



# Labor Market Analysis for Program Recommendation

## Web Applications Development Occupations

### Foothill College

Prepared by the San Francisco Bay Center of Excellence for Labor Market Research  
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#### Recommendation

Based on all available data, there appears to be an “undersupply” of Web Applications Development workers compared to the demand for this cluster of occupations in the Bay region and in the Silicon Valley sub-region (Santa Clara county). There is a projected annual gap of about 16,947 students in the Bay region and 8,412 students in the Silicon Valley Sub-Region.

#### Introduction

This report provides student outcomes data on employment and earnings for TOP 0707.10 Computer Programming 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 colleges in the state and region, as well as to outcomes across all CTE programs at Foothill College and in the region.

This report profiles Web Applications Development Occupations in the 12 county Bay region and in the Silicon Valley sub-region for a proposed new program at Foothill College.

- **Computer Programmers (15-1251):** Create, modify, and test the code, forms, and script that allow computer applications to run. Work from specifications drawn up by software developers or other individuals. May assist software developers by analyzing user needs and designing software solutions. May develop and write computer programs to store, locate, and retrieve specific documents, data, and information.  
Entry-Level Educational Requirement: Bachelor’s degree  
Training Requirement: None  
Percentage of Community College Award Holders or Some Postsecondary Coursework: 20%
- **Software Developers and Software Quality Assurance Analysts and Testers (15-1256):** Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team. May supervise computer programmers.  
Entry-Level Educational Requirement: Bachelor’s degree  
Training Requirement: None  
Percentage of Community College Award Holders or Some Postsecondary Coursework: 11%
- **Web Developers and Digital Interface Designers (15-1257):** Design, create, and modify Web sites. Analyze user needs to implement Web site content, graphics, performance, and capacity. May integrate Web sites with other computer applications. May convert written, graphic, audio, and video components to compatible Web formats by using software designed to facilitate the creation of Web and multimedia content. Excludes

“Multimedia Artists and Animators” (27-1014).

Entry-Level Educational Requirement: Associate’s degree

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 26%

## Occupational Demand

**Table 1. Employment Outlook for Web Applications Development Occupations in Bay Region**

Occupation	2020 Jobs	2025 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer Programmers	10,252	10,237	-15	0%	3,671	734	\$43	\$56
Software Developers and Software Quality Assurance Analysts and Testers	140,249	162,499	22,250	16%	75,729	15,146	\$56	\$72
Web Developers and Digital Interface Designers	11,548	12,950	1,402	12%	5,832	1,166	\$30	\$48
<b>Total</b>	<b>162,049</b>	<b>185,686</b>	<b>23,637</b>	<b>15%</b>	<b>85,231</b>	<b>17,046</b>		

Source: EMSI 2022.1

**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 Web Applications Development Occupations in Silicon Valley Sub-region**

Occupation	2020 Jobs	2025 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer Programmers	3,794	3,787	-7	-0%	1,325	265	\$39	\$51
Software Developers and Software Quality Assurance Analysts and Testers	74,735	85,370	10,634	14%	38,920	7,784	\$58	\$75
Web Developers and Digital Interface Designers	3,641	4,152	512	14%	1,891	378	\$32	\$49
<b>Total</b>	<b>82,170</b>	<b>93,309</b>	<b>11,139</b>	<b>14%</b>	<b>42,135</b>	<b>8,427</b>		

Source: EMSI 2022.1

**Silicon Valley Sub-Region includes:** Santa Clara County

## Job Postings in Bay Region and Silicon Valley Sub-Region

**Table 3. Number of Job Postings by Occupation for latest 12 months (Aug 2021 - Jul 2022)**

Occupation	Bay Region	Silicon Valley
Software Developers, Applications	109,492	49,474
Web Developers	22,118	8,411
Software Quality Assurance Engineers and Testers	11,298	5,696
Computer Programmers	4,052	1,521
Software Developers, Systems Software	929	500

Source: Burning Glass

**Table 4a. Top Job Titles for Web Applications Development Occupations for latest 12 months (Aug 2021 - Jul 2022) - Bay Region**

