FOOTHILL COLLEGE

Computer Science

Program Report
For Greater South Bay and Peninsula Region
(Santa Clara and San Mateo Counties)

September 2016

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Computer Science

CIP 2010: A program that focuses on computer theory, computing problems and solutions, and the design of computer systems and user interfaces from a scientific perspective. Includes instruction in the principles of computational science, computer development and programming, and applications to a variety of end-use situations.

Target Occupations‡

Computer and Information Systems Managers (11-3021)
Computer and Information Research Scientists (15-1111)
Information Security Analysts (15-1122)
Computer Programmers (15-1131)
Software Developers, Applications (15-1132)
Software Developers, Systems Software (15-1133)
Web Developers (15-1134)
Computer Network Architects (15-1143)
Computer User Support Specialists (15-1151)
Computer Network Support Specialists (15-1152)
Computer Occupations, All Other (15-1199)

‡Based on EMSI crosswalk of the Classification of Instructional Programs (CIP) codes with Standard Occupational Classification (SOC) codes as published by the U.S. Department of Education.

In 2016, the number of Computer Science jobs in the target occupations in Santa Clara and San Mateo Counties totaled 147,150. The Bureau of Labor Statistics (BLS) expects the total number of positions to increase by almost 8% over the next three years.

Occupation Summary for Computer Science

147,150	7.5%	$62.64/hr
Jobs (2016)[1]	**% Change (2016-2019)[3]**	**Median Hourly Earnings**
319% above National average[2]	Nation: 5.8%	Nation: $41.77/hr

[1]Based on total number of jobs for target occupations in Santa Clara and San Mateo Counties.
[2]Represents occupation density as compared to national average (national average=1).
[3]Based on turnover and new jobs.

Target occupations that are mapped to the Computer Science program are disaggregated to see which occupations are projected to see the highest number of annual openings (Software Developers, Applications), highest percentage rate of growth over the next three years (Web Developers), and the highest median hourly earnings (Computer and Information Systems Managers). While Web Developers are expected to experience job growth (13%), these occupations are more represented and concentrated in our region (Santa Clara and San Mateo Counties) compared to the national average.

Target Occupations

Occupation	2016 Jobs	Annual Openings	Median Hourly Earnings	Growth (2016 - 2019)	Location Quotient (2016)
Software Developers, Applications	53,570	2,495	$66.05/hr	9.37%	6.58
Software Developers, Systems Software	31,165	994	$66.59/hr	5.10%	7.39
Computer and Information Systems Managers	16,878	609	$85.25/hr	7.06%	4.58
Computer User Support Specialists	12,471	594	$35.52/hr	10.12%	1.84
Computer Programmers	9,519	278	$46.14/hr	0.92%	2.99
Computer Occupations, All Other	5,657	175	$55.78/hr	4.81%	2.28
Web Developers	5,375	303	$45.93/hr	12.67%	3.06
Computer Network Support	4,506	164	$42.04/hr	6.84%	2.16

Occupation	2016 Jobs	Annual Openings	Median Hourly Earnings	Growth (2016 - 2019)	Location Quotient (2016)
Specialists					
Computer Network Architects	4,091	151	$68.59/hr	6.62%	2.64
Computer and Information Research Scientists	2,256	79	$66.76/hr	6.52%	7.93
Information Security Analysts	1,662	87	$57.16/hr	11.43%	1.77

