CENTER OF EXCELLENCE FOR LABOR MARKET RESEARCH BAY AREA

# Labor Market Analysis for Program Recommendation
# Computer Developer, Specialist, and Analyst Occupations
# (Artificial Intelligence)
# Silicon Valley Subregion

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

**Certificate Program**

**October 2026**

## Summary

| **Recommendation Based on Labor Market Data: ☑ Yes ☐ With Reservations ☐ No** | | |
|---|---|---|
| | **Earning Wage Meets Living Wage** | **Meets Demand** |
| **Bay Region** | **Entry Level Hourly Wage- $70**<br>**Mid-Career Hourly Wage- $88**<br><br>**Mid-Career Hourly Wage at or above the Bay Living Wage ($27)?**<br>**☑ Yes**<br>**☐ No** | **Demand: 14,395**<br>**Supply: 392 (3% of Demand is Met)**<br>**Gap: 14,003**<br><br>**In-Demand?**<br>**☑ Yes**<br>**☐ No** |
| **Silicon Valley Subregion** | **Entry Level Hourly Wage- $77**<br>**Mid-Career Hourly Wage- $95**<br><br>**Mid-Career Hourly Wage at or above the Subregion Living Wage ($30)?**<br>**☑ Yes**<br>**☐ No** | **Demand: 6,977**<br>**Supply: 136 (2% of Demand is Met)**<br>**Gap: 6,841**<br><br>**In-Demand?**<br>**☑ Yes**<br>**☐ 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. In this report, living wage estimates are based on the California Self-Sufficiency Standard. The Bay Region Center of Excellence is gradually transitioning to the MIT Living Wage Calculator. During this transition, we include estimates in the methodology section from both sources for reference and comparison. 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

The labor market data supports this proposed program. The occupations meet both the Bay Region and Silicon Valley subregion living wage at the mid-career level. An additional 14,003 students are needed in the Bay Region and 6,841 students in the Silicon Valley subregion to complete their program. Lastly, only 3% of labor market demand is being met in the Bay Region, and 2% of demand is being met in the Silicon Valley subregion overall. This analysis only includes above-middle-skill occupations, requiring a bachelor's degree or higher.

## Introduction

This report provides student outcomes data on employment and earnings for TOP 0708.00 - Computer Infrastructure and Support and TOP 0702.00 - Computer Information Systems 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 Computer Developer, Specialist, and Analyst Occupations in the 12 county Bay Region and in the Silicon Valley subregion. This report includes occupations with two different skill levels. The occupations classified as middle-skill 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.

**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 Education: 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%

**Computer User Support Specialists (15-1232):** Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, via telephone, or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.

Typical Entry-Level Education: Some college, no 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%

**Computer Systems Analysts (15-1211):** Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions, improve existing computer

systems, and review computer system capabilities, workflow, and schedule limitations. May analyze or recommend commercially available software.

Typical Entry-Level Education: 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: 22%

**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 Education: 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: 20%

**Software Quality Assurance Analysts and Testers (15-1253):** Develop and execute software tests to identify software problems and their causes. Test system modifications to prepare for implementation. Document software and application defects using a bug tracking system and report defects to software or web developers. Create and maintain databases of known defects. May participate in software design reviews to provide input on functional requirements, operational characteristics, product designs, and schedules.

Typical Entry-Level Education: 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: 21%

## Occupational Demand

**Table 1. Employment Outlook for Computer Developer, Specialist, and Analyst Occupations in the Bay Region**

| Occupation | 2025 Jobs | 2030 Jobs | 5-yr Change | 5-yr % Change | 5-yr Total Openings | Annual Openings | Entry Level Hourly | Mid-Career Hourly Wage |
|---|---|---|---|---|---|---|---|---|
| Software Developers | 159,652 | 169,189 | 9,537 | 6% | 49,105 | 9,821 | $79 | $98 |
| Web and Digital Interface Designers | 11,650 | 11,857 | 206 | 2% | 3,938 | 788 | $54 | $84 |
| Software Quality Assurance | 12,623 | 13,107 | 484 | 4% | 4,213 | 843 | $51 | $73 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Analysts and Testers | | | | | | | | |
| Computer Systems Analysts | 21,059 | 22,578 | 1,519 | 7% | 7,683 | 1,537 | $52 | $68 |
| Computer User Support Specialists | 19,774 | 20,395 | 621 | 3% | 7,030 | 1,406 | $34 | $43 |
| **Total** | **224,758** | **237,126** | **12,368** | **6%** | **71,969** | **14,395** | **$70** | **$88** |

