CSci 127: Introduction to Computer Science


CS @ Hunter College

Syllabus

CSci 127: Introduction to Computer Science
Catalog Description: 3 hours, 3 credits: This course presents an overview of computer science (CS) with an emphasis on problem-solving and computational thinking through 'coding': computer programming for beginners. Other topics include: organization of hardware, software, and how information is structured on contemporary computing devices. This course is pre-requisite to several introductory core courses in the CS Major. The course is also required for the CS minor. MATH 12500 or higher is strongly recommended as a co-req for intended Majors.
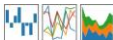
(Show syllabus webpage)

Syllabus: Topics
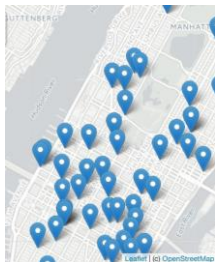
- **This course assumes no previous programming experience.**

- "… Emphasis on problem-solving and computational thinking through 'coding': computer programming for beginners..."

- Organization:

  Introduce coding constructs in Python,
  - Apply those ideas to different problems (e.g. analyzing & mapping data),
  - Other:
    - ❖ logical circuits,
    - ❖ Unix command line interface,
    - ❖ GitHub,
    - ❖ simplified machine language,
    - ❖ C++.

Today's Topics

- Programming Language
- Introduction to Python
- Definite Loops (for-loops)
- Turtle Graphics
- Algorithms

What is a Programming Language ?

- Instructions to computers to follow
- Used to implement algorithms
- Computers think in Binary

Introduction to Python

- We will be writing programs– commands to the computer to do something.

- If you can write a logical argument or persuasive essay, you can write a program.

- Our first language, Python, is popular for its ease–of–use, flexibility, and extendibility.

- The first lab goes into step–by–step details of getting Python running.

- We'll look at the design and basic structure

First Program: `Hello, World!`

Demo in `pythonTutor`

First Program: `Hello, World!`

```
#Name:   Thomas Hunter
#Date:   September 1, 2017
#This program prints:  Hello, World!

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

These lines are comments
(for us, not computer to read)
(this one also)

Prints the string "Hello, World!" to the screen

- Output to the screen is: `Hello, World!`
- Can replace `Hello, World!` with another string to be printed.

Variations on `Hello, World!`

```
#Name:  L-M Miranda
#Date:  Hunter College HS '98
#This program prints intro lyrics

print('Get your education,')
print("don't forget from whence you came, and")
print("The world's gonna know your name.")
```
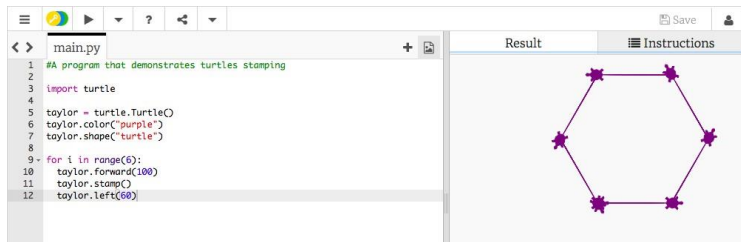
- Each print statement writes its output on a new line.
- Results in three lines of output.
- Can use single or double quotes, just need to match.

Turtles Introduction

- A simple, whimsical graphics package for Python
- Dates back to Logos Turtles in the 1960s (Demo
- from webpage)
- (Fancier turtle demo)

Turtles Introduction
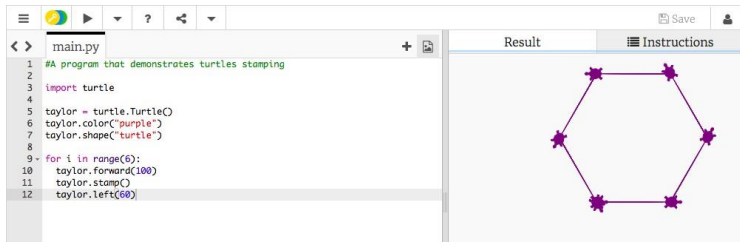
- Creates a turtle, called `taylor`
- Changes the color (to purple) and shape (to turtle-shaped)
- Repeats 6 times:
  - Move forward; stamp; and turn left 60 degrees

Class Work – 10 minutes

1. Write a program that will draw a 10–sided polygon.

2. Write a program that will repeat the line:

   I'm lookin' for a mind at work!

   three times.

Decagon Program

- Start with the hexagon program.
- Has 10 sides (instead of 6), so change the `range(6)` to `range(10)`.
- Makes 10 turns (instead of 6),
  so change the `taylor.left(60)` to `taylor.left(360/10)`.

Work Program

2 Write a program that will repeat the line:

```
I'm lookin' for a mind at work!
```

three times.

- Repeats three times, so, use `range(3)`:

```
for i in range(3):
```

- Instead of turtle commands, repeating a print statement.
- Completed program:

```
# Your name here!
for i in range(3):
    print("I'm lookin' for a mind at work!")
```

What is an Algorithm?

From our textbook:

- An algorithm is a process or set of rules to be followed to solve a problem.
- Programming is a skill that allows a computer scientist to take an algorithm and represent it in a notation (a program) that can be followed by a computer.