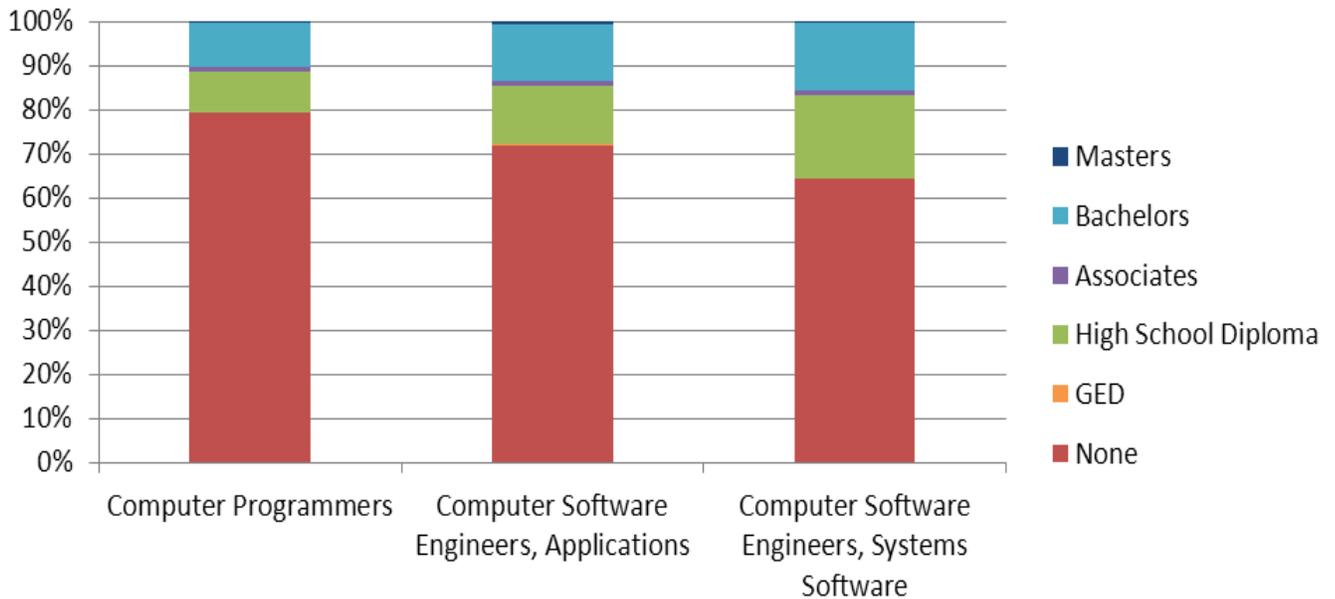


# Skills Gap

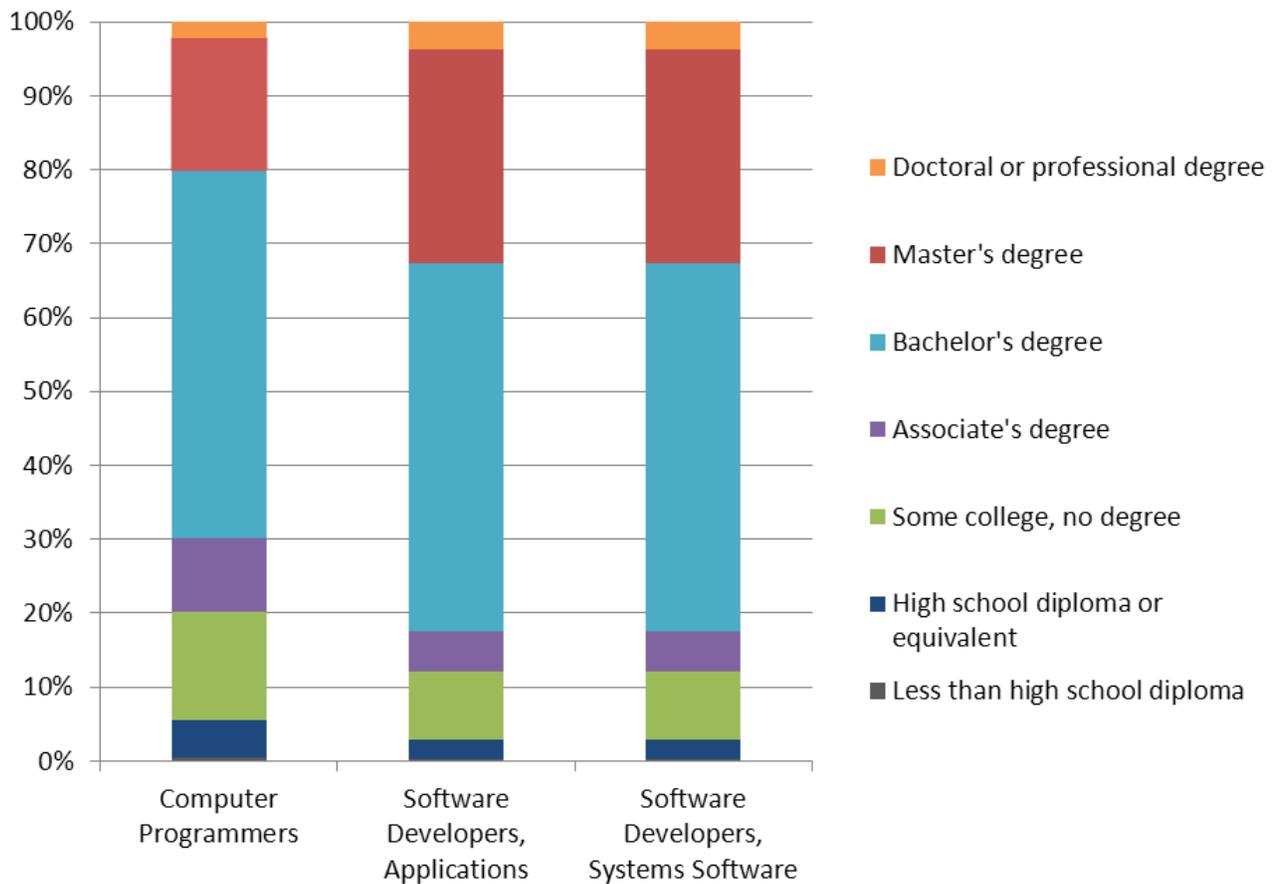
*Computer Programmers*  
*Computer Software Engineers, Applications*  
*Computer Software Engineers, Systems Software*