Source: Lightcast 2026.3
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 Computer Developer, Specialist, and Analyst Occupations in the Silicon Valley Subregion**

| Occupation | 2025 Jobs | 2030 Jobs | 5-yr Change | 5-yr % Change | 5-yr Total Openings | Annual Openings | Entry Level Hourly | Mid-Career Hourly Wage |
|---|---|---|---|---|---|---|---|---|
| Software Developers | 87,283 | 91,539 | 4,255 | 5% | 25,676 | 5,135 | $83 | $102 |
| Web and Digital Interface Designers | 4,448 | 4,567 | 118 | 3% | 1,504 | 301 | $75 | $96 |
| Software Quality Assurance Analysts and Testers | 6,343 | 6,535 | 191 | 3% | 2,025 | 405 | $59 | $80 |
| Computer Systems Analysts | 7,637 | 8,596 | 958 | 13% | 3,203 | 641 | $57 | $75 |
| Computer User Support Specialists | 6,345 | 6,795 | 450 | 7% | 2,476 | 495 | $35 | $44 |
| **Total** | **112,056** | **118,032** | **5,976** | **5%** | **34,884** | **6,977** | **$77** | **$95** |

Source: Lightcast 2026.3
Silicon Valley Subregion includes: Santa Clara County

## Job Postings in the Bay Region and Silicon Valley Subregion

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

| Occupation | Bay Region | Silicon Valley |
|---|---|---|
| Software Developers | 59,047 | 29,163 |
| Web and Digital Interface Designers | 5,984 | 2,743 |
| Computer User Support Specialists | 5,134 | 1,642 |
| Software Quality Assurance Analysts and Testers | 4,651 | 2,873 |
| Computer Systems Analysts | 2,801 | 1,013 |

Source: Lightcast 2026.3; "Job Posting Analytics." Oct. 2025 - Sep. 2026

**Table 4a. Top Job Titles in Job Postings for Computer Developer, Specialist, and Analyst Occupations in the Bay Region**

| Title | Bay | Title | Bay |
|---|---|---|---|
| Software Engineers | 6,460 | DevOps Engineers | 852 |

| | | | |
|---|---|---|---|
| Staff Software Engineers | 2,274 | Software Development Engineers | 775 |
| Full Stack Engineers | 1,563 | Software Engineering Managers | 773 |
| Full Stack Software Engineers | 1,360 | Members of Technical Staff | 671 |
| Solutions Architects | 1,310 | Embedded Software Engineers | 621 |
| Artificial Intelligence Engineers | 1,242 | Software Engineering Interns | 614 |
| Infrastructure Software Engineers | 1,223 | Solutions Engineers | 514 |
| Principal Software Engineers | 1,163 | Application Engineers | 506 |
| Back End Software Engineers | 954 | iOS Software Engineers | 455 |

Source: Lightcast 2026.3; "Job Posting Analytics." Oct. 2025 - Sep. 2026

**Table 4b. Top Job Titles in Job Postings for Computer Developer, Specialist, and Analyst Occupations in the Silicon Valley Subregion**

| Title | Subregion | Title | Subregion |
|---|---|---|---|
| Software Engineers | 2,649 | Back End Software Engineers | 428 |
| Staff Software Engineers | 1,091 | Full Stack Engineers | 422 |
| Infrastructure Software Engineers | 747 | DevOps Engineers | 408 |
| Principal Software Engineers | 714 | Embedded Software Engineers | 403 |
| Full Stack Software Engineers | 596 | Application Engineers | 364 |
| Software Development Engineers | 583 | Field Application Engineers | 334 |
| Solutions Architects | 485 | Software Engineering Interns | 325 |
| Software Engineering Managers | 446 | iOS Software Engineers | 305 |
| Artificial Intelligence Engineers | 436 | Members of Technical Staff | 280 |

Source: Lightcast 2026.3; "Job Posting Analytics." Oct. 2025 - Sep. 2026

## Industry Concentration

**Table 5. Industries Hiring for Computer Developer, Specialist, and Analyst Occupations in the Bay Region**

| Industry - 6 Digit NAICS (No. American Industry Classification) Codes | Jobs in Industry (2025) | Jobs in Industry (2030) | % Change (2025-30) | % Occupation Group in Industry (2025) |
|---|---|---|---|---|
| General Medical and Surgical Hospitals | 671 | 659 | -2% | 30% |
| Offices of Physicians (except Mental Health Specialists) | 328 | 346 | 6% | 15% |
| Hospitals (Local Government) | 286 | 325 | 14% | 13% |
| HMO Medical Centers | 281 | 333 | 18% | 13% |
| Medical Laboratories | 242 | 253 | 5% | 11% |
| Hospitals (State Government) | 92 | 114 | 23% | 4% |
| Diagnostic Imaging Centers | 57 | 62 | 10% | 3% |
| All Other Outpatient Care Centers | 54 | 69 | 29% | 2% |
| Freestanding Ambulatory Surgical and Emergency Centers | 29 | 34 | 15% | 1% |
| Temporary Help Services | 25 | 25 | 2% | 1% |