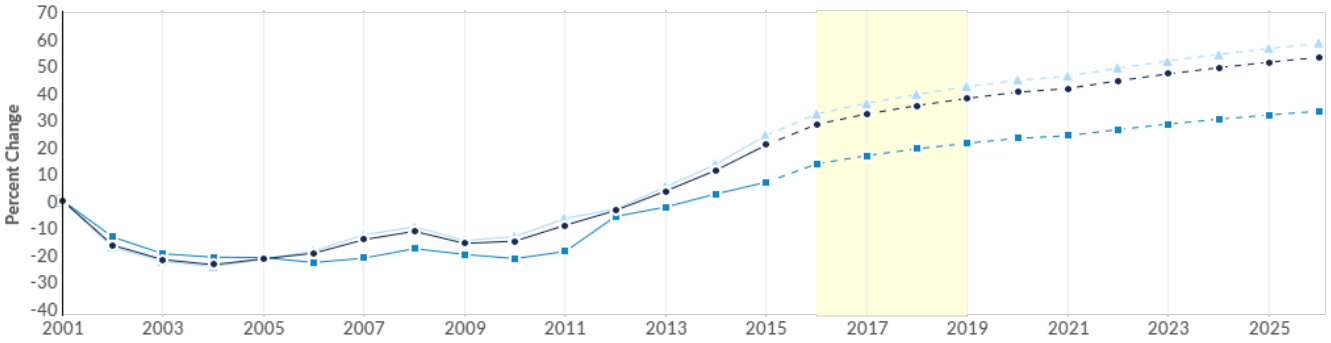
Growth in the Computer Science occupations show how each occupation is projected to increase in jobs over the next three years. A growth of about 8% is expected in the next three years for Computer Science.

Growth for Computer Science

147,150	158,168	11,018	7.5%
2016 Jobs	2019 Jobs	Change (2016-2019)	% Change (2016-2019)

Occupation	2016 Jobs	2019 Jobs	Change	% Change
Computer and Information Systems Managers (11-3021)	16,878	18,070	1,192	7%
Computer and Information Research Scientists (15-1111)	2,256	2,403	147	7%
Information Security Analysts (15-1122)	1,662	1,852	190	11%
Computer Programmers (15-1131)	9,519	9,607	88	1%
Software Developers, Applications (15-1132)	53,570	58,589	5,019	9%
Software Developers, Systems Software (15-1133)	31,165	32,754	1,589	5%
Web Developers (15-1134)	5,375	6,056	681	13%
Computer Network Architects (15-1143)	4,091	4,362	271	7%
Computer User Support Specialists (15-1151)	12,471	13,733	1,262	10%
Computer Network Support Specialists (15-1152)	4,506	4,814	308	7%
Computer Occupations, All Other (15-1199)	5,657	5,929	272	5%

Regional Trends

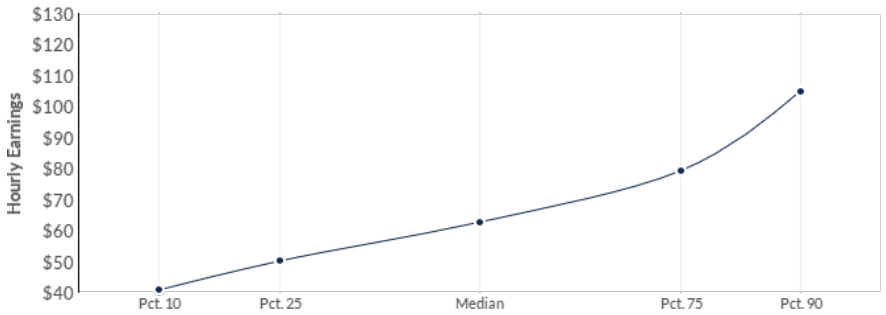


	Region	2016 Jobs	2019 Jobs	Change	% Change
●	Region	147,150	158,168	11,018	7.5%
●	San Mateo County, CA	26,890	28,704	1,814	6.7%
●	Santa Clara County, CA	120,260	129,464	9,204	7.7%

The percentile earnings table shows the range the Computer Science occupations earn in the region. While the median earnings are around $62/hour, wages can range from below $50/hour to above $79/hour. Each of the target occupations' range in wages is also displayed.