## Education and Experience Distribution

Required Education Levels in DWS Job Orders

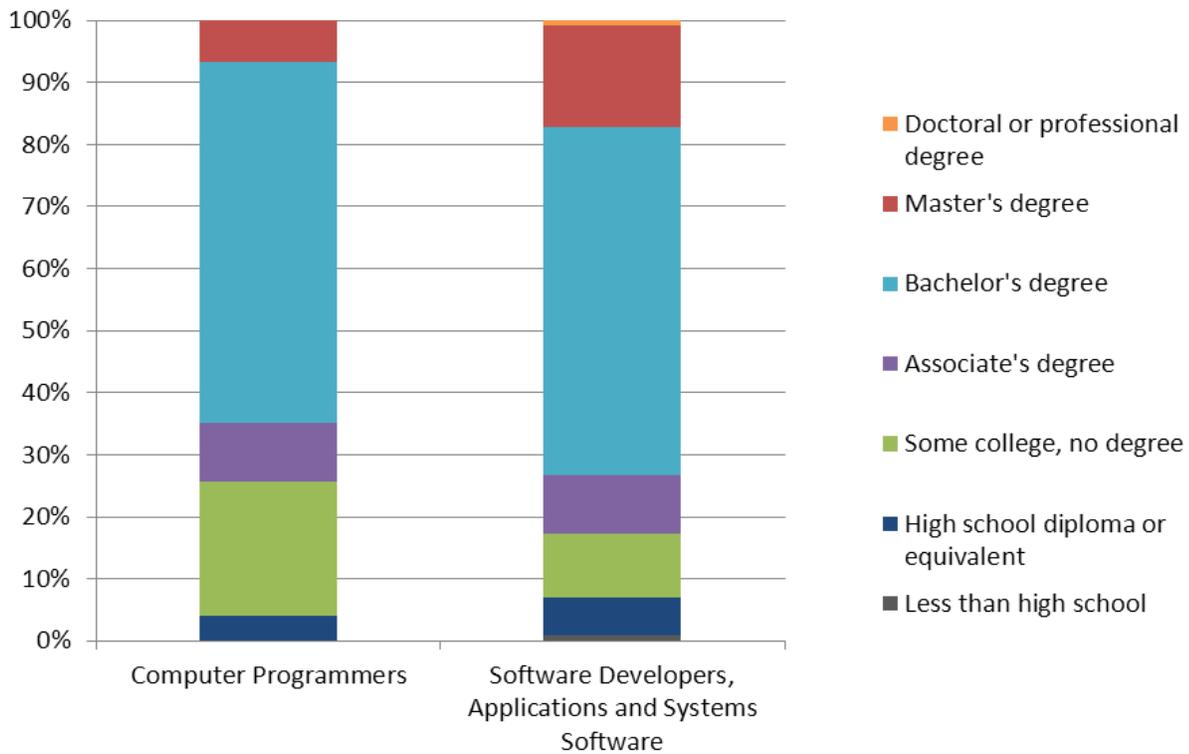


## Distribution of Educational Attainment in US, 2009



Bureau of Labor Statistics

## Distribution of Education Attainment in Utah, 2010



2010 ACS PUMS

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## Comparing Training Requirement Information

### Computer Programmers, 151131

- BLS occupational coding: Bachelor's degree, no work experience, no on-the-job training
- DWS job postings for 2011: 79% of job orders required no education
- ONET education requirement survey of employees: 78% required bachelor's degree, 11% some college (no degree), 6% high school diploma or equivalent

### Software Developers, Applications, 151132

- BLS occupational coding: Bachelor's degree, no work experience, no on-the-job training
- DWS job posting for 2011: 72% of job orders required no education
- ONET education requirement survey of employees: 75% required bachelor's degree, 17% master's degree, 7% associate's degree

### Software Developers, Systems Software, 151133

- BLS occupational coding: Bachelor's degree, no work experience, no on-the-job training
- DWS job posting for 2011: 65% of job orders required no education
- ONET education requirement survey of employees: 54% required bachelor's degree, 23% master's degree, 10% high school diploma or equivalent

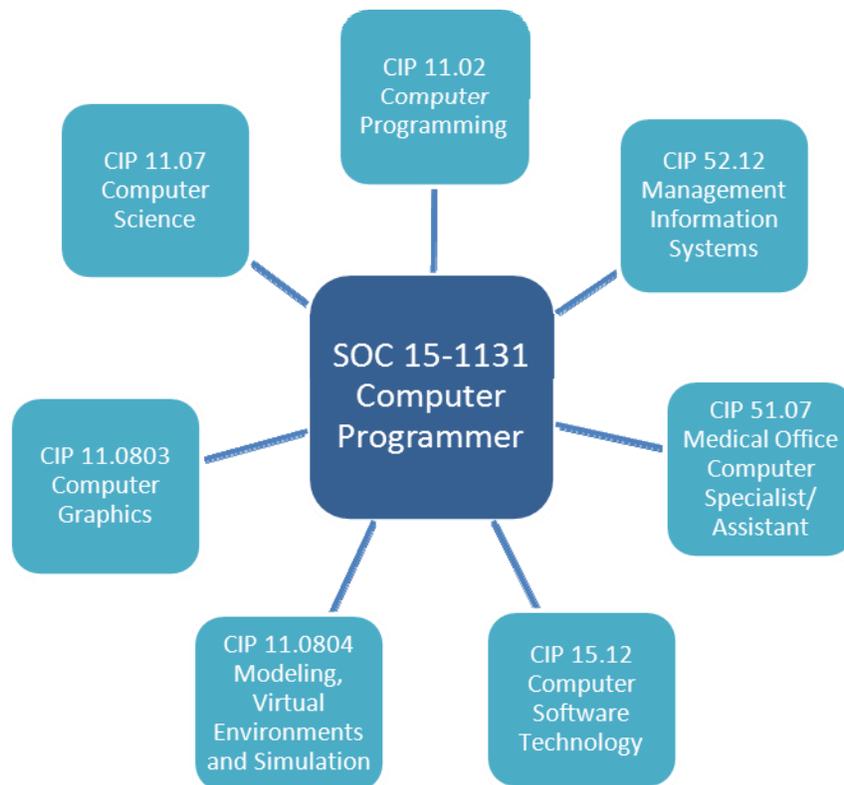
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## ***Educational Programs***