Source: Lightcast 2026.3

**Table 6. Top Employers Posting Computer Developer, Specialist, and Analyst Occupations in the Bay Region and the Silicon Valley Subregion**

| Employer | Bay | Employer | Silicon Valley |
|---|---|---|---|
| Google | 3,448 | Google | 2,850 |
| Apple | 3,075 | Apple | 2,843 |
| Amazon | 1,485 | Nvidia | 933 |
| Nvidia | 936 | Amazon | 822 |
| Salesforce | 678 | Palo Alto Networks | 531 |
| Tesla | 664 | AMD | 486 |

Source: Lightcast 2026.3; "Job Posting Analytics." Oct. 2025 - Sep. 2026

## Educational Supply

There are nine community colleges in the Bay Region issuing 142 awards on average annually (last 3 years ending 2024-25) on TOP 0708.00 - Computer Infrastructure and Support. In the Silicon Valley subregion, there are two community colleges that issued 18 awards on average annually (last 3 years) on this TOP code.

There are 13 community colleges in the Bay Region issuing 238 awards on average annually (last 3 years ending 2024-25) on TOP 0702.00 - Computer Information Systems. In the Silicon Valley subregion, there are three community colleges that issued 106 awards on average annually (last 3 years) on this TOP code.

There is one other CTE educational institution in the Bay Region issuing 12 awards on average annually (last 3 years ending 2023-24) on CIP 11.1006- Computer Support Specialist. There is one other CTE educational institution in the Silicon Valley subregion issuing 12 awards on average annually (last 3 years) on this CIP code. There are no other CTE educational institutions in the Bay Region issuing awards on average annually (last 3 years) on CIP 11.0501- Computer Systems Analysis/Analyst.

**Table 7a. Community College Awards on TOP 0708.00 - Computer Infrastructure and Support in the Bay Region**

| College | Subregion | Associate Degree | High unit Certificate | Low unit Certificate | Noncredit award | Total |
|---|---|---|---|---|---|---|
| Cabrillo | SC-Monterey | 7 | 0 | 4 | 14 | 25 |
| Deanza | Silicon Valley | 0 | 0 | 1 | 2 | 3 |
| Foothill | Silicon Valley | 0 | 0 | 15 | 0 | 15 |
| Hartnell | SC-Monterey | 0 | 2 | 0 | 0 | 2 |
| Las Positas | East Bay | 0 | 0 | 1 | 0 | 1 |
| Los Medanos | East Bay | 7 | 2 | 4 | 0 | 13 |
| San Francisco | Mid-Peninsula | 0 | 0 | 26 | 0 | 26 |
| Santa Rosa | North Bay | 0 | 0 | 56 | 0 | 56 |
| Skyline | Mid-Peninsula | 0 | 0 | 1 | 0 | 1 |
| **Total** | | **14** | **4** | **108** | **16** | **142** |

Source: CCCCO DataMart
Note: The annual average for awards is 2022-23 to 2024-25.

**Table 7b. Community College Awards on TOP 0702.00 - Computer Information Systems in the Bay Region**

| College | Subregion | Associate Degree | High unit Certificate | Low unit Certificate | Total |
|---|---|---|---|---|---|
| Alameda | East Bay | 2 | 0 | 2 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| Chabot Hayward | East Bay | 21 | 0 | 0 | 21 |
| Diablo Valley | East Bay | 3 | 0 | 30 | 33 |
| Gavilan | Silicon Valley | 1 | 0 | 5 | 6 |
| Laney | East Bay | 4 | 0 | 0 | 4 |
| Las Positas | East Bay | 12 | 0 | 11 | 23 |
| Marin | North Bay | 2 | 0 | 1 | 3 |
| Merritt | East Bay | 9 | 0 | 18 | 27 |
| Mission | Silicon Valley | 32 | 0 | 43 | 75 |
| Monterey | SC-Monterey | 1 | 0 | 0 | 1 |
| Ohlone | East Bay | 0 | 0 | 8 | 8 |
| San Jose City | Silicon Valley | 0 | 0 | 25 | 25 |
| Skyline | Mid-Peninsula | 7 | 1 | 0 | 8 |
| **Total** | | **94** | **1** | **143** | **238** |

Source: CCCCO DataMart
Note: The annual average for awards is 2022-23 to 2024-25.

