** Game Development Occupations**

**Labor Market Information Report**

**Santa Rosa Junior College**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

December 2018

# Recommendation

Based on all available data, there appears to be a significant undersupply of Game Development workers compared to the demand for this cluster of occupations in the Bay region and in the North Bay sub-region (Marin, Napa, Solano and Sonoma Counties). The gap is about 12,916 students annually in the Bay region and about 298 students annually in the North Bay sub-region.

This report also provides student outcomes data on employment and earnings for programs on TOP 0614.20 - Electronic Game Design in the state and region. It is recommended that this 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 Santa Rosa Junior College and in the region.

# Introduction

This report profiles Game Development Occupations in the 12 county Bay region and in the North Bay sub-region for a proposed new program at Santa Rosa Junior College. Labor market information (LMI) is not available at the eight-digit SOC Code level for Video Game Designers (15-1199.11), therefore, the data shown in Tables 1 and 2 is for Computer Occupations, All Other (at the six digit SOC level) and likely overstates demand for Video Game Designers. Tables 3, 4, 6, 9, 10 and 11 use job postings data from Burning Glass at the eight-digit SOC Code level for Video Game Designers (15-1199.11).

|  |
| --- |
| * **Computer Occupations, All Other (SOC 15-1199):** All computer occupations not listed separately. Excludes “Computer and Information Systems Managers” (11-3021), “Computer Hardware Engineers” (17-2061), “Electrical and Electronics Engineers” (17-2070), “Computer Science Teachers, Postsecondary” (25-1021), “Multimedia Artists and Animators” (27-1014), “Graphic Designers” (27-1024), “Computer Operators” (43-9011), and “Computer, Automated Teller, and Office Machine Repairs” (49-2011). |
| *Entry-Level Educational Requirement: Bachelor's degree* |
| *Training Requirement: None* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 35%* |
|  |
| * **Multimedia Artists and Animators (SOC** **27-1014):** Create special effects, animation, or other visual images using film, video, computers, or other electronic tools and media for use in products or creations, such as computer games, movies, music videos, and commercials. |
| *Entry-Level Educational Requirement: Bachelor's degree* |
| *Training Requirement: None* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 27%* |
|  |
| * **Software Developers, Applications (SOC 15-1132):** 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: 13%* |
|  |
| * **Computer Programmers (SOC 15-1131):** 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: 22%* |

# Occupational Demand

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Computer Occupations, All Other | 19,753 | 21,788 | 2,035 | 10% | 8,847 | 1,769 | $26.52 | $53.50 |
| Multimedia Artists and Animators | 4,765 | 5,061 | 296 | 6% | 2,250 | 450 | $13.19 | $37.76 |
| Software Developers, Applications | 90,031 | 109,101 | 19,070 | 21% | 49,809 | 9,962 | $38.71 | $62.17 |
| Computer Programmers | 14,212 | 14,794 | 583 | 4% | 5,307 | 1,061 | $27.67 | $48.82 |
| **Total** | **128,761** | **150,744** | **21,983** | **17%** | **66,213** | **13,243** | **$34.68** | **$58.46** |

*Source: EMSI 2018.4*

**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 Game Development Occupations in North Bay Sub-Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Computer Occupations, All Other | 942 | 946 | 3 | 0% | 325 | 65 | $22.24 | $41.48 |
| Multimedia Artists and Animators | 657 | 617 | (40) | (6%) | 252 | 50 | $12.44 | $35.94 |
| Software Developers, Applications | 1,699 | 1,874 | 174 | 10% | 733 | 147 | $32.02 | $54.43 |
| Computer Programmers | 685 | 632 | (53) | (8%) | 205 | 41 | $25.26 | $42.12 |
| **TOTAL** | **3,983** | **4,068** | **85** | **2%** | **1,515** | **303** | **$25.32** | **$46.20** |

*Source: EMSI 2018.4*

**North Bay Sub-Region** includes Marin, Napa, Solano and Sonoma Counties

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

**Table 3. Number of Job Postings by Occupation for latest 12 months (Oct 2017 - Sept 2018)**

|  |  |  |
| --- | --- | --- |
| Occupation | Bay Region | North Bay |
| Software Developers, Applications (15-1132.00) | 94,406 | 1,395 |
| Computer Programmers (15-1131.00) | 4,072 | 100 |
| Software Developers, System Software (15-1133.00) | 1,219 | 33 |
| Video Game Designers (15-1199.11) | 1,074 | 33 |
| **Total** | **100,771** | **1,561** |

