

# Computer Software Development (TOP 0707.00)

## *Regional Program Demand Report*

*Foothill College, San Francisco larger MSA*

# Introduction and Contents

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## Purpose and Goals

This report is designed to integrate and analyze data from multiple sources to help educational institutions discover regional labor market needs for certain postsecondary programs of study. The overall goal is to help a college align their program offerings the economy and labor market of its service region. To do this, the report selects a set of focus occupations, determines the regional job outlook for them, and compares this to the number of recent graduates in related programs at regional educational institutions. While this is a first step toward a supply/demand analysis, for increased accuracy it could be extended with survey-based information from local employers regarding their hiring outlook and recruitment sources.

The occupation employment and wage numbers are from EMSI's national Complete Employment database, which is built using numerous published data sources from the federal Bureau of Labor Statistics, Bureau of Economic Analysis, and Bureau of the Census. In addition, the report uses industry/occupation data and projections created by the State of AnyState. The completions-by-program and program-to-occupation links use data from the U.S. Department of Education.

These data sources have been specially processed and harmonized to provide more complete and detailed data than any individual source used. For more information, see the final page of this report.

## Focus College

Foothill College

## Region Definition

Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara

## Key Terms and Concepts

**Programs:** Courses of postsecondary study defined by CIP (Classification of Instructional Programs) codes.

**Occupation:** A category of workers defined by the Standard Occupational Classification (SOC).

**Relating occupations to Programs:** EMSI determines these links using information from the U.S. Department of Education.

**Replacement Jobs:** The estimated number of job openings in an occupation due to retirement, turnover, and other factors aside from job growth. Based on national percentages by occupation.

**Annual openings:** The sum of new jobs and estimated replacement jobs for a given occupation, divided by the number of years in the timeframe.

**Earnings:** For industries, total annual earnings per worker is reported; these earnings include wages, salaries, profits, and benefits. Occupational earnings are reported as median hourly wage only.

**Jobs:** Full-time and part-time positions held by proprietors and payroll employees in the public or private sector. May exceed actual worker count.

**Projections:** Estimates of future job or population numbers based on (1) recent historical regional trends and (2) published forecasts created by a consensus of state and federal agencies.

# Executive Summary

## Overview

This report focuses on **2 occupations** which are expected to provide **540 annual job openings** from 2008-2013 in the San Francisco larger MSA 6-county area. Meanwhile, in 2007, area colleges produced **338 graduates** in **15 programs** related to these occupations. The numbers indicate an opportunity for area colleges to expand their offerings in this field.<sup>1</sup>

## Focus Occupations

The following occupations were selected for analysis in this report:<sup>2</sup>

- Computer programmers
- Numerical tool and process control programmers

## Focus Programs

The key occupations above correspond to the following standard postsecondary program titles:<sup>3</sup>

- Artificial Intelligence and Robotics
- Computer Programming/Programmer, General
- Computer Programming, Specific Applications
- Computer Programming, Vendor/Product Certification
- Computer Programming, Other
- Data Processing and Data Processing Technology/Technician
- Web Page, Digital/Multimedia and Information Resources Design
- Computer Graphics
- Computer Software and Media Applications, Other
- Web/Multimedia Management and Webmaster
- Bioinformatics
- Medical Office Computer Specialist/Assistant
- Medical Informatics
- E-Commerce/Electronic Commerce
- Management Information Systems, General

**1. Annual job openings: new plus replacement jobs divided by years in the timeframe. Note that openings may be filled from various sources besides new graduates, and that graduates may work in occupations unrelated to their degree.**

**2. Occupations are defined by the federal SOC system.**

**3. Programs are defined by the federal CIP system. The occupation-program crosswalk is based on the CIP-SOC crosswalk published by the U.S. Department of Education.**

## Labor Market Outlook

Aggregated data for all focus occupations:

	Region	State[s]	U.S.
2008 total jobs	17,194	47,784	495,120
2013 total jobs	17,762	48,328	491,299
2008-2013 growth	568	543	-3,821
2008-2013 repl. jobs	2,130	5,866	49,801
Median hourly earnings	\$36.10	\$31.62	\$29.86

## Focus Program Completions

"Completions" represents the total number of students to attain an award or degree at each given level in all the above college programs.