Percentile Earnings for Computer Science

$50.06/hr	$62.64/hr	$79.19/hr
25th Percentile Earnings	Median Earnings	75th Percentile Earnings



Occupation	25th Percentile Earnings	Median Earnings	75th Percentile Earnings
Computer and Information Systems Managers (11-3021)	$69.93	$85.25	$120.75
Computer and Information Research Scientists (15-1111)	$52.86	$66.76	$86.49
Information Security Analysts (15-1122)	$46.87	$57.16	$70.64
Computer Programmers (15-1131)	$31.93	$46.14	$59.27
Software Developers, Applications (15-1132)	$53.64	$66.05	$80.44
Software Developers, Systems Software (15-1133)	$54.73	$66.59	$81.30
Web Developers (15-1134)	$34.13	$45.93	$60.46
Computer Network Architects (15-1143)	$56.29	$68.59	$80.27
Computer User Support Specialists (15-1151)	$26.07	$35.52	$47.45
Computer Network Support Specialists (15-1152)	$32.80	$42.04	$53.75
Computer Occupations, All Other (15-1199)	$38.20	$55.78	$71.01

Program Completion Data

Program data reviews completion information about awards by institution and types of awards conferred in the region (Santa Clara and San Mateo Counties). Foothill College is one of the thirteen regional institutions that is supporting and preparing for Computer Science occupations. Associates degree awards represent a minority of all completion from Computer Science programs (3%).

Program Summary for Computer Science

13	620	10,853
Regional Institutions	**Regional Program Completions (2015)**	**Annual Openings (2015)**
had Completions in the last 13 years	Foothill College Completions: 12	

Regional Completions by Institution

Institution	Certificates (2015)	Degrees (2015)	Total Completions (2015)
Stanford University	0	435	435
San Jose State University	0	167	167
Foothill College	0	12	12
College of San Mateo	0	5	5
San Jose City College	0	1	1
Silicon Valley University	0	0	0
International Technological University	0	0	0
West Valley College	0	0	0
Skyline College	0	0	0
Opportunities Industrialization Center-West	0	0	0
Notre Dame de Namur University	0	0	0
Mission College	0	0	0
Canada College	0	0	0

Regional Completions by Award Level

Award Level	Completions (2015)	Percent
Associates degree	18	2.9%
Bachelors degree	338	54.5%
Masters degree	233	37.6%

Award Level	Completions (2015)	Percent
Doctors degree	31	5.0%

Target Occupations Demographics

The demographics among those employed in Computer Science occupations in Santa Clara and San Mateo Counties for 2016 show that a majority are males (77%) and a third are between the ages of 35-44 (35%) and half are Asian (51%).

Occupation Gender Breakdown

Gender	2016 Jobs	2016 Percent
Males	112,949	76.8%
Females	34,201	23.2%

Occupation Age Breakdown

Age	2016 Jobs	2016 Percent
14-18	362	0.2%
19-24	5,915	4.0%
25-34	39,189	26.6%
35-44	51,433	35.0%
45-54	34,519	23.5%
55-64	13,435	9.1%
65+	2,297	1.6%

Occupation Race/Ethnicity Breakdown

Race/Ethnicity	2016 Jobs	2016 Percent
Asian	74,779	50.8%
White	58,139	39.5%
Hispanic or Latino	8,341	5.7%
Black or African American	3,159	2.1%
Two or More Races	2,182	1.5%
Native Hawaiian or Other Pacific Islander	338	0.2%
American Indian or Alaska Native	212	0.1%

Industries Employing Computer Science Occupations

A number of industries in Santa Clara and San Mateo Counties employ those trained in Computer Science and its related occupations. The following table represents a regional industry breakdown of the number of Computer Science positions employed, the percentage of Computer Science employed by industry and the Computer Science jobs represent within all jobs by each industry. While Custom Computer Programming Services employed only 19% of all regional Computer Science positions in 2016, Computer Science occupations composed a large amount of jobs in that industry (51%).

