APS101: Computer Programming

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Lecture 1: Introduction

On the agenda…

- Survey
- Why study Computer Programming?
- What is Computer Programming?
- Science vs. Application
- Java: Object-Oriented Programming
- Demo

Survey time…

Why study Computer Programming?

- Everyone is doing it…
- Allows you to automate processes that would be too tedious to do manually
- Many applications: software development, scientific research, financial analysis, usability engineering, medical support, robotics, mobile communications, etc.

What is Computer Programming?

- Generally, a way of "telling" the computer what you want it to
- But also, it's a way of solving problems
- There are many ways to do this – many LANGUAGES
- Typically high-level, where each language has its own SYNTAX (grammar)

Programming as a Language

- Not that different from a human language…
- Good programmers know many languages
- In each language, some things are grammatical, and some things aren't

Syntax Errors

- Bad grammar: “the at I airport arrived”
- Good grammar: “I arrived at the airport”

- Bad syntax: int a = 5
- Good syntax: int a = 5;

- Fix the CODE to eliminate these errors.

Runtime Errors

- Instructions are GRAMMATICAL, but incorrect in terms of MEANING

  (i.e., your program runs, but it's not doing what it's supposed to, or it crashes due to errors)

- No easy way to fix these – can use various strategies (ex. Exception Handling)

Programming Essentials

- Variables (storing information)
- Expressions (ex. a / (b - c) + d)
- Assignment Statements (ex. a = 5;)
- Functions / Methods
- Loops
- Conditional Statements
- Input / Output
- Etc.

Computer Science
vs.
Computer Programming

Good Programming Habits

- Descriptive variable names
  - int k vs. int numWords
- Commenting
- Other style conventions
  - Pot-hole: run_my_method()
  - Camel hump: runMyMethod()
- Testing
- Modularity

Object-Oriented Programming

- vs. Imperative Programming
  (ex. Python, C)

- Java and C++ are examples of OOP

- Other programming paradigms:
  - Functional Programming
  - Logic Programming

Hello World!

- In Python…

  print “Hello World!”

  …that’s it.

- In Java…

```
public class HelloWorld {
        public static void main(String [] args) {
                System.out.println(“Hello World!”);
        }
}
```

OOP Basics

- Class ex. class Animal
- Object
- Instance ex. Dog rover = new Dog()
- Method ex. rover.bark()

- More advanced: encapsulation (information hiding), inheritance, polymorphism, etc.

Next lecture:
Course Mechanics!

Blackboard

http://portal.utoronto.ca

Questions?

DEMO