ABOUT COMPUTER SCIENCE
MOST COMMON CS JOB TITLES

- Computer Programmer
- Computer System Analyst
- Software Developers
- Computer and Information Research
COMPUTER PROGRAMMERS

What they do:

- Write programs in a variety of computer languages, such as C++ and Java
- Update and expand existing programs
- Debug programs by testing for and fixing errors

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COMPUTER PROGRAMMERS (CONT.)

- Build and use computer-assisted software engineering (CASE) tools to automate the writing of some code
- Use code libraries, which are collections of independent lines of code, to simplify the writing
COMPUTER PROGRAMMERS (CONT.)

- **Degree required:** Bachelor’s degree
  (an Associate Degree or Certificate *may* be sufficient)

- **Facts:**
  - Average annual pay: $71,380
  - Expected growth: 12% (average)

**Note:** This is low-level programming, which *can* be outsourced.
What they do:

- Consult with managers to determine the role of the IT system in an organization
- Research emerging technologies to decide if installing them can increase the organization’s efficiency and effectiveness
- Prepare an analysis of costs and benefits so that management can decide if computer upgrades are financially worthwhile

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Devise ways to make existing computer systems meet new needs
Design and develop new systems by choosing and configuring hardware and software
Oversee installing and configuring the new system to customize it for the organization
Do tests to ensure that the systems work as expected
Train the system’s end users and write instruction manuals, when required
Degree required: Bachelor’s degree

Facts:
- Average annual pay: $77,740
- Expected growth: 22% (faster than average)

Job Outlook:
- A greater reliance on computer systems in organizations throughout the economy will lead to an increased demand for this occupation.
SOFTWARE DEVELOPERS

What they do:

- **Design, develop, and test** software; must possess **strong coding skills**, but are more likely to develop algorithms and solve problems than write code.
- Often work as **part of a team** that designs new hardware, software, and systems.

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In detail:

- Analyze users’ needs, then design, test, and develop software to meet those needs
- Recommend software upgrades for customers' existing programs and systems
- Design each piece of the application or system and plan how the pieces will work together

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SOFTWARE DEVELOPERS (CONT.)

- Create flowcharts and other models that instruct programmers how to write the software’s code
- Ensure that the software continues to function normally through software maintenance and testing
- Document every aspect of the application or system as a reference for future maintenance and upgrades
- Collaborate with other computer specialists to create optimum software
SOFTWARE DEVELOPERS (CONT.)

- **Degree required:** Bachelor’s degree

- **Facts:**
  - Average annual pay: $90,530
  - Expected growth: **30 % (much faster than average)**

- **Job Outlook:**
  - The main reason for the rapid growth is a large increase in the demand for computer software.

**Note:** It is a good idea to start an internship during your junior/senior years.
What they do:

* Explore fundamental issues in computation and develop theories and models to address those issues
* Help scientists and engineers solve complex computing problems
* Invent new computing languages, tools, and methods to improve the way in which people work with computers

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COMPUTER AND INFORMATION RESEARCH

- Develop and improve the software systems that form the basis of the modern computing experience
- Design experiments to test the operation of these software systems
- Analyze the results of their experiments
- Publish their findings in academic journals
Computer and Information Research

- **Degree required:** PhD
- **Facts:**
  - Average annual pay: $100,660
  - Expected growth: 19% (average)

- **Job Outlook:**
  - Computer and information research scientists are likely to enjoy excellent job prospects, as many companies report difficulties finding a sufficient number of these highly skilled workers.
WHAT ABOUT OUTSOURCING?

- The myth appears to be entirely without foundation
  - Only 3% of our work force was located abroad in 2010, and it is declining.
Is CS a One-Person Job?

- Computing professionals *hardly ever* work alone.
- Building software is the effort of many people in a wide variety of skills.
- **Good communication** is an essential skill for success in the field.
  - This includes good *writing skills*.
- Software development is also... **CREATIVE** (yes, it is)
Work Environment

- **Software developers** and **computer programmers** normally work in clean, comfortable offices or in laboratories in which computer equipment is located.

- **Software developers** who work for software vendors and consulting firms frequently travel to meet with customers.
  - **Telecommuting** is becoming more common as technological advances allow more work to be done from remote locations.
QUALIFICATIONS

- A **bachelor's degree** commonly is required for software engineering jobs, although a master’s degree is preferred for some positions.

- A **bachelor’s degree** also is required for many computer programming jobs, although a 2-year degree or certificate **may be** adequate in some cases.

- Employers favour applicants who already have relevant skills and experience. Workers who keep up to date with the latest technology usually have good opportunities for advancement.
(A Few) Degrees Requiring CS Courses

- **Aerospace Engineers**
  - Design aircraft, spacecraft, satellites, and missiles.
  - Test prototypes to make sure that they function according to design.