### **SOC to CIP**

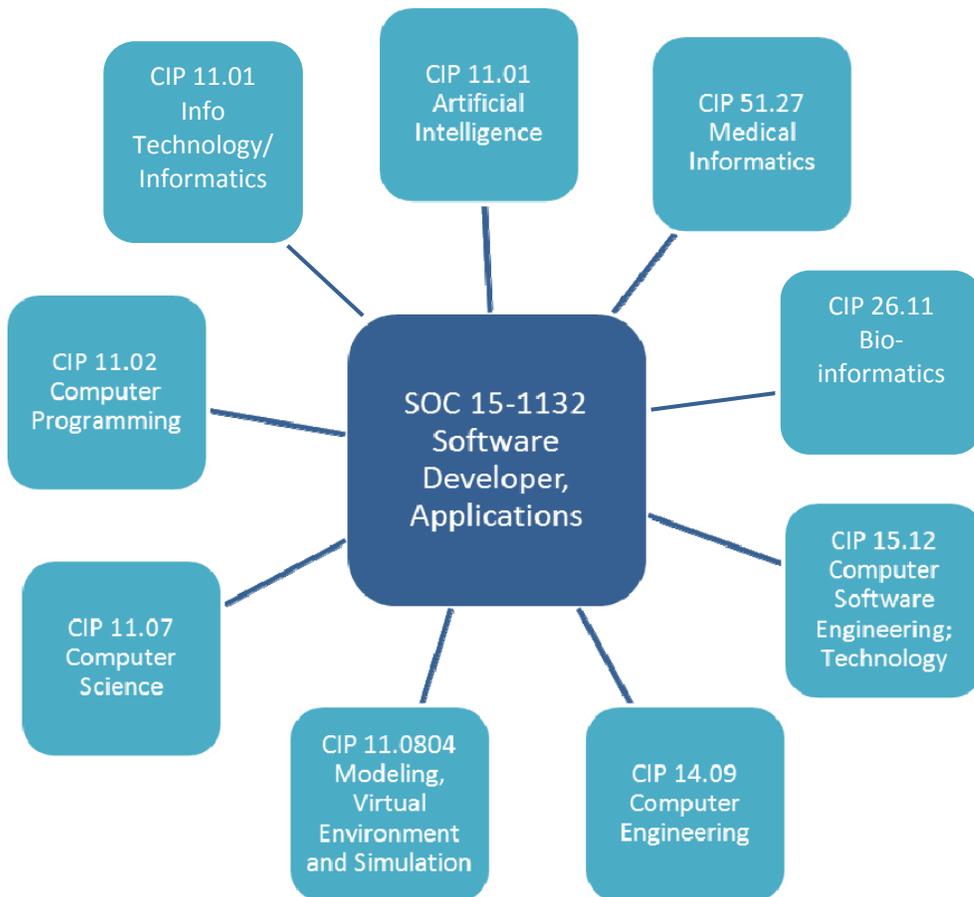
### **National Center for Educational Statistics**

### **Computer Programmers, 151131**



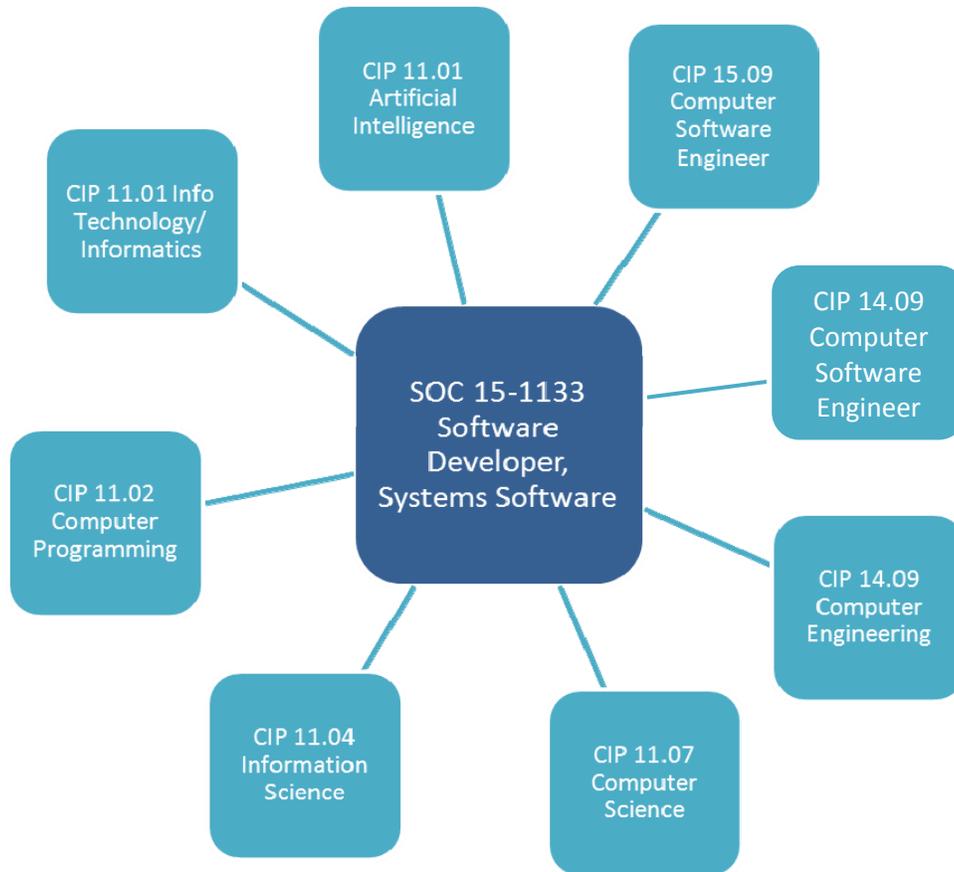
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## Software Developers, Applications, 151132



