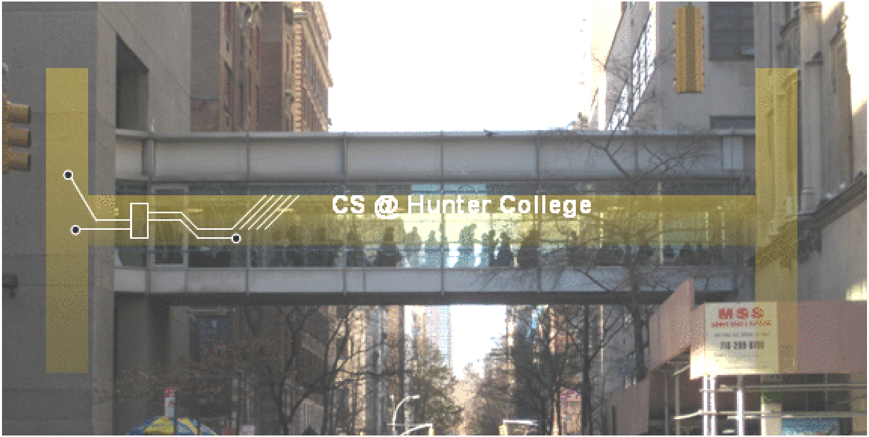
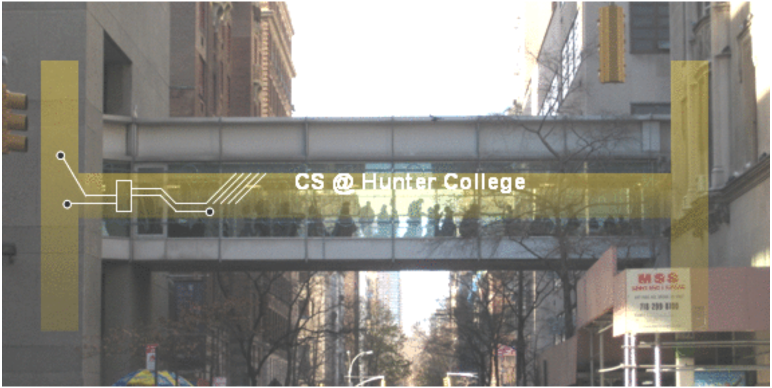
CSci 127: Introduction to Computer Science



hunter.cuny.edu/csci

Welcome



- This lecture will be recorded

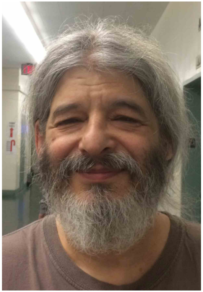
Introductions: Course Designers

Dr. Katherine St. John

Professor,
Interim Chair

Dr. William Sakas

Associate Professor,
Chair



Prof. Eric Schweitzer

Undergraduate Program
Coordinator

Introductions: Instructors

Lola Samigjonova

Early College
Initiative

Dr. Tiziana Ligorio

Large Lecture
Course Coordinator

Introductions: Undergraduate Teaching Assistants

Aida Jevric

Andrew Robinson

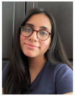
Arterio Rodrigues

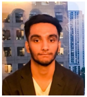
Bahtija Durakovic

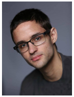
Christopher Asma

David Lin

Destiny Barbery


Diana Luna

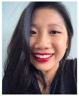

Ghazanfar Shahbaz


ilya Baburashvili

Jessie Lin

Leonardo Matone

Mandy Yu


Nancy Ng

Omer Skaljic

Roziena Badree

Sadab Hafiz

Seth Spiegel

Sheikh Fuad

Stephanie Yung

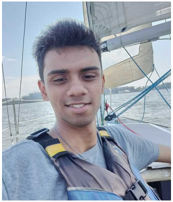
Syeda Nahar

Tyler Robinson

Yash Mahtani

Yoomin Song

Introductions: Autograder Programmers

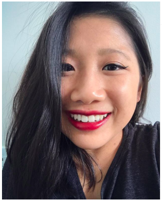


Ifte Ahmed

Leonardo Matone

Lola Samigjonova

Mandy Yu

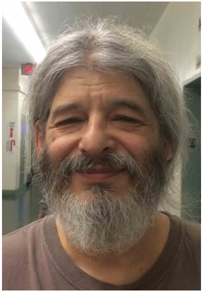


Nancy Ng

Yash Mahtani

Introductions: Advisors

Emely Peguero
Pre-majors & Early Majors
emely.pegueronova@hunter.cuny.edu



Eric Schweitzer
Undergraduate Program Coordinator
eschweit@hunter.cuny.edu

Where to find Course Content

- Course Website: https://huntercsci127.github.io/f21.html

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- Course Website: https://huntercsci127.github.io/f21.html
- Blackboard

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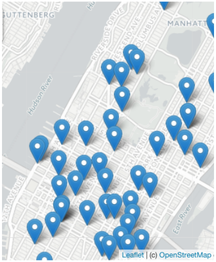
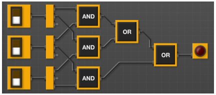
- Blackboard
- Gradescope (program submission)

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...*
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.