Award Level	2007 Completions (Foothill College)	2007 Completions (All Colleges in Region)
Award < 2 years	6	65
Associate's	6	50
Bachelor's	-	132
Postbaccalaureate Certificate	-	-
Master's	-	87
Doctor's	-	4
Professional	-	-
<b>TOTAL</b>	<b>12</b>	<b>338</b>

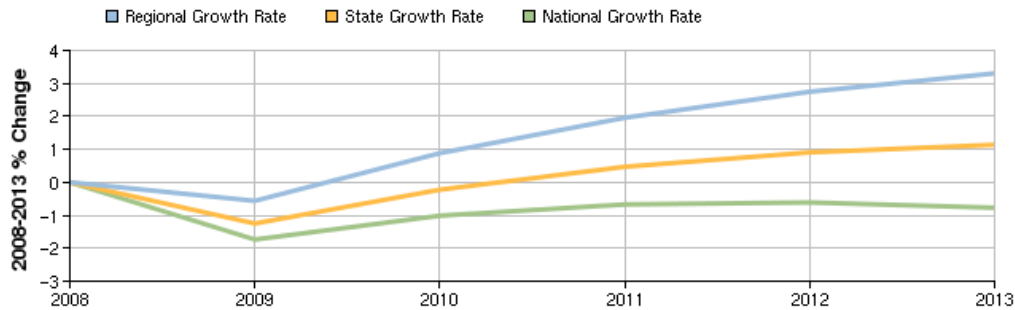
Source: U.S. Department of Education, National Center for Education

Statistics: Integrated Postsecondary Education Data System (IPEDS).

# Job Outlook Summary

## Percent Change in Employment, All Focus Occupations

This graph shows yearly percent growth compared to 2008.



The table summarizes the regional job outlook for the focus occupations using employment projections and current wage data, indicating the demand for these kinds of workers and their pay scale. Colleges which strive to be labor market responsive, maximize their economic impact, and generate a return on investment for public funds should generally focus program resources to support high-growth, high-wage occupations.

## Detailed Information by Occupation

Occupation Title	2008-13 Avg. Annual Openings			Median Hourly Earnings		
	Region	State[s]	U.S.	Region	State[s]	U.S.
Computer programmers	538	1,265	9,066	\$36.31	\$31.87	\$30.21
Numerical tool and process control programmers	1	17	130	\$27.05	\$24.29	\$20.44
<b>TOTAL</b>	<b>540</b>	<b>1,282</b>	<b>9,196</b>	<b>\$36.10</b>	<b>\$31.62</b>	<b>\$29.86</b>

Source: EMSI Complete Employment, 3/2008.

Average annual openings: total new plus replacement jobs over the entire timeframe divided by number of years in the timeframe.

1. Projected new and replacement jobs can indicate demand, but are not necessarily equivalent to demand. The number is based on past regional performance of the industries that employ workers in the given occupations, combined with official, biannual state and federal ten-year estimates. Projections may underestimate demand if employers need these kinds of workers but are unable to hire qualified individuals to meet their needs, or if unforeseen business recruitment and growth outpace past trends. Similarly, projections may overestimate demand if there are unforeseen contractions in key employers, entire industries, or the national economy as a whole.

# Regional Job Outlook

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The table summarizes the regional job outlook for the focus occupations using employment projections and current wage data, indicating the demand for these kinds of workers and their pay scale. Colleges which strive to be labor market responsive, maximize their economic impact, and generate a return on investment for public funds should generally focus program resources to support high-growth, high-wage occupations. Occupations are sorted by total 2008 jobs.

<b>Occupation Title</b>	<b>2008 Jobs</b>	<b>2013 Jobs</b>	<b>New Jobs</b>	<b>New &amp; Rep. Jobs</b>	<b>Median Hourly Earnings</b>
Computer programmers	16,780	17,381	601	2,692	\$36.31
Numerical tool and process control programmers	415	382	-33	6	\$27.05
	<b>17,194</b>	<b>17,762</b>	<b>568</b>	<b>2,698</b>	<b>\$36.10</b>

Source: EMSI Complete Employment - Spring 2009.

