

# Python Programming Occupations

# Labor Market Information Report

# Diablo Valley College

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

**January 2021**

## Recommendation

Based on all available data, there appears to be an “undersupply” of Python Programming workers compared to the demand for this cluster of occupations in the Bay region and in the East Bay sub-region (Alameda and Contra Costa counties). There is a projected annual gap of about 18,618 students in the Bay region and 1,956 students in the East Bay 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 Diablo Valley College and in the region.

This report profiles Python Programming Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new program at Diablo Valley 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. Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. May design embedded systems software. Apply principles and techniques of computer science, engineering, and mathematical analysis.
  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 Python Programming Occupations in Bay Region**

| **Occupation** | **2019 Jobs** | **2024 Jobs** | **5-yr Change** | **5-yr % Change** | **5-yr Total Openings** | **Annual Openings** | **25% Hourly Earning** | **Median Hourly Wage** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Computer Programmers | 10,862 | 11,491 | 629 | 6% | 4,656 | 931 | $40.41 | $53.43 |
| Software Developers and Software Quality Assurance Analysts and Testers | 148,308 | 171,538 | 23,230 | 16% | 84,460 | 16,892 | $52.79 | $67.72 |
| Web Developers and Digital Interface Designers | 11,306 | 13,134 | 1,828 | 16% | 6,400 | 1,280 | $29.03 | $45.02 |
| **Total** | **170,476** | **196,163** | **25,687** | **15%** | **95,516** | **19,103** | **$50.43** | **$65.30** |
| Source: EMSI 2020.4 |

**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 Python Programming Occupations in East Bay Sub-region**

| **Occupation** | **2019 Jobs** | **2024 Jobs** | **5-yr Change** | **5-yr % Change** | **5-yr Total Openings** | **Annual Openings** | **25% Hourly Earning** | **Median Hourly Wage** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Computer Programmers | 2,071 | 2,031 | -40 | -2% | 732 | 146 | $35.84 | $47.82 |
| Software Developers and Software Quality Assurance Analysts and Testers | 19,223 | 20,769 | 1,546 | 8% | 9,262 | 1,852 | $47.86 | $60.79 |
| Web Developers and Digital Interface Designers | 2,195 | 2,359 | 164 | 7% | 1,024 | 205 | $23.65 | $39.97 |
| **Total** | **23,489** | **25,159** | **1,670** | **7%** | **11,018** | **2,203** | **$44.54** | **$57.70** |
| Source: EMSI 2020.4 |

**East Bay Sub-Region includes:** Alameda, Contra Costa Counties

### Job Postings in Bay Region and East Bay Sub-Region

**Table 3. Number of Job Postings by Occupation for latest 12 months (Jan 2020 - Dec 2020)**

| **Occupation** | **Bay Region** | **East Bay** |
| --- | --- | --- |
| Software Developers, Applications | 100,236 | 15,531 |
| Web Developers | 22,703 | 3,434 |
| Computer Programmers | 4,501 | 924 |
| Software Developers, Systems Software | 1,083 | 178 |
| Source: Burning Glass |

**Table 4a. Top Job Titles for Python Programming Occupations for latest 12 months (Jan 2020 - Dec 2020) Bay Region**

| **Title** | **Bay** | **Title** | **Bay** |
| --- | --- | --- | --- |
| Software Engineer | 4,365 | Senior Devops Engineer | 780 |
| Senior Software Engineer | 3,373 | Salesforce Developer | 715 |
| Devops Engineer | 2,075 | Senior Java Developer | 688 |
| Java Developer | 1,957 | Ios Developer | 674 |
| Full-Stack Software Engineer | 1,256 | Full Stack Developer | 628 |
| Senior Front End Engineer | 1,062 | Android Developer | 609 |
| Front End Engineer | 1,042 | Software Developer | 597 |
| Senior Backend Engineer | 1,037 | Python Developer | 587 |
| Backend Engineer | 927 | Ux Designer | 531 |
| Source: Burning Glass |

**Table 4b. Top Job Titles for Python Programming Occupations for latest 12 months (Jan 2020 - Dec 2020) East Bay Sub-Region**

| **Title** | **East Bay** | **Title** | **East Bay** |
| --- | --- | --- | --- |
| Software Engineer | 896 | Senior Java Developer | 173 |
| Senior Software Engineer | 627 | .Net Developer | 163 |
| Devops Engineer | 449 | Software Developer | 143 |
| Java Developer | 383 | Senior Devops Engineer | 134 |
| Full-Stack Software Engineer | 377 | Senior Full-Stack Software Engineer | 133 |
| Senior Front End Engineer | 287 | Full Stack Developer | 120 |
| Front End Engineer | 267 | Build/Release Engineer | 101 |
| Senior Backend Engineer | 260 | Web Developer | 87 |
| Backend Engineer | 200 | Salesforce Developer | 86 |
| Source: Burning Glass |

