working families to meet basic needs at a minimally adequate level, considering family composition, ages of children, and geographic differences in costs based on the Self-Sufficiency Standard methodology.

Entry-level wages are the hourly earnings paid to workers who are newly entering an occupation.

Mid-career wages are the hourly earnings paid to workers who have accumulated several years of experience in an occupation, reflecting increased productivity, skill proficiency, and responsibility beyond entry-level roles but short of late-career or senior positions.

Sources

O*Net Online

Lightcast

CTE LaunchBoard www.calpassplus.org

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

CCCCO Data Mart

Contacts

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