Syllabus: Topics





- **This course assumes no previous programming experience.**

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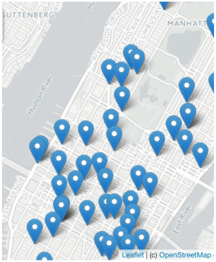

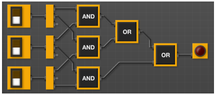

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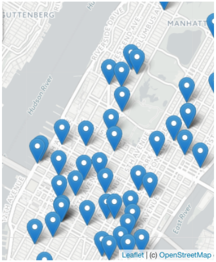

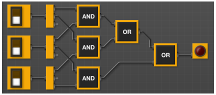

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  - Introduce coding constructs in Python,

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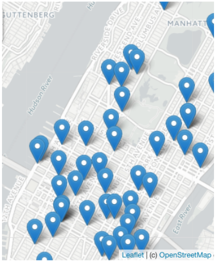

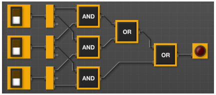

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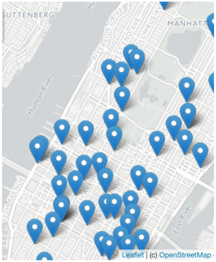

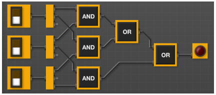

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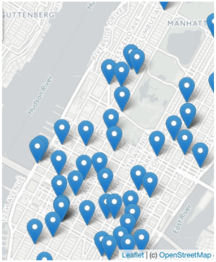
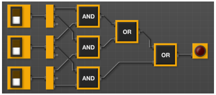


Leaflet | (c) OpenStreetMap



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    - ★ for logical circuits,

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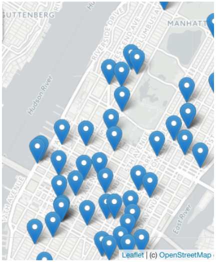

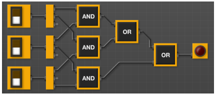

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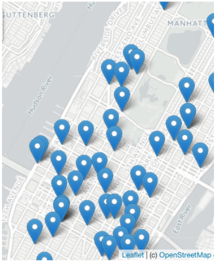

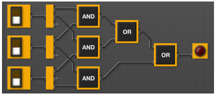

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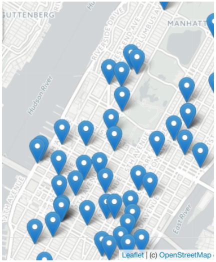
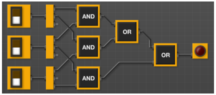
    - for the markup language for github,

Syllabus: Topics





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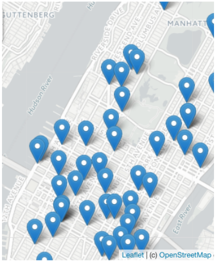
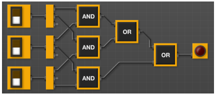
Syllabus: Topics





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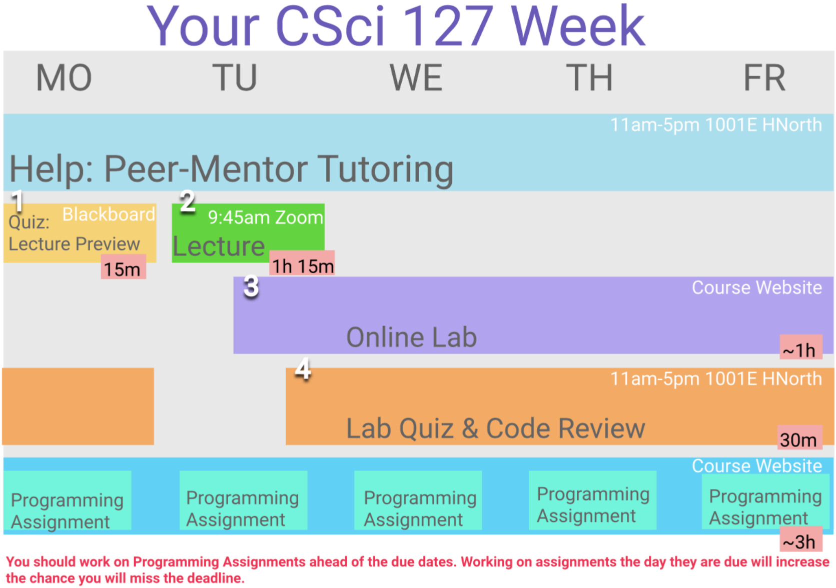
    - ★ for the markup language for github,
    - ★ for the simplified machine language, &
    - ★ for C++.