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## Software Developers, Systems Software, 151133



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## Utah Programs of Study

Details in Appendix A

### Computer Programmers, 151131

CIP	2009-2010 Total Completers
11.0201 Computer Programming/Programmer, General	10
11.0202 Computer Programming, Specific Applications	18
11.0701 Computer Science	442
11.0803 Computer Graphics	4
52.1201 Management Information Systems	217
<b>Total</b>	<b>691</b>

### Computer Software Engineers, Applications, 151132

CIP	2009-2010 Total Completers
11.0103 Information Technology	162
11.0201 Computer Programming/Programmer, General	10
11.0202 Computer Programming, Specific Applications	18
11.0701 Computer Science	442
14.0901 Computer Engineering, General	70
14.0903 Computer Software Engineering	2
26.1103 Bioinformatics	10
51.2706 Medical Informatics	12
<b>Total</b>	<b>726</b>

### Computer Software Engineers, Systems Software, 151133

CIP	2009-2010 Total Completers
11.0103 Information Technology	162
11.0201 Computer Programming/Programmer, General	10
11.0202 Computer Programming, Specific Applications	18
11.0401 Information Science/Studies	72
11.0701 Computer Science	442
14.0901 Computer Engineering, General	70
14.0903 Computer Software Engineering	2
<b>Total</b>	<b>776</b>

Total of 2193 completed a program of study related to at least one of these three occupations.

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## Top Fields of Degrees for Utah Incumbents

### ACS 2010

#### Computer Programmers, 151131

Field of Degree	Count	Frequency
Computer Science	23	48%
Computer and Information Systems	4	8%
Electrical Engineering	3	6%
Other	18	38%
<b>Total</b>	<b>48</b>	<b>100%</b>

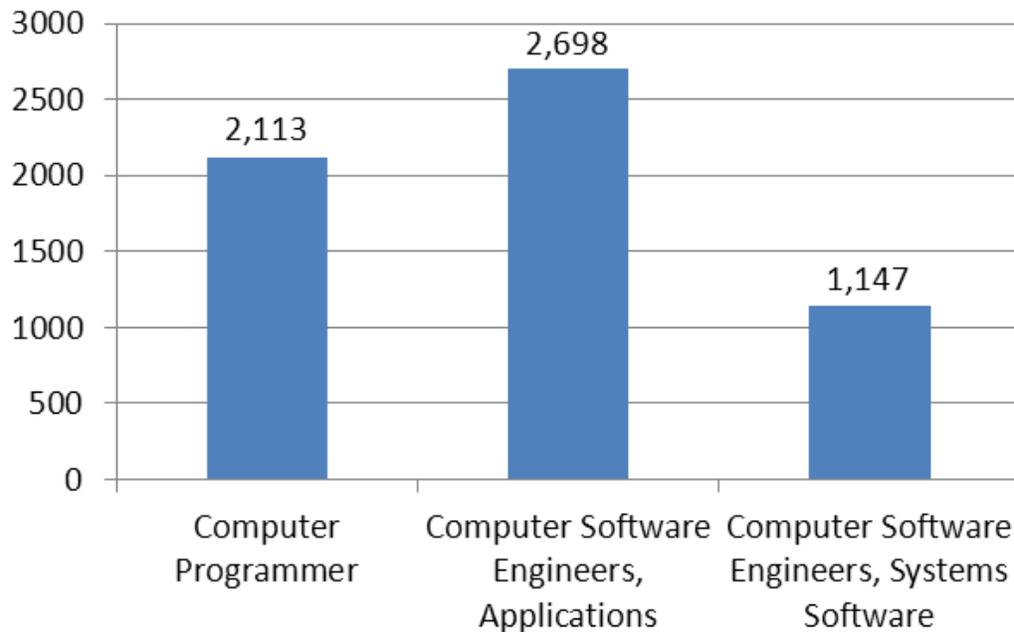
#### Software Developers, Applications and Systems Software, 151132 and 151133