*Source: Burning Glass*

**Table 4. Top Job Titles for Game Development Occupations for latest 12 months (Oct 2017 - Sept 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Common Title | Bay | North Bay | Common Title | Bay | North Bay |
| Software Development Engineer | 27,829 | 532 | iOS Developer | 957 | 1 |
| Java Developer | 6,342 | 17 | Senior Devops Engineer | 903 | 3 |
| Devops Engineer | 3,493 | 71 | .Net Developer | 859 | 7 |
| Applications Engineer | 2,665 | 11 | Software Engineering Manager | 739 | 1 |
| Java Engineer | 2,431 | 19 | Senior Engineer | 710 | 22 |
| Software Developer | 2,327 |  | Software Architect | 590 | 6 |
| Python Developer | 1,542 | 13 | Salesforce Developer | 552 | 9 |
| Developer | 1,401 | 83 | Full Stack Developer | 528 | 7 |
| Senior Developer | 1,365 | 26 | Programmer/Analyst | 522 | 29 |
| Android Developer | 1,285 | 3 | Lead Developer | 495 | 26 |
| Applications Developer | 1,258 | 3 | Mobile App Developer | 479 | 65 |
| Principal Software Engineer | 1,133 | 9 | C++ Developer | 446 | 4 |
| Engineer | 1,043 | 1 | Full Stack Engineer | 436 | 4 |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Game Development Workers in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Industry – 6 Digit NAICS (No. American Industry Classification) Codes | Jobs in Industry (2017) | Jobs in Industry (2022) | % Change (2017-22) | % in Industry (2017) |
| Custom Computer Programming Services (541511) | 28,103 | 28,804 | 19% | 21.9% |
| Computer Systems Design Services (541512) | 17,438 | 17,653 | 16% | 13.4% |
| Software Publishers (511210) | 15,473 | 15,953 | 22% | 12.2% |
| Internet Publishing and Broadcasting and Web Search Portals (519130) | 15,304 | 15,807 | 37% | 12.0% |
| Electronic Computer Manufacturing (334111) | 7,006 | 7,111 | 8% | 5.4% |
| Data Processing, Hosting, and Related Services (518210) | 4,561 | 4,761 | 33% | 3.6% |
| Other Computer Related Services (541519) | 3,877 | 3,950 | 23% | 3.0% |
| Corporate, Subsidiary, and Regional Managing Offices (551114) | 2,963 | 3,053 | 9% | 2.3% |
| Federal Government, Civilian, Excluding Postal Service (901199) | 1,659 | 1,651 | 0% | 1.3% |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715) | 1,458 | 1,498 | (6%) | 1.1% |
| Temporary Help Services (561320) | 1,255 | 1,257 | 7% | 1.0% |

*Source: EMSI 2018.4*

**Table 6. Top Employers Posting Game Development Occupations in Bay and North Bay Sub-Region (Oct 2017 - Sept 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Employer | Bay | Employer | Bay | Employer | North Bay |
| Apple Inc. | 2,217 | Paypal | 269 | Capital Markets Placement | 412 |
| Capital Markets Placement | 1,587 | Etouch Systems Corporation | 263 | Microsoft Corporation | 45 |
| Amazon | 1,313 | Linkedin Limited | 261 | Autodesk Incorporated | 29 |
| Google Inc. | 967 | Infoobjects Inc | 253 | Ascent | 19 |
| Cisco Systems Incorporated | 932 | Accenture | 250 | Activision | 17 |
| Facebook | 605 | Splunk | 240 | Telltale Games | 12 |
| Oracle | 573 | Twitter | 226 | Net Matrix Solutions | 11 |
| Workday, Inc | 566 | Xoriant Incorporated | 225 | Revature | 11 |
| IBM | 472 | Redpoint Ventures | 212 | Telltale, Inc | 11 |
| Microsoft Corporation | 396 | Techfetch Com | 209 | General Dynamics | 10 |
| Salesforce | 387 | Tesla Motors | 201 | Keysight Technologies | 10 |
| Nvidia Corporation | 351 | Bayone Solutions | 198 | Keysight Technologies, Inc | 10 |
| Vmware Incorporated | 349 | Adobe Systems | 194 | Akili Interactive Labs | 9 |
| Intel Corporation | 348 | Cynet Systems | 191 | Kavaliro | 9 |
| Walmart / Sam's | 330 | Synergisticit | 190 | Marin General Hospital | 8 |
| SAP | 321 | Redolent, Inc | 188 | California State University | 7 |
| eBay | 317 | Dell | 184 | Carbonite | 7 |