# State & National Job Outlook

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These two tables summarize the state and national job outlook for the focus occupations using employment projections and current wage data, indicating the demand for these kinds of workers and their pay scale. Occupations are in the same order as they are in the regional job outlook table on the previous page.

## State Job Outlook

Occupation Title	2008 Jobs	2013 Jobs	New Jobs	New & Rep. Jobs	Median Hourly Earnings
Computer programmers	46,090	46,712	622	6,326	\$31.87
Numerical tool and process control programmers	1,694	1,615	-79	83	\$24.29
	<b>47,784</b>	<b>48,328</b>	<b>543</b>	<b>6,409</b>	<b>\$31.62</b>

Source: EMSI Complete Employment - Spring 2009.

## National Job Outlook

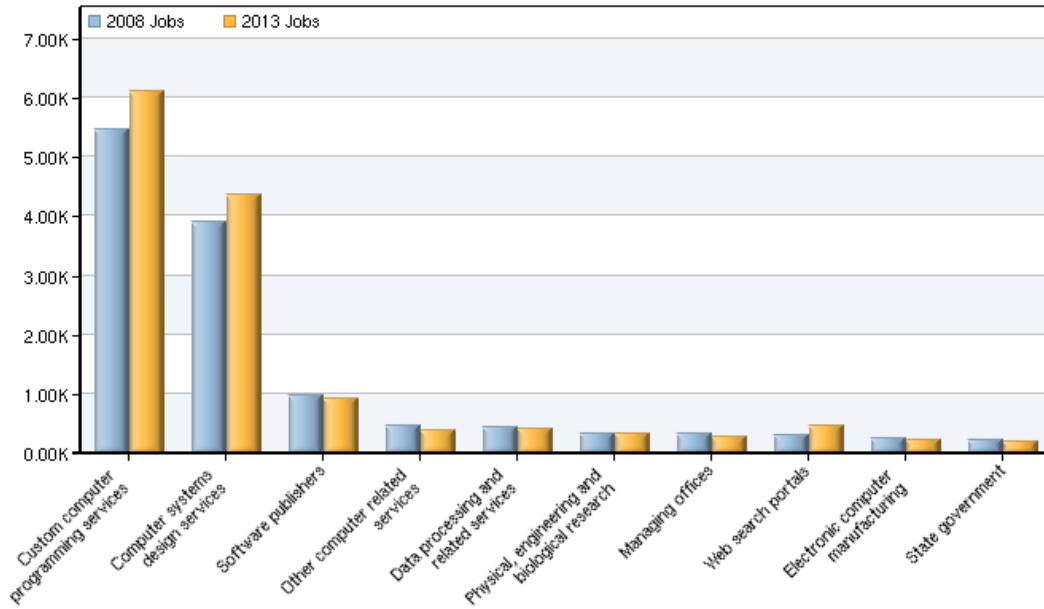
Occupation Title	2008 Jobs	2013 Jobs	New Jobs	New & Rep. Jobs	Median Hourly Earnings
Computer programmers	476,373	473,694	-2,679	45,331	\$30.21
Numerical tool and process control programmers	18,747	17,605	-1,142	649	\$20.44
	<b>495,120</b>	<b>491,299</b>	<b>-3,821</b>	<b>45,980</b>	<b>\$29.86</b>

Source: EMSI Complete Employment - Spring 2009.

# Inverse Staffing Patterns

## Industrial Makeup

These are your region's top ten growing industries in the selected occupations.



NAICS Code	Description	2008 Jobs	2013 Jobs	Change	% Change
541511	Custom computer programming services	5,475	6,118	643	12%
541512	Computer systems design services	3,905	4,363	458	12%
511210	Software publishers	956	923	-33	-3%
541519	Other computer related services	448	381	-67	-15%
518210	Data processing and related services	421	400	-21	-5%
541710	Physical, engineering and biological research	316	324	8	3%
551114	Managing offices	310	274	-36	-12%
518112	Web search portals	305	445	140	46%
334111	Electronic computer manufacturing	248	218	-30	-12%
920000	State government	222	201	-21	-9%

# Regional Graduation Summary

Regional graduations ("completions" or number of awards/degrees granted) in the programs tied to the focus occupations are one indicator of workforce supply. (Other sources include in-migration of new workers to the region, promotion from within firms, and currently unemployed workers in the same or similar occupations.) The following table breaks down these graduations by program and award level at AnyRegion college and at all institutions in the region. A zero entry for completers indicates the program is offered but had no completions, while a "-" indicates the program is not offered.