Field of Degree	Count	Frequency
Computer Science	35	48%
Electrical Engineering	8	9%
Computer and Information Systems	6	7%
Computer Engineering	3	4%
Business Management and Administration	3	4%
Other	30	35%
<b>Total</b>	<b>85</b>	<b>100%</b>

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## ***Supply and Demand Analysis***

### **DWS Job Orders**



Department of Workforce Services

Between these three occupations, there were a total of 5,958 job orders in 2011. The largest number was for computer software engineers who were focused on applications.

### **DWS Job Orders Descriptions**

Analyzing the description of the job orders provides insight about required qualifications that might have gone unnoticed if only the other fields were considered.

#### **Education**

Even though most job orders appear to require no education, as indicated in the education required field, a closer inspection of the description field tells a different story. Of the 5,958 total job orders, 3,014 (around 51 percent) require or prefer some sort of a degree, from associate's to doctorate. Bachelor's degree is mentioned in 2,201 orders, which is approximately 37 percent of job orders. The most popular fields of degrees are computer science, electrical engineering, and information systems.

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## Team work

Approximately 70 percent of job orders (4,189) require the ability to work in a team. Keywords used include “team”, “groups”, “cooperation”, and “collaboration.”

## Communication

The number of job orders requiring strong oral and written communication skills is 3,437, which about 58 percent.

## Technical skills

Ability to use java script expected by 43 percent of job orders (2,590).

Knowledge of SQL is required by 41 percent of job orders (2,433).

Twenty-nine percent of job orders (1,746) require familiarity with object-oriented application/design.

Proficiency with HTML is expected by 23 percent of job orders (1,399).

Twenty percent (1,148) stipulate expertise in Linux.

## Stock Analysis and DWS Occupational Projections

SOC Code	Occupation	2010 Employment	2012 Projected Employment	2018 Projected Employment
151131	Computer Programmer	7,180	7,340	7,496
151132	Computer Software Engineer, Application	5,150	5,570	7,651
151133	Computer Software Engineer, Systems Software	3,450	3,770	5,085

2010 employment source: DWS <http://jobs.utah.gov/wi/pubs/outlooks/state/shortterm.pdf>

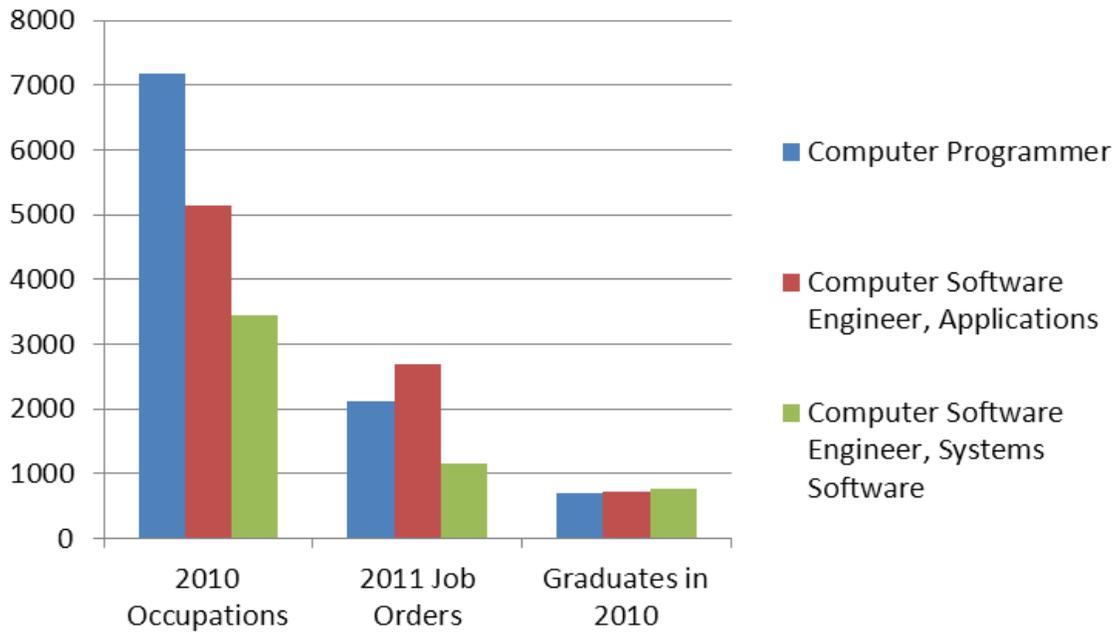
Short term projections source: DWS <http://jobs.utah.gov/wi/pubs/outlooks/state/shortterm.pdf>