Title	Bay	Title	Bay
Software Engineer	3,607	ios Developer	591
Senior Software Engineer	3,068	Front End Engineer	557
Devops Engineer	1,436	UX Designer	537
Java Developer	1,005	Staff Software Engineer	524
Senior Devops Engineer	813	Front End Developer	524
Android Developer	707	Senior Backend Engineer	516
Backend Engineer	698	Principal Software Engineer	515
Full Stack Developer	670	Salesforce Developer	509
Software Developer	656	Python Developer	497

Source: Burning Glass

**Table 4b. Top Job Titles for Web Applications Development Occupations for latest 12 months (Aug 2021 - Jul 2022) - Silicon Valley Sub-Region**

Title	Silicon Valley	Title	Silicon Valley
Software Engineer	1,472	Frontend Developer	255
Senior Software Engineer	1,027	Senior Java Developer	247
Devops Engineer	587	ios Developer	245
Java Developer	509	UX Designer	239
Python Developer	335	Full Stack Developer	236
Senior Devops Engineer	325	Software Engineer III	217
Android Developer	311	Staff Software Engineer	213
Backend Engineer	259	Design Verification Engineer	204
Software Developer	255	Embedded Software Engineer	203

Source: Burning Glass

## Industry Concentration

**Table 5. Industries hiring Web Applications Development Workers in Bay Region**

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2020)	Jobs in Industry (2025)	% Change (2020-25)	% Occupation Group in Industry (2020)
Computer Systems Design Services	302,806	360,230	19%	16%
Custom Computer Programming Services	292,349	350,646	20%	15%

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2020)	Jobs in Industry (2025)	% Change (2020-25)	% Occupation Group in Industry (2020)
Software Publishers	170,991	213,602	25%	9%
Corporate, Subsidiary, and Regional Managing Offices	85,575	92,102	8%	4%
Data Processing, Hosting, and Related Services	66,806	79,776	19%	4%
Internet Publishing and Broadcasting and Web Search Portals	43,477	58,566	35%	2%
Engineering Services	38,428	42,045	9%	2%
Other Computer Related Services	37,019	43,736	18%	2%
Temporary Help Services	33,560	40,998	22%	2%
Electronic Shopping and Mail-Order Houses	32,190	43,263	34%	2%

Source: EMSI 2022.1

**Table 6. Top Employers Posting Web Applications Development Occupations in Bay Region and Silicon Valley Sub-Region (Aug 2021 - Jul 2022)**

Employer	Bay	Employer	Silicon Valley
Amazon	3,903	Amazon	2,236
Apple Inc.	1,788	Apple Inc.	1,698
Google Inc.	1,637	Google Inc.	1,294
Walmart	956	Intel Corporation	835
Intel Corporation	843	Walmart	792
Capital One	789	Nvidia Corporation	694
eBay	763	Palo Alto Networks	513
Nvidia Corporation	695	Cisco Systems Incorporated	453
TATA Consultancy Services	674	Advanced Micro Devices	424
Facebook	667	Paypal	371
Lucid Motors	663	Rivian	355

Source: Burning Glass

## Educational Supply

There are eight (8) community colleges in the Bay Region issuing 42 awards on average annually (last 3 years ending 2018-19) on TOP 0707.10 Computer Programming. In the Silicon Valley Sub-Region, there are four (4) community colleges that issued eight (8) awards on average annually (last 3 years) on this TOP code.

There are two (2) other CTE educational institutions in the Bay Region issuing 57 awards on average annually (last 3 years ending 2019-20) on TOP 0707.10 Computer Programming. There is one (1) other CTE educational institution in the Silicon Valley Sub-Region issuing seven (7) awards on average annually (last 3 years) on this TOP code.

**Table 7a. Community College Awards on TOP 0707.10 Computer Programming in Bay Region**

College	Subregion	Associate Degree	Award < 1 academic yr	Postsecondary awards	Total
Berkeley City College	East Bay	3	2	0	5
Cabrillo College	SC-Monterey	4	19	1	24
Canada College	Mid-Peninsula	0	4	0	4
Foothill College	Silicon Valley	0	1	0	1
Mission College	Silicon Valley	0	3	0	3
Ohlone College	East Bay	0	1	0	1
San Jose City College	Silicon Valley	0	1	1	2
West Valley College	Silicon Valley	0	1	1	2
<b>Total</b>		<b>7</b>	<b>32</b>	<b>3</b>	<b>42</b>

Source: Data Mart

Note: The annual average for awards is 2017-18 to 2019-20.