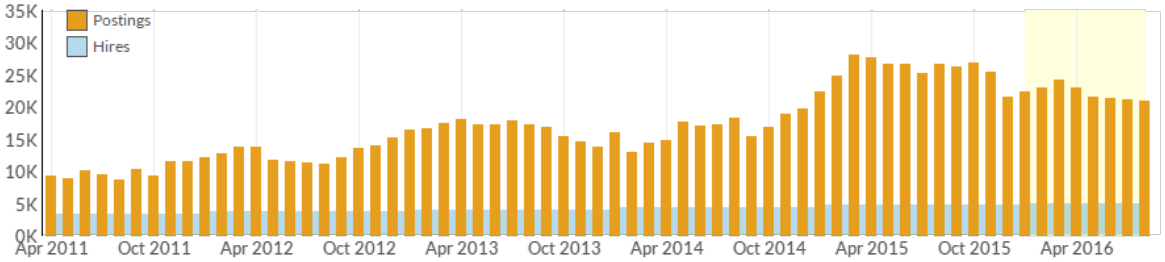
Industries Employing Computer Science Occupations

Industry	Occupation Group Jobs in Industry (2016)	% of Occupation Group in Industry (2016)	% of Total Jobs in Industry (2016)
Custom Computer Programming Services	27,953	19.0%	51.3%
Internet Publishing and Broadcasting and Web Search Portals	22,499	15.3%	41.1%
Computer Systems Design Services	18,619	12.7%	52.3%
Electronic Computer Manufacturing	17,415	11.8%	34.5%
Software Publishers	16,206	11.0%	54.4%

In an average month, there were 22,123 unique (internet) job postings for Computer Science jobs, and 4,929 actually hired from January 2016 to August 2016. This means there was approximately 1 hire for every 5 unique (internet) job postings for occupations in Computer Science. In cases where there were more hires compared to job postings, it suggests that the internet may not be the primary way that job openings for these occupations are advertised.

Job Postings vs. Hires

22,123	4,929
Avg. Monthly Postings (Jan 2016 - Aug 2016)	**Avg. Monthly Hires (Jan 2016 - Aug 2016)**



Occupation	Avg Monthly Postings (Jan 2016 - Aug 2016)	Avg Monthly Hires (Jan 2016 - Aug 2016)
Software Developers, Applications	9,499	1,828
Computer Occupations, All Other	4,680	207
Software Developers, Systems Software	2,046	909
Web Developers	1,726	180
Computer User Support Specialists	1,070	465
Computer and Information Systems Managers	1,034	561
Information Security Analysts	753	63
Computer and Information Research Scientists	581	73
Computer Programmers	509	339
Computer Network Architects	200	149
Computer Network Support Specialists	25	155

The top five concentrated hard and soft skills employers list in Computer Science job posting descriptions are listed below. The “Postings with Skill” column is the total amount of (internet) job postings that mention the skills listed below. These numbers may be higher than the average monthly postings from above, because this number includes duplicated (internet) job postings. The “Concentration Score” gauge relevance of the skill by indicating the frequency in which this skill is being mentioned in (internet) job postings for Computer Science compared to all other (internet) job postings.

Concentrated Hard Skills

Skill	Concentration Score	Postings with Skill
Java (Programming Language)	4.11	73,543
Python (Programming Language)	3.35	30,831
Algorithms	2.93	20,962
C++ (Programming Language)	2.77	37,635
Apache Hadoop	2.52	18,860

Concentrated Soft Skills

Skill	Concentration Score	Postings with Skill
Memory	0.07	2,001
Leadership	0.04	37,256
Reliability	0.02	2,891
Creativity	0.02	6,656
Medical Ethics	0.01	880

Appendix A - Data Sources and Calculations

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Occupation Data

Emsi occupation employment data are based on final Emsi industry data and final Emsi staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level Emsi earnings by industry.

Completers Data

The completers data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

CareerBuilder/Emsi Job Postings

Job postings are collected from various sources and processed/enriched by Careerbuilder to provide information such as standardized company name, occupation, skills, and geography. Emsi performs additional filtering and processing to improve compatibility with Emsi data.

State Data Sources

This report uses state data from the following agencies: California Labor Market Information Department