Long term projections source: DWS

DWS projects employment for these occupations for 2012 and 2018. There is expected to be a combined total of 16,680 openings in 2012 and 20,232 in 2018.

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## Flow Analysis



## Transferability of Skills

ONET lists the knowledge, tools & technology, skills, abilities, work activities, and work context related to each occupation. Within these three occupations there is significant overlap with each of those fields, indicating a transferability of skills. Similarity within the occupations is also demonstrated by the instructional programs assigned to each. Many of the same CIPs are listed for the three occupations. The common requirements suggest that individuals with certain skills sets can be considered for all three occupations.

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## **Appendix A**

### **Utah Programs of Study**

#### **Computer Programmers, 151131**

##### **CIP 11.0201 Computer Programming/Programmer, General**

<b>School</b>	<b>Degrees Offered</b>	<b>2009-2010 Total Completers</b>
Davis Applied Technology College	Award, Associate's	10
Eagle Gate College	Award, Associate's	
Provo College	Associate's	
Stevens-Henager College (4)	Associate's, Bachelor's	
University of Phoenix	Bachelor's	
Utah State University-College of Eastern Utah	Associate's	
Utah Valley University	Award	

##### **CIP 11.0202 Computer Programming, Specific Applications**

<b>School</b>	<b>Degrees Offered</b>	<b>2009-2010 Total Completers</b>
Stevens-Henager College	Bachelor's	18
Western Governors University	Bachelor's	

##### **CIP 11.0701 Computer Science**

<b>School</b>	<b>Degrees Offered</b>	<b>2009-2010 Total Completers</b>
Brigham Young University	Bachelor's, Master's, Doctoral	442
Neumont University	Bachelor's, Master's	
Salt Lake Community College	Associate's	
Snow College	Associate's	
Southern Utah University	Bachelor's	
Stevens-Henager College(4)	Bachelor's	
University of Utah	Bachelor's, Master's, Doctoral	
Utah Valley University	Associate's, Bachelor's	
Weber State University	Associate's, Bachelor's	
Westminster College	Bachelor's	

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### CIP 11.0803 Computer Graphics

School	Degrees Offered	2009-2010 Total Completers
Brigham Young University	Bachelor's	4
Broadview University	Associate's	
Stevens-Henager College	Associate's	

### CIP 52.1201 Management Information Systems

School	Degrees Offered	2009-2010 Total Completers
Brigham Young University	Bachelor's	217
DeVry University	Master's	
Salt Lake Community College	Associate's	
University of Phoenix	Bachelor's, Master's	
University of Utah	Bachelor's, Master's	
Weber State University	Award, Associate's, Bachelor's	
Western Governors University	Bachelor's, Master's	

### Computer Software Engineers, Applications, 151132

#### CIP 11.0103 Information Technology

School	Degrees Offered	2009-2010 Total Completers
Brigham Young University	Bachelor's, Master's	162
Broadview University (2)	Associate's	
Southern Utah University	Associate's	
University of Phoenix	Bachelor's	
Utah Valley University	Associate's, Bachelor's	
Western Governors University	Bachelors, Master's	