## Industry Concentration

**Table 5. Industries hiring Python Programming Workers in Bay Region**

| **Industry – 6 Digit NAICS (No. American** **Industry Classification) Codes** | **Jobs in Industry (2019)** | **Jobs in Industry (2024)** | **% Change (2019-24)** | **% Occupation Group in Industry (2019)** |
| --- | --- | --- | --- | --- |
| Custom Computer Programming Services | 35,995 | 42,549 | 18% | 21% |
| Software Publishers | 22,450 | 28,644 | 28% | 13% |
| Computer Systems Design Services | 21,297 | 24,035 | 13% | 12% |
| Internet Publishing and Broadcasting and Web Search Portals | 16,984 | 21,490 | 27% | 10% |
| Electronic Computer Manufacturing | 15,467 | 16,701 | 8% | 9% |
| Data Processing, Hosting, and Related Services | 6,641 | 8,477 | 28% | 4% |
| Other Computer Related Services | 4,779 | 5,887 | 23% | 3% |
| Corporate, Subsidiary, and Regional Managing Offices | 3,606 | 3,548 | -2% | 2% |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) | 2,853 | 3,154 | 11% | 2% |
| Semiconductor and Related Device Manufacturing | 1,968 | 1,788 | -9% | 1% |
| Source: EMSI 2020.4 |

**Table 6. Top Employers Posting Python Programming Occupations in Bay Region and East Bay Sub-Region (Jan 2020 - Dec 2020)**

| **Employer** | **Bay** | **Employer** | **East Bay** |
| --- | --- | --- | --- |
| Amazon | 1762 | Workday, Inc | 211 |
| Apple Inc. | 1666 | Amazon | 158 |
| Vmware Incorporated | 711 | Wells Fargo | 154 |
| Cisco Systems Incorporated | 701 | NTT Data | 129 |
| Facebook | 647 | Tesla | 117 |
| Nvidia Corporation | 644 | Albertsons | 98 |
| Infobahn Softworld Incorporated | 533 | Lawrence Livermore National Laboratory | 95 |
| Wells Fargo | 493 | Siemens | 92 |
| Paypal | 460 | Veeva Systems | 91 |
| Xoriant Incorporated | 455 | Ascent Technology Services | 91 |
| Splunk | 430 | Ntt Data Services | 80 |
| IBM | 426 | University Of California Berkeley | 64 |
| Salesforce | 407 | Safeway Incorporated | 61 |
| eBay | 388 | Lucid Motors Inc | 61 |
| Source: Burning Glass |

## Educational Supply

There are14 community colleges in the Bay Region issuing 485 awards on average annually (last 3 years ending 2018-19) on TOP 0707.10 - Computer Programming. In the East Bay Sub-Region, there is a six (6) community colleges that issued 247 awards on average annually (last 3 years) on this TOP code.

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

| **College** | **Subregion** | **Associate** | **Certificate Low** | **Total** |
| --- | --- | --- | --- | --- |
| Berkeley City | East Bay | 2 | 3 | 5 |
| Cabrillo | SC-Monterey | 2 | 15 | 17 |
| Contra Costa | East Bay | 1 | 0 | 1 |
| De Anza | Silicon Valley | 7 | 51 | 58 |
| Diablo Valley | East Bay | 90 | 139 | 229 |
| Gavilan | Silicon Valley | 14 | 6 | 20 |
| Hartnell | SC-Monterey | 40 | 3 | 43 |
| Laney | East Bay | 7 | 3 | 10 |
| Las Positas | East Bay | 1 | 0 | 1 |
| Ohlone | East Bay | 1 | 0 | 1 |
| San Francisco | Mid-Peninsula | 0 | 69 | 69 |
| San Jose City | Silicon Valley | 7 | 12 | 19 |
| San Mateo | Mid-Peninsula | 1 | 4 | 5 |
| Solano | North Bay | 6 | 1 | 7 |
| **Total** | **-** | **179** | **306** | **485** |
| Source: Data Mart |

*Note: The annual average for awards is 2016-17 to 2018-19.*

## Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 19,103 annual openings for the Python Programming occupational cluster and 485 annual (3-year average) awards for an annual undersupply of 18,618 students. In the East Bay Sub-Region, there is also a gap with 2,203 annual openings and 247 annual (3-year average) awards for an annual undersupply of 1,956 students.

