Computational Expression (CMPSC 100)

Janyl Jumadinova

January 14–16, 2019
What will we explore in this class?

Introduction to the field of computing

Algorithms

Software

Programming Languages - Java

Applications of computer science

DNA manipulation

Graphics

Music, etc.
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- Applications of computer science
  - DNA manipulation
  - Graphics
  - Music, etc.
Computer Science Involves More than Programming!

- People
- Teams
- Writing
- Speaking
Highlights of this course

- Class Activities
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- Laboratory Sessions
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- Practical Sessions (Fridays)
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- Challenging Programming
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- Fun Presentations
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- Real-world Software Tools
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- Class Activities
- Laboratory Sessions
- Practical Sessions (Fridays)
- Challenging Programming
- Group Projects
- Fun Presentations
- Real-world Software Tools
- New Friends and Colleagues
Keep in Touch

- Email
- Office hours
- Course website (https://cs.allegheny.edu/sites/jjumadinova/teaching/100)
- Teaching assistants (https://www.cs.allegheny.edu/teaching/teachingassistants/)
- Slack channel (more on this later) (https://cs100s2019.slack.com/)
- Github Organization (more on this later) (https://github.com/Allegheny-Computer-Science-100-S2019)
Announcements

- No Lab this week
- Practical session on Friday
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)
A computation is a sequence of well-defined operations that lead from an initial starting point to a desired final outcome.
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Computer science is the study of computation.

Computers are a medium for expression in computer science.
What is a computer?
Information is broken into discrete pieces.

Each piece is represented as a number, a binary number.
Digital Computers

- Information is broken into discrete pieces.
- Each piece is represented as a number, a **binary number**.

**Binary Numbers:**

- Base 2 system.
- A single bit: either 0 or 1
  - can represent two items, e.g. state of the light bulb.
- \( N \) bits can represent \( 2^N \) unique items.

**Unit Conversations**
Simple Structure

[Diagram showing the structure with User, Application, Operating System, and Hardware]

User

Application

Operating System

Hardware
Computer science is the study of computation
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- investigating problems that can be solved computationally
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- **computational solutions to problems in math, science, medicine, business, education, journalism, ...**

Computers play a key role
What field has ...

- One of the best-rated jobs in the world?
What field has ...?

- One of the best-rated jobs in the world?
  - 4 of the top 10 highest paid, highest growth jobs?
- Shown strong job growth?

In 2015, 60,000 students graduated with a degree in Computer Science!

In 2015, 530,000 open positions needing that degree!

National Center for Education Statistics

Bureau of Labor Statistics
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- A severe shortage in college graduates?

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