**CIP 11.0201 Computer Programming/Programmer, General**

School	Degrees Offered	2009-2010 Total Completers
Davis Applied Technology College	Award, Associate's	10
Eagle Gate College	Award, Associate's	
Provo College	Associate's	
Stevens-Henager College (4)	Associate's, Bachelor's	
University of Phoenix	Bachelor's	
Utah State University-College of Eastern Utah	Associate's	
Utah Valley University	Award	

**CIP 11.0202 Computer Programming, Specific Applications**

School	Degrees Offered	2009-2010 Total Completers
Stevens-Henager College	Bachelor's	18
Western Governors University	Bachelor's	

**CIP 11.0701 Computer Science**

School	Degrees Offered	2009-2010 Total Completers
Brigham Young University	Bachelor's, Master's, Doctoral	442
Neumont University	Bachelor's, Master's	
Salt Lake Community College	Associate's	
Snow College	Associate's	
Southern Utah University	Bachelor's	
Stevens-Henager College(4)	Bachelor's	
University of Utah	Bachelor's, Master's, Doctoral	
Utah Valley University	Associate's, Bachelor's	
Weber State University	Associate's, Bachelor's	
Westminster College	Bachelor's	

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**CIP 14.0901 Computer Engineering, General**

School	Degrees Offered	2009-2010 Total Completers
Brigham Young University	Bachelor's	70
Salt Lake Community College	Associate's	
University of Utah	Bachelor's	
Utah State University	Bachelor's, Master's	

**CIP 14.0903 Computer Software Engineering**

School	Degrees Offered	2009-2010 Total Completers
Utah Valley University	Bachelor's	2

**CIP 26.1103 Bioinformatics**

School	Degrees Offered	2009-2010 Total Completers
Brigham Young University	Bachelor's	10

**CIP 51.2706 Medical Informatics**

School	Degrees Offered	2009-2010 Total Completers
University of Utah	Master's, Doctoral	12

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## Computer Software Engineers, Systems Software, 151133

### CIP 11.0103 Information Technology

School	Degrees Offered	2009-2010 Total Completers
Brigham Young University	Bachelor's, Master's	162
Broadview University (2)	Associate's	
Southern Utah University	Associate's	
University of Phoenix	Bachelor's	
Utah Valley University	Associate's, Bachelor's	
Western Governors University	Bachelors, Master's	

### CIP 11.0201 Computer Programming/Programmer, General

School	Degrees Offered	2009-2010 Total Completers
Davis Applied Technology College	Award, Associate's	10
Eagle Gate College	Award, Associate's	
Provo College	Associate's	
Stevens-Henager College (4)	Associate's, Bachelor's	
University of Phoenix	Bachelor's	
Utah State University-College of Eastern Utah	Associate's	
Utah Valley University	Award	

### CIP 11.0202 Computer Programming, Specific Applications

School	Degrees Offered	2009-2010 Total Completers
Stevens-Henager College	Bachelor's	18
Western Governors University	Bachelor's	

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**CIP 11.0401 Information Science/Studies**

School	Degrees Offered	2009-2010 Total Completers
Davis Applied Technology College	Award, Associate's	72
Everest College-West Valley City	Award	
Southern Utah University	Bachelor's	
Utah State University	Bachelor's, Master's	
Utah State University-College of Eastern Utah	Associate's	
Utah Valley University	Bachelor's	
Weber State University	Award, Bachelor's	

**CIP 11.0701 Computer Science**

School	Degrees Offered	2009-2010 Total Completers
Brigham Young University	Bachelor's, Master's, Doctoral	442
Neumont University	Bachelor's, Master's	
Salt Lake Community College	Associate's	
Snow College	Associate's	
Southern Utah University	Bachelor's	
Stevens-Henager College(4)	Bachelor's	
University of Utah	Bachelor's, Master's, Doctoral	
Utah Valley University	Associate's, Bachelor's	
Weber State University	Associate's, Bachelor's	
Westminster College	Bachelor's	

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**CIP 14.0901 Computer Engineering, General**

<b>School</b>	<b>Degrees Offered</b>	<b>2009-2010 Total Completers</b>
<b>Brigham Young University</b>	Bachelor's	70
<b>Salt Lake Community College</b>	Associate's	
<b>University of Utah</b>	Bachelor's	
<b>Utah State University</b>	Bachelor's, Master's	

**CIP 14.0903 Computer Software Engineering**

<b>School</b>	<b>Degrees Offered</b>	<b>2009-2010 Total Completers</b>
<b>Utah Valley University</b>	Bachelor's	2