# Introduction to Computer Programming and Computational Thinking

November 2, 2019
Session 1
Innovation 129



#### Names and Faces and Pronouns

Sarom Leang, Ph.D. (Instructor)

- **X** Professor
- X 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
- X Design a program to solve the problem
- **x** Read, write, and execute Python code



## **Student Expectations**

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



#### Resources

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



#### Introductions

#### Choose one:

- **X** Everyone has a story. What is yours?
- \* Answer the following questions:
  - X Name / Preferred Name
  - X 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 lowa 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?



### **Impact**

- Weather modeling
- ✗ Global Positioning System (GPS)
- **X** Advertisement
- Schedule management
- Inventory management
- Data encryption
- Who liked your Facebook post



## **Emerging Areas**

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

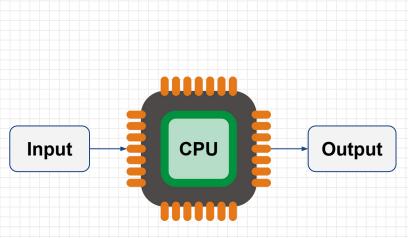


# Salary Outlook (Median 2017)

- **✗** Software Developer: \$101,790
- ✗ Computer Network Architect: \$104,650
- Information Security Analyst: \$95,510
- ✗ Computer Systems Analyst: \$88,270
- X Statistician: \$84,060
- ✗ Computer Programmer: \$82,240
- ✗ Web Developer: \$67,990

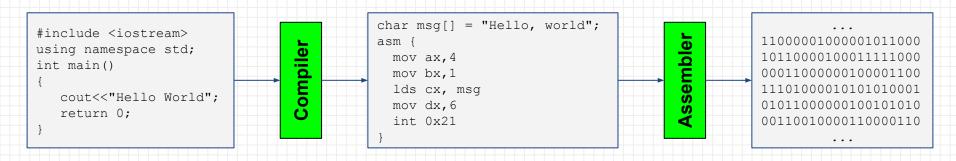


## Programming for a Computer





## 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**

- **X** A text editor
  - X ATOM <a href="https://atom.io">https://atom.io</a>
  - X Sublime <a href="https://www.sublimetext.com">https://www.sublimetext.com</a>
- **X** A Python interpreter
  - X Python 3.8.0 https://www.python.org



# First Programming Exercise: Hello World

- X Open up a blank document in the ATOM editor
- X Type: print("Hello World!")
- Save the file as hello.py into your Documents folder
- Open up the command prompt
  - Y 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
  - X Repeat step a
- **x** 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!")