- **Degree required:**
  - Bachelor’s degree

- **Facts:**
  - Average annual pay: $97,480
  - Expected growth: 5%
    
    (slower than average)
Chemical Engineers

- Design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, paper, and pulp, by applying principles and technology of chemistry, physics, and engineering.

Degree required:
- Bachelor’s degree

Facts:
- Average annual pay: $90,300
- Expected growth: 6% (slower than average)
DEGREES REQUIRING CS COURSES (CONT.)

- **Computer (hardware) Engineers**
  - Research, design, develop, and test computer equipment such as chips, circuit boards, or routers.
  - By solving complex problems in computer hardware, these engineers create rapid advances in computer technology.

- **Degree required:**
  - Bachelor’s degree

- **Facts:**
  - Average annual pay: $98,810
  - Expected growth: 9% *(slower than average)*
Electrical Engineers

- Design, develop, test, and supervise the manufacturing of electrical equipment such as electric motors, radar and navigation systems, communications systems, and power generation equipment.

Degree required:

Bachelor’s degree

Facts:

- Average annual pay: $87,180
- Expected growth: 6% *(slower than average)*
Civil Engineers

- Design and supervise large construction projects, including roads, buildings, airports, tunnels, dams, bridges, and systems for water supply and sewage treatment.

**Degree required:**
Bachelor’s degree

**Facts:**
- Average annual pay: $77,560
- Expected growth: 19% (average)
WHERE TO TRANSFER?

- **Difficult decision**
- **Do**
  - Check the university Web site
  - Read about the courses offered
  - Ask if internships are available
  - Ask percentage of students who find a job through the school after graduation
  - Look for possible research projects
  - Talk to the university’s counselors
  - Attend any orientation the university offers
OUR TRANSFER STUDENTS

- Last year OCC students who took our Java and C++ courses transfer to:
  - UC Irvine, Berkeley, Los Angeles, San Diego, Santa Cruz, and Riverside
  - Cal State University Fullerton, Long Beach, and Poly Pomona
  - Private institutions: USC, Virginia Tech

- OCC has the **highest transfer rate** in the state of California
WHAT UCI OFFERS

- For undergraduate education, **UCI** offers **six majors:**
  - Computer Science
  - Software Engineering
  - Computer Game Science
  - Informatics
  - Computer Science & Engineering
  - Business Information Management

WHAT UCI OFFERS (CONT.)

- Graduate students from **UCI**, have been hired at
  - Google
  - Pixar
  - IBM
  - Blizzard
  - Unisys
  - Deloitte
  - Microsoft
  - Yahoo
  - NASA
  - Merrill Lynch
  - and many other world-renowned organizations.
What UCI Offers (cont.)

- **Project courses**
  - Projects that go from one to three quarters with the same team

- Opportunities to do **research with faculty**
  - You can directly contact professors for specific topics to find out if there is a project going on

- **Internships** that start during your junior year and often end up in a job when you graduate

- **Companies** contact the school to hire CS students
  - Other jobs can be found at ics.jobs
(A Few) CS Areas of Specialization

- **Artificial Intelligence**
  - Develop computers that simulate human learning and reasoning ability

- **Computer Design and Engineering**
  - Design new computer circuits, microchips, and other electronic components

- **Computer Architecture**
  - Design new computer instruction sets, and combine electronic or optical components to provide powerful but cost-effective computing

- **Information Technology**
  - Develop and manage information systems that support a business or organization
CS Areas of Specialization (cont.)

- **Software Engineering**
  - Develop methods for the production of software systems on time, within budget, and with few or no defects

- **Computer Theory**
  - Investigate the fundamental theories of how computers solve problems, and apply the results to other areas of computer science

- **Operating Systems and Networks**
  - Develop the basic software computers use to supervise themselves or to communicate with other computers

- **Software Applications**
  - Apply computing and technology to solving problems outside the computer field (for example, in education or medicine)

- **Gaming**
  - Design and create games
2013 Most Popular Languages

- Order varies, but these are always at the top:
  - C
  - C++
  - C#
  - Java
  - PHP
  - Perl
  - Python
  - SQL
  - JavaScript
  - HTML, XML

- There are *thousands* of programming languages
IN SUMMARY…

- **Computer Science is not just programming**, but rather a discipline that stresses the design, analysis, implementation, management, and application of large software systems as well as systems that combine both hardware and software.

- **Jobs in computing are growing**, contrary to popular perceptions
  - Expected to “grow much faster than average” (an increase of 20% or more)
  - New growth areas will continue to arise from rapidly evolving technology (proliferation of Web sites, increase use of the Internet, mobile technology and so on)
Beyond computing careers, **Computer Science skills** can also be applied to many fields like **Business and Financial Management**, **BioInformatics**, **Law**, and more.

Employment for **computer programmers** (**certificate** and **self-taught programmers**) might decline in the future.

- **BUT**, **software developers** (possessing a CS bachelor’s degree) have excellent prospects.
For more information:
Do pay a visit here at OCC to the Career Center Transfer Center