Introduction to Computer Science I

Janyl Jumadinova
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What is Computer Science?
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A quote from a famous computer scientist: “Computer Science is no more about computers than astronomy is about telescopes” Edsger Dijkstra (1930 2002)
What is Computer Science?

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  ▶ programming languages used to describe computations
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Computers play a key role
What field has …?

- The best-rated job, and 5 of the top 10 highest paid, highest growth jobs?
- Shown strong job growth?
- A severe shortage in college graduates?
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Computer Science!

Job Openings for Computer Science graduates

Expected # of students graduating with a 4 year Computer Science degree

- Engineering
- Physical Sciences
- Mathematical/Computer Sciences
- Biological/Agricultural Sciences
1,000,000 more jobs than students by 2020

$500 billion opportunity

1.4 million computing jobs

400,000 computer science students

Computer science is a top paying college degree and computer programming jobs are growing at 2X the national average.
The Job/Student Gap

Computer Science Students

- 2% of students
- 98% of students

All other math and science students

Computing Jobs

- 60% of jobs
- 40% of jobs

All other math and science jobs

Sources: College Board, Bureau of Labor Statistics, National Science Foundation
<table>
<thead>
<tr>
<th>Job Title</th>
<th>Salary</th>
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<tbody>
<tr>
<td>Software engineer</td>
<td>$93,000</td>
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<tr>
<td>Systems Engineer</td>
<td>$91,000</td>
</tr>
<tr>
<td>Software developer</td>
<td>$89,000</td>
</tr>
<tr>
<td>Java Developer</td>
<td>$98,000</td>
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<tr>
<td>Business analyst</td>
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<td>.NET developer</td>
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<td>Web developer</td>
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<tr>
<td>Systems administrator</td>
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<tr>
<td>Project Manager</td>
<td>$93,000</td>
</tr>
<tr>
<td>Network engineer</td>
<td>$91,000</td>
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In USD as of Sep 17, 2012

<table>
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<tr>
<th>35k</th>
<th>70k</th>
<th>105k</th>
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“In fifteen years we’ll be teaching programming just like reading and writing…and wondering why we didn’t do it sooner.”

— Mark Zuckerberg
Applications of Computer Science

Motion Analysis
Applications of Computer Science

Animated Movies...
Applications of Computer Science

... are made by Computer Scientists
Applications of Computer Science

- Think about your interests ...
- You can bet computer scientists are working in these areas!
What is a computer?
Hardware/Software

- Software/hardware relationship:
  - Hardware is controlled by software
  - Software is the collection of instructions that you issue to the computer to perform actions and make decisions
Simple Structure
What is Computer Programming?

Programming is the act of writing usable and useful software.

A program is a set of instructions.
What is Computer Programming?

- Programming is the act of writing usable and useful software
- A program is a set of instructions
We will use **Java** programming language in this class.

Java is a programming language originally developed by Sun Microsystems and released in 1995 as a core component of Sun’s Java platform.
HISTORY OF JAVA

- Started development in 1991 at Sun
- Originally called Oak
- Intended for smart consumer-electronic devices
- Derives much syntax/concepts from C++
- BCPL → B → C → C++ → Java
- Development almost halted, but 1993 saw introduction of web; Java was revamped to be able to easily add dynamic content to web pages
- Formally announced and released in May 1995
- Released under GPL to the public in May 2007