*Source: Burning Glass*

# Educational Supply

Santa Rosa Junior College is the only community college in the Bay Region issuing awards annually on TOP 0614.20 - Electronic Game Design, with one award. There are 15 community colleges in the Bay Region issuing 327 awards annually TOP 0707.10 - Computer Programming. There is one college issuing four awards annually on TOP 0707.10 in the North Bay sub-region.

**Table 7. Awards on TOP 0614.20 - Electronic Game Design and TOP 0707.10 – Computer Programming in the Bay Region**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| College | Sub-Region | TOP | Headcount | Associates | Certificates | Total |
| **Santa Rosa** | North Bay | 061420 | n/a | 1 |  | 1 |
| **San Francisco** | Mid-Peninsula | 061420 | 16 |  |  |  |
| **Marin** | North Bay | 061420 | 28 |  |  |  |
| **Hartnell** | Santa Cruz & Monterey | 070710 | 15 |  |  |  |
| **Berkeley City** | East Bay | 070710 | 289 | 2 | 4 | 5 |
| **Cabrillo** | Santa Cruz & Monterey | 070710 | n/a | 6 | 20 | 26 |
| **Contra Costa** | East Bay | 070710 | n/a | 2 | 1 | 3 |
| **Deanza** | Silicon Valley | 070710 | 2,247 | 7 | 29 | 37 |
| **Diablo Valley** | East Bay | 070710 | 1,386 | 43 | 112 | 155 |
| **Gavilan** | Silicon Valley | 070710 | 323 | 8 | 3 | 11 |
| **Hartnell** | Santa Cruz & Monterey | 070710 | 245 | 11 | 1 | 12 |
| **Laney** | East Bay | 070710 | 455 | 1 | 1 | 2 |
| **Las Positas** | East Bay | 070710 | 548 | 1 | 2 | 3 |
| **Ohlone** | East Bay | 070710 | 771 | 1 | 0 | 1 |
| **San Francisco** | Mid-Peninsula | 070710 | 2,004 |  | 54 | 54 |
| **San Jose City** | Silicon Valley | 070710 | 369 | 6 | 6 | 12 |
| **San Mateo** | Mid-Peninsula | 070710 | 682 | 1 | 1 | 2 |
| **Solano** | North Bay | 070710 | n/a | 4 | 0 | 4 |
| **Total Bay Region** | |  |  | **94** | **233** | **327** |
| **Total North Bay Sub-Region** | |  |  | **5** | **0** | **5** |

# *Source: IPEDS, Data Mart and Launchboard*

NOTE: Headcount of students who took one or more courses is for 2016-17. The annual average for awards is 2014-17 unless there are only awards in 2016-17. The annual average for other postsecondary is for 2013-16.

# Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 13,243 annual openings for the Game Development occupational cluster and 327 annual awards for an annual undersupply of 12,916. In the North Bay sub-region, there is also a gap with 303 annual openings and 5 annual awards for an annual undersupply of 298.

# Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0614.20 - Electronic Game Design**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2015-16 | Bay  (All CTE Programs) | Santa Rosa Junior College (All CTE Programs) | State (0614.20) | Bay (0614.20) | North Bay (0614.20) | Santa Rosa Junior College (0614.20) |
| % Employed Four Quarters After Exit | 75% | 76% | 57% | n/a | n/a | n/a |
| Median Quarterly Earnings Two Quarters After Exit | $13,996 | $9,839 | $4,188 | n/a | n/a | n/a |
| Median % Change in Earnings | 40% | 50% | 87% | n/a | n/a | n/a |
| % of Students Earning a Living Wage | 63% | 62% | 32% | n/a | n/a | n/a |