CIP Code	Program Title	Award Level	2007 Completions, Your College	2007 Completions, Entire Region
11.0102	Artificial Intelligence and Robotics	[all]	-	-
11.0201	Computer Programming/Programmer, General	Award of less than 1 academic year	4	28
		Award of at least 1 but less than 2 academic years	-	1
		Associate's degree	3	28
		Award of at least 2 but less than 4 academic years	-	-
		Bachelor's degree	-	-
11.0202	Computer Programming, Specific Applications	[all]	-	-
11.0203	Computer Programming, Vendor/Product Certification	[all]	-	-
11.0299	Computer Programming, Other	[all]	-	-
11.0301	Data Processing and Data Processing Technology/Technician	[all]	-	-
11.0801	Web Page, Digital/Multimedia and Information Resources Design	Award of less than 1 academic year	-	11
		Award of at least 1 but less than 2 academic years	-	-
		Associate's degree	-	4
		Bachelor's degree	-	5
		Master's degree	-	8
11.0803	Computer Graphics	Award of less than 1 academic year	-	4
		Award of at least 1 but less than 2 academic years	-	11
		Associate's degree	-	14
		Bachelor's degree	-	84
		Master's degree	-	28
11.0899	Computer Software and Media Applications, Other	Award of less than 1 academic year	-	7
		Bachelor's degree	-	2
11.1004	Web/Multimedia Management and Webmaster	Award of less than 1 academic year	1	2
		Award of at least 1 but less than 2 academic years	-	-
		Associate's degree	3	4
26.1103	Bioinformatics	[all]	-	-
51.0709	Medical Office Computer Specialist/Assistant	[all]	-	-



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CIP Code	Program Title	Award Level	2007 Completions, Your College	2007 Completions, Entire Region
51.2706	Medical Informatics	Master's degree	-	8
		Doctor's degree	-	4
52.0208	E-Commerce/Electronic Commerce	Award of less than 1 academic year	1	1
		Award of at least 1 but less than 2 academic years	-	-
		Associate's degree	-	-
		Bachelor's degree	-	1
		Master's degree	-	2
52.1201	Management Information Systems, General	Award of less than 1 academic year	-	-
		Award of at least 1 but less than 2 academic years	-	-
		Associate's degree	-	-
		Bachelor's degree	-	40
		Master's degree	-	41
<b>TOTAL</b>			<b>12</b>	<b>338</b>

Source: U.S. Department of Education, National Center for Education Statistics: Integrated Postsecondary Education Data System (IPEDS).

# Occupational Programs & Completers

The following section provides detailed information for each focus occupation, including the job outlook information provided above. Each occupation is also associated with one or more postsecondary programs (defined by standard CIP 2000 codes) using information published by the U.S. Department of Education with customizations by EMSI.

A zero entry for completers indicates the program is offered but had no completions, while a "-" indicates the program is not offered.

## Summary Table

Occupation	2008-2013 Avg. Annual Openings	2007 Completions, All Related Programs (College)	2007 Completions, All Related Programs (Region)	Total Related Programs	Total Occs. Sharing Same Programs
Computer programmers	538	12	338	14	13
Numerical tool and process control programmers	1	7	57	2	5

Source: EMSI Complete Employment; U.S. Department of Education, IPEDS & Occupational Code Crosswalk - CIP 2000.

An occupation may be related to multiple programs and vice versa. Completions may be double-counted if related to multiple occupations; **do not total**. See columns "Total Related Programs" and "Total Occs. Sharing Same Programs" to refine interpretation of openings versus completions.

## Detail Tables

The following tables provide detailed information for focus occupations and related programs, comparing estimated average annual openings in each occupation with recent completions (awards/degrees) in related programs at both AnyRegion College and at all institutions in the region. Many postsecondary programs are linked to multiple occupations; this is shown in the final column of each table and is one indication that fewer program completers will likely enter the given occupation than the overall total would suggest.