**Table 7b. Other CTE Institutions Awards on TOP 0707.10 Computer Programming in Bay Region**

College	Subregion	Associate Degree	Bachelor's degree	Total
Academy of Art University	Mid-Peninsula	6	44	50
Santa Clara University	Silicon Valley	0	7	7
<b>Total</b>		<b>6</b>	<b>51</b>	<b>57</b>

Note: The annual average for awards is 2017-18 to 2019-20.

## Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 17,046 annual openings for the Web Applications Development occupational cluster and 99 annual (3-year average) awards for an annual undersupply of 16,947 students. In the Silicon Valley Sub-Region, there is also a gap with 8,427 annual openings and 15 annual (3-year average) awards for an annual undersupply of 8,412 students.

## Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0707.10 Computer Programming**

Metric Outcomes	Bay All CTE Programs	Foothill All CTE Programs	State 0707.10	Bay 0707.10	Silicon Valley 0707.10	Foothill 0707.10
Students with a Job Closely Related to Their Field of Study	74%	91%	65%	66%	63%	100%

Metric Outcomes	Bay All CTE Programs	Foothill All CTE Programs	State 0707.10	Bay 0707.10	Silicon Valley 0707.10	Foothill 0707.10
Median Annual Earnings for SWP Exiting Students	\$47,419	\$66,288	\$39,896	\$55,772	\$58,498	\$81,566
Median Change in Earnings for SWP Exiting Students	23%	43%	21%	20%	18%	21%
Exiting Students Who Attained the Living Wage	52%	64%	54%	55%	56%	71%

Source: Launchboard Strong Workforce Program Median of 2017 to 2020.

## Skills, Certifications and Education

**Table 9. Top Skills for Web Applications Development Occupations in Bay Region (Aug 2021 - Jul 2022)**

Skill	Posting	Skill	Posting
JavaScript	10,855	Linux	3,262
Software Engineering	8,720	Scrum	3,040
Java	8,361	Ruby	3,031
Python	8,255	Ruby on Rails	2,976
Quality Assurance and Control	8,113	Adobe Photoshop	2,972
Software Development	7,184	AngularJS	2,877
SQL	5,900	Atlassian JIRA	2,849
React Javascript	4,821	Selenium	2,814
Git	4,516	Project Management	2,775
Front-end Development	4,500	HTML5	2,659
Web Development	4,088	Product Management	2,641
Web Application Development	3,915	Docker Software	2,633
Unit Testing	3,424	TypeScript	2,630
Debugging	3,310	Product Development	2,622

Source: Burning Glass

**Table 10. Certifications for Web Applications Development Occupations in Bay Region (Aug 2021 - Jul 2022)**

Certification	Posting	Certification	Posting
Driver's License	227	Cisco Certified Security Professional	56
Security Clearance	184	Six Sigma Certification	48
Project Management Certification	161	First Aid Cpr Aed	38

Certification	Posting	Certification	Posting
Certified Scrum Trainer (CST)	131	Certified Software Quality Engineer (CSQE)	36
Project Management Professional (PMP)	124	Certified Novell Administrator	36
Certified Salesforce Platform Developer	76	ISTQB Certified	32
Certified Quality Engineer (CQE)	74	Certified ScrumMaster (CSM)	32
American Society For Quality (ASQ) Certification	73	Certified Quality Auditor (CQA)	32
IT Infrastructure Library (ITIL) Certification	66	Cisco Certified Network Associate (CCNA)	30
Automation Certification	60	Certified Medical Assistant	28

Source: Burning Glass

Note: 96% of records have been excluded because they do not include a certification. As a result, the chart above may not be representative of the full sample.

**Table 11. Education Requirements for Web Applications Development Occupations in Bay Region**

Education (minimum advertised)	Latest 12 Mos. Postings	Percent 12 Mos. Postings
High school or vocational training	1,110	5%
Associate's degree	286	1%
Bachelor's degree and higher	21,169	94%

Source: Burning Glass

Note: 41% 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 skills listed in O\*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCCO Data Mart.

## Sources

O\*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

CTE LaunchBoard [www.calpassplus.org/Launchboard/](http://www.calpassplus.org/Launchboard/)

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor's Office MIS system

## Contacts

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