**Table 7c. Other CTE Institutions Awards on CIP 11.1006- Computer Support Specialist in the Bay Region**

| College | Subregion | Certificates of less than 1 year | Total |
|---|---|---|---|
| CET-San Jose | Silicon Valley | 12 | 12 |
| **Total** | | **12** | **12** |

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

## Gap Analysis

Based on the data included in this report, there is a labor market gap in the Bay Region with 14,395 annual openings for the Computer Developer, Specialist, and Analyst occupational cluster and 392 annual (3-year average) awards for an annual undersupply of 14,003 students. In the Silicon Valley subregion, there is also a gap with 6,977 annual openings and 136 annual (3-year average) awards for an annual undersupply of 6,841 students.

## Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0708.00 - Computer Infrastructure and Support**

| Metric Outcomes | Bay All CTE Program | State 0708.00 | Bay 0708.00 | Silicon Valley 0708.00 |
|---|---|---|---|---|
| Students with a Job Closely Related to Their Field of Study | 75% | 68% | 70% | NA |
| Median Annual Earnings for SWP Exiting Students | $59,448 | $59,164 | $64,399 | $69,315 |
| Median Change in Earnings for SWP Exiting Students | 30% | 21% | 24% | 22% |
| Exiting Students Who Attained the Living Wage | 50% | 58% | 55% | 53% |

Source: DataVista Program Median of 2021 to 2023.

## Skills, Certifications and Education

**Table 9. Top Skills in Job Postings for Computer Developer, Specialist, and Analyst Occupations in the Bay Region**

| Skill | Posting | Skill | Posting |
|---|---|---|---|
| Software Engineering | 29,662 | Machine Learning | 14,836 |
| Computer Science | 28,857 | Amazon Web Services | 13,707 |
| Python (Programming Language) | 28,463 | C++ (Programming Language) | 12,557 |
| Scalability | 25,516 | CI/CD | 12,364 |
| Workflow Management | 22,270 | Java (Programming Language) | 11,380 |
| Artificial Intelligence | 22,220 | JavaScript (Programming Language) | 10,184 |
| Application Programming Interface (API) | 19,489 | Tooling | 9,424 |
| Automation | 17,735 | Full Stack Development | 9,306 |
| Software Development | 17,648 | React.js (Javascript Library) | 9,306 |
| Debugging | 15,214 | Kubernetes | 9,175 |

Source: Lightcast 2026.3; "Job Posting Analytics." Oct. 2025 - Sep. 2026

**Table 10. Certifications in Job Postings for Computer Developer, Specialist, and Analyst Occupations in the Bay Region**

| Certification | Posting | Certification | Posting |
|---|---|---|---|
| Salesforce Certification | 288 | Advanced Cardiovascular Life Support (ACLS) Certification | 155 |
| Project Management Professional Certification | 191 | ITIL Foundation Certification | 131 |
| GIAC Certifications | 166 | | |

Source: Lightcast 2026.3; "Job Posting Analytics." Oct. 2025 - Sep. 2026

**Table 11. Education Requirements for Computer Developer, Specialist, and Analyst Occupations in the Bay Region**

| Education Level | Job Postings | % of Total |
|---|---|---|
| High school or GED | 747 | 1% |
| Associate degree | 1,414 | 2% |
| Bachelor's degree & higher | 62,575 | 97% |

Source: Lightcast 2026.3; "Job Posting Analytics." Oct. 2025 - Sep. 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 CCCCO Data Mart and CTE Launchboard.

This report uses living wage estimates from the California Self-Sufficiency Standard. The Bay Region Center of Excellence is gradually transitioning to the Massachusetts Institute of Technology (MIT) Living Wage Calculator, which will become the primary living wage benchmark used in future reports. During this transition, we include both estimates to provide context and allow readers to understand how the selected benchmark affects wage comparisons. Because the California Self-Sufficiency Standard and the MIT Living

Wage Calculator use different methodologies, their estimates are not directly interchangeable. The MIT Living Wage Calculator generally produces higher living wage thresholds; therefore, future reports may identify fewer occupations as providing a living wage, even when the underlying occupational wage data has not changed. For comparison, the MIT living wage is $33 per hour for the Bay Region and $38 per hour for the Silicon Valley subregion. Under the California Self-Sufficiency Standard, the living wage is $27 per hour for the Bay Region and $30 per hour for the Silicon Valley subregion.

## Definitions

**Demand** refers to average annual openings which includes a combination of both new jobs and replacement jobs between 2025 to 2030. 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 (2025 to 2030) 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

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