## Student Outcomes

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

| **2017-18** | **Bay****All CTE Program** | **Diablo Valley All CTE Program** | **State****0707.10** | **Bay 0707.10** | **East Bay 0707.10** | **Diablo Valley 0707.10** |
| --- | --- | --- | --- | --- | --- | --- |
| % Employed Four Quarters After Exit | 67% | 60% | 57% | 55% | 51% | 42% |
| Median Quarterly Earning Two Quarters After Exit | $11,466 | $8,979 | $9,542 | $13,414 | $10,838 | $9,269 |
| Median % Change in Earning | 31% | 35% | 29% | 25% | 32% | 35% |
| % of Students Earning a Living Wage | 53% | 39% | 56% | 56% | 51% | 43% |
| Source: Launchboard Pipeline (version available on August 2020) |

## Skills, Certifications and Education

**Table 9. Top Skills for Python Programming Occupations in Bay Region (Jan 2020 - Dec 2020)**

| **Skill** | **Posting** | **Skill** | **Posting** |
| --- | --- | --- | --- |
| Java | 52,353 | Debugging | 12,807 |
| Software Engineering | 49,055 | React Javascript | 12,452 |
| JavaScript | 36,109 | DevOps | 12,441 |
| Python | 32,759 | Node.js | 11,954 |
| SQL | 31,988 | Version Control | 11,888 |
| Software Development | 30,803 | Unit Testing | 11,616 |
| Git | 21,912 | Object-Oriented Analysis and Design (OOAD) | 11,447 |
| Linux | 17,882 | Kubernetes | 11,184 |
| C++ | 16,448 | Ruby on Rails | 10,680 |
| Docker Software | 14,546 | Swift (Programming Language) | 10,303 |
| Ruby | 14,303 | Web Application Development | 10,257 |
| NoSQL | 14,162 | Scalability Design | 10,158 |
| AngularJS | 13,864 | Oracle | 10,045 |
| Web Development | 13,408 | Microsoft C# | 9,537 |
| Source: Burning Glass |

**Table 10. Certifications for Python Programming Occupations in Bay Region (Jan 2020 - Dec 2020)**

| **Certification** | **Posting** | **Certification** | **Posting** |
| --- | --- | --- | --- |
| Security Clearance | 650 | Certified Scrum Trainer (CST) | 110 |
| Certified Salesforce Platform Developer | 510 | Mbe Certified | 108 |
| IT Infrastructure Library (ITIL) Certification | 483 | Cisco Certified Network Professional (CCNP) | 107 |
| Driver's License | 361 | Certified Scrum Professional (CSP) | 98 |
| Certified Information Systems Security Professional (CISSP) | 248 | Certified Salesforce Platform Developer II | 96 |
| Project Management Certification | 206 | Cisco Certified Internetwork Expert (CCIE) | 94 |
| Certified Salesforce Administrator | 194 | Project Management Professional (PMP) | 84 |
| Cisco Certified Network Associate (CCNA) | 137 | Certified Novell Administrator | 78 |
| SANS/GIAC Certification | 121 | Certified Information Systems Auditor (CISA) | 77 |
| Certified ScrumMaster (CSM) | 121 | Certified Salesforce Technical Architect | 75 |
| Source: Burning Glass |

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

**Table 11. Education Requirements for Python Programming Occupations in Bay Region (Jan 2020 - Dec 2020)**

| **Education (minimum advertised)** | **Latest 12 Mos. Postings** | **Percent 12 Mos. Postings** |
| --- | --- | --- |
| High school or vocational training | 1,194 | 2% |
| Associate's degree | 373 | 1% |
| Bachelor's degree | 58,820 | 89% |
| Master's degree | 2,988 | 5% |
| Doctoral degree | 1,870 | 3% |
| Source: Burning Glass |

*Note: 49% of records have been excluded because they do not include a degree level. As a result, the chart below 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 CCCCO Data Mart.

## Sources

O\*Net Online
Labor Insight/Jobs (Burning Glass)
Economic Modeling Specialists International (EMSI)
CTE LaunchBoard 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

For more information, please contact:

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