*Source: Launchboard Pipeline (version available on 12/6/18)*

# Skills, Certifications and Education

**Table 9. Top Skills for Game Development Occupations in Bay Region (Oct 2017 - Sept 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Skill | Postings | Skill | Postings | Skill | Postings |
| Java | 41,160 | Data Structures | 7,447 | Relational Databases | 5,513 |
| Software Engineering | 38,564 | Scrum | 7,284 | Docker Software | 5,261 |
| Python | 27,914 | Quality Assurance and Control | 7,277 | React Javascript | 5,228 |
| Software Development | 26,776 | MySQL | 7,104 | Kubernetes | 5,083 |
| JavaScript | 20,707 | Agile Development | 6,991 | Project Management | 4,963 |
| SQL | 19,684 | Microsoft C# | 6,895 | HTML5 | 4,904 |
| Linux | 18,852 | AngularJS | 6,811 | Salesforce | 4,826 |
| C++ | 16,541 | Scalability Design | 6,704 | Scala | 4,661 |
| Git | 12,184 | Ruby | 6,661 | Apache Webserver | 4,653 |
| Object-Oriented Analysis and Design (OOAD) | 10,860 | Apache Hadoop | 6,423 | Product Management | 4,623 |
| Debugging | 10,635 | Extensible Markup Language (XML) | 6,133 | Software as a Service (SaaS) | 4,600 |
| Oracle | 10,056 | Big Data | 6,086 | PostgreSQL | 4,489 |
| DevOps | 10,042 | Software Architecture | 6,014 | Node.js | 4,319 |
| UNIX | 9,242 | JavaScript Object Notation (JSON) | 5,915 | Hypertext Preprocessor (PHP) | 4,212 |
| Unit Testing | 8,993 | PERL Scripting Language | 5,868 | Ansible | 4,205 |
| Web Application Development | 8,316 | Machine Learning | 5,774 | Product Development | 4,159 |
| Continuous Integration (CI) | 8,120 | Apache Kafka | 5,523 | Computer Engineering | 4,098 |
| NoSQL | 7,719 | jQuery | 5,519 | Chef Infrastructure Automation | 4,089 |

*Source: Burning Glass*

**Table 10. Certifications for Game Development Occupations in the Bay Region (Oct 2017 - Sept 2018)**

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.

|  |  |  |  |
| --- | --- | --- | --- |
| Certification | Postings | Certification | Postings |
| IT Infrastructure Library (ITIL) Certification | 495 | Java Certification | 80 |
| Security Clearance | 421 | Certified Information Systems Auditor (CISA) | 78 |
| Driver's License | 318 | Certified ScrumMaster (CSM) | 77 |
| Project Management Certification | 305 | Automation Certification | 69 |
| Salesforce Developer | 239 | Certified Salesforce Advanced Developer | 67 |
| Certified Information Systems Security Professional (CISSP) | 231 | Certified Information Security Manager (CISM) | 66 |
| ITIL Certification | 186 | Certified Salesforce Platform Developer II | 63 |
| Cisco Certified Internetwork Expert (CCIE) | 185 | Agile Certification | 62 |
| Cisco Certified Network Associate (CCNA) | 179 | Salesforce Platform App Builder | 58 |
| Cisco Certified Network Professional (CCNP) | 167 | Certified Scrum Professional (CSP) | 57 |
| Certified Salesforce Platform Developer | 156 | Mbe Certified | 55 |
| Certified Salesforce Administrator | 152 | Microsoft Certified Solutions Developer (MCSD) | 54 |
| Project Management Professional (PMP) | 144 | Certified Senior System Architect | 52 |
| Certified Scrum Trainer (CST) | 142 | ITIL Foundation | 51 |
| SANS/GIAC Certification | 102 | Certified Salesforce Platform Developer I | 48 |
| CompTIA Security+ | 91 | Red Hat Certified Engineer (RHCE) | 46 |
| Microsoft Certified Professional (MCP) | 88 | Certified Salesforce Advanced Administrator | 44 |
| Capability Model Maturity Integration (CMMI) Certification | 82 | Certified Novell Administrator | 43 |

*Source: Burning Glass*

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

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.

|  |  |
| --- | --- |
| Education (minimum advertised) | Latest 12 Mos. Postings |
| High school or vocational training | 604 (1%) |
| Associate Degree | 333 (1%) |
| Bachelor’s Degree or Higher | 50,553 (98%) |

*Source: Burning Glass*

# 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/](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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