Sources for this section: EMSI Complete Employment, 3/2008; U.S. Department of Education, IPEDS.

### Computer programmers

2008-2013 Avg. Annual Openings: **538**

Median Hourly Earnings: **\$36.31**

Related Programs	2007 Completions, College	2007 Completions, Entire Region	Other Occupations Linked to Program
TOTAL, ALL RELATED PROGRAMS	12	338	13
Artificial Intelligence and Robotics	-	-	4
Computer Programming/Programmer, General	7	57	1
Computer Programming, Specific Applications	-	-	-
Computer Programming, Vendor/Product Certification	-	-	-
Computer Programming, Other	-	-	-
Web Page, Digital/Multimedia and Information Resources Design	-	28	2
Computer Graphics	-	141	-
Computer Software and Media Applications, Other	-	9	-
Web/Multimedia Management and Webmaster	4	6	1
Bioinformatics	-	-	1
Medical Office Computer Specialist/Assistant	-	-	1
Medical Informatics	-	12	-
E-Commerce/Electronic Commerce	1	4	1
Management Information Systems, General	-	81	2

### Numerical tool and process control programmers

2008-2013 Avg. Annual Openings: **1**

Median Hourly Earnings: **\$27.05**

Related Programs	2007 Completions, College	2007 Completions, Entire Region	Other Occupations Linked to Program
TOTAL, ALL RELATED PROGRAMS	7	57	5
Computer Programming/Programmer, General	7	57	2
Data Processing and Data Processing Technology/Technician	-	-	3

# About the Data

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## Introduction

EMSI data is a compilation and harmonization of more than 80 government and private-sector sources. Updated every six months and based on the most recent data available, the dataset covers the entire US population and economy, down to each individual ZIP code. It includes data for industries, occupations, demographics, postsecondary institutions, and selected economic indicators.

## Occupation Data

Organizing regional employment information by occupation provides a workforce-oriented view of the regional economy. EMSI's occupation data are based on EMSI's industry data and regional "staffing patterns" (showing the average mix of job types in various industries) taken from the Occupational Employment Statistics program (U.S. Bureau of Labor Statistics). Wage information is augmented by data from the American Community Survey (U.S. Census). Replacement jobs and annual openings estimates are based on national survey data by occupation. As in the official government statistics, occupations are categorized by Standard Occupational Classification (SOC) codes and titles.

## Completions Data

Completions are voluntarily reported by postsecondary institutions through the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS). Completions are organized by program using the Classification of Instructional Programs (CIP) codes and titles.

## Relating Occupations to Postsecondary Programs

The occupation-to-program (SOC-to-CIP) "crosswalk" is a large table that describes which occupations are generally trained for by each standard postsecondary program (based on Classification of Instructional Programs [CIP] codes and titles, last updated in 2000). EMSI starts with the official crosswalk published by the U.S. Department of Education and customizes it in various ways to make it more accurate and practical for comparing programs to regional labor markets.

# About Economic Modeling Specialists

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## Products and Services

EMSI provides integrated regional economic and labor market data, web-based analysis tools, data-driven reports, and custom consulting services. EMSI specializes in detailed information about regional economies for assessment and planning purposes, bringing together industry, workforce, economic development, and education/training perspectives.

EMSI's expertise is centered on regional economics, data integration and analysis, programming, and design so that it can provide the best available products and services for regional decision makers. EMSI recently merged with its sister company CCbenefits Inc.-well known for conducting socioeconomic impact studies for over 800 community and technical colleges across the nation-to offer an integrated portfolio of solutions for college, workforce, and economic development professionals.

## Clients

EMSI's client base includes hundreds of colleges, workforce boards, economic development organizations, governmental agencies, economists, consultants, academics, and private-sector analysts. With over four thousand current clients in the U.S., Canada, and the United Kingdom, EMSI's products and services are critical for informing regional policy.

## Contact EMSI

For more information about EMSI, visit us at [www.economicmodeling.com](http://www.economicmodeling.com), or call us toll-free at 866.999.3674.