Introduction to Computer Programming and Computational Thinking

November 2, 2019

Session 1

Innovation 129

Names and Faces and Pronouns

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- ✘ Professor
- ✘ Mr. Leang

Jesse McClandish (Mentor)

- ✘ Jesse

Schedule

10:00 AM - 11:30 AM **Session I (AM)**

11:30 AM - 12:15 AM **Lunch (JC)**

12:20 PM - 01:50 PM **Session II (PM)**

01:50 PM - 02:00 PM **Depart to Busses**

Course Overview

This course introduces the fundamental building blocks of computational thinking and computer programming using the Python language.

Upon successful completion of this course, students will be able to:

- ✘ Improve their computational thinking skills
- ✘ Identify/characterize/define a problem
- ✘ Design a program to solve the problem
- ✘ Read, write, and execute Python code

Student Expectations

- ✘ **NO FOOD**
- ✘ **NO DRINKS** (on the table)
- ✘ Be respectful to individuals and property
- ✘ Be open to learning
- ✘ Be open to not understanding
- ✘ Be patient with yourself
- ✘ Ask questions
- ✘ Explore
- ✘ Embrace failure

Resources

- Google
  - https://www.google.com/
  - Refine web searches
    https://support.google.com/websearch/answer/2466433
- Stackoverflow
  - https://stackoverflow.com/

Introductions

Choose one:

- ✘ Everyone has a story. What is yours?
- ✘ Answer the following questions:
  - ✗ Name / Preferred Name
  - ✗ Grade level and school
  - ✗ Why did you choose to attend STEM Fusion!?
  - ✗ Why did you choose this course for STEM Fusion!?
  - ✗ What do you hope to get out of this course

My Story

1982 Coming to America!

Khmer Rouge Genocide

1998 EIP Class 7 Scholar
Wakefield High School

2004 B.S. Chemistry (Honors, High Distinction), Minor CS

George Mason University

2011 Ph.D. Physical Chemistry / Postdoctoral Researcher

Iowa State University

2014 Assistant Research Scientist

The Ames Laboratory, Department of Energy

2018 Senior Computational Scientist/Software Engineer

EP Analytics, Inc.

Discussion

- ✘ What is computer programming?
- ✘ Why should you learn computer programming?
- ✘ What is the impact of computer programming on our world?

Emerging Areas

- ✘ Artificial intelligence and robotics
  - ✗ Machine learning
  - ✗ Deep learning (neural networks)
- ✘ Bioinformatics
  - ✗ Genome sequencing
  - ✗ Personalized medicine
- ✘ Computer vision
  - ✗ Augmented reality
- ✘ Cybersecurity
- ✘ Quantum computing

Programming for a Computer

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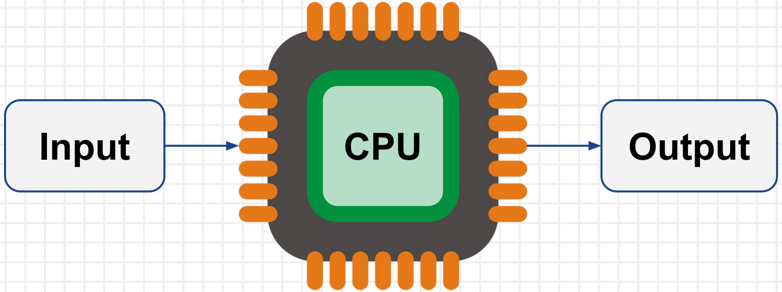

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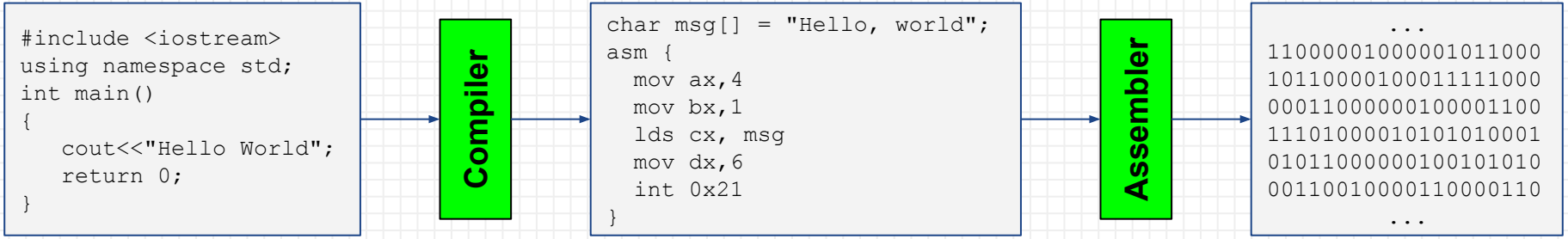
Programming for a Computer



High level language
(e.g., C, C++, Java)

Assembly language
(e.g., x86)

Machine code

Note: Python uses an interpreter to convert Python code to Python bytecode.

Programming Environment

- ✘ A text editor
  - ✗ ATOM https://atom.io
  - ✗ Sublime https://www.sublimetext.com
- ✘ A Python interpreter
  - ✗ Python 3.8.0 https://www.python.org

First Programming Exercise: Hello World

- ✘ Open up a blank document in the ATOM editor
- ✘ Type: `print("Hello World!")`
- ✘ Save the file as **hello.py** into your **Documents** folder
- ✘ Open up the command prompt
  - ✗ Test if python is working: type `python` and hit enter
  - ✗ If you get an error then: type
    `set PATH=%PATH%;C:\Python38`
    and hit enter
  - ✗ Repeat step a
- ✘ Execute your script:
  - ✗ Switch into the directory containing hello.py
    - `cd Documents`
  - ✗ Call the python program to interpret and execute your code
    - `python hello.py`

hello.py

```
print("Hello World!")
```