Course Structure



Your CSci 127 Week

MO TU WE TH FR

11am-5pm 1001E HNorth

Help: Peer-Mentor Tutoring

1 Quiz: Blackboard Lecture Preview 15m

2 9:45am Zoom Lecture 1h 15m

3 Course Website Online Lab ~1h

4 11am-5pm 1001E HNorth Lab Quiz & Code Review 30m

Course Website

Programming Assignment

Programming Assignment

Programming Assignment

Programming Assignment

Programming Assignment

~3h

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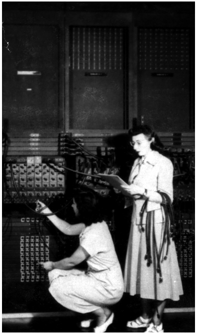
1&2 - Lecture

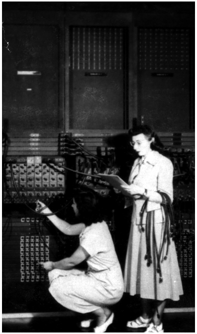


First "computers"

ENIAC, 1945.

- Tuesdays, 9:45-11:00am, on Zoom.

1&2 - Lecture



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- Mix of explanation, challenges & active concept application.

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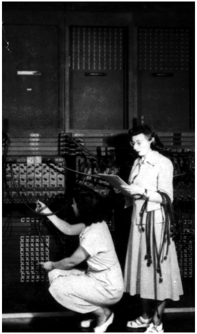

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- Lecture Preview: 15 minutes Quiz on Blackboard **prior** to each lecture (opens on Mondays).

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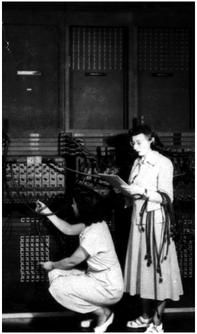

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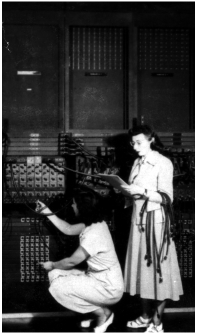

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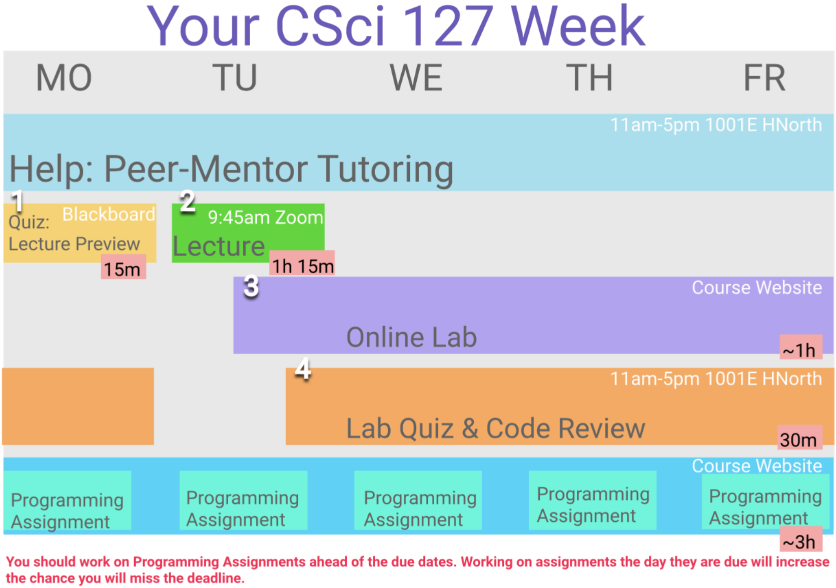
- Lecture Quiz: on Gradescope during lecture.
- Ask questions in Q&A.

Course Structure



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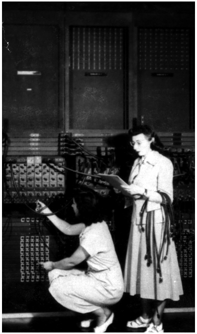
3 - Online Lab



First "computers"

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Each Week:

- **You must independently read through the weekly online Lab.**

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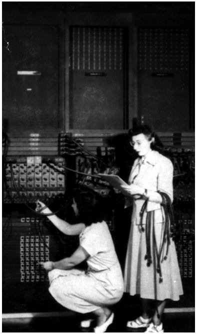

First "computers"

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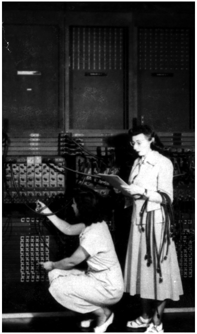
Each Week:

- **You must independently read through the weekly online Lab.**
- Replaces scheduled recitation meeting.

3 - Online Lab



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Each Week:

- **You must independently read through the weekly online Lab.**
- Replaces scheduled recitation meeting.
- Set aside about 1 hour each week, preferably at the same time, add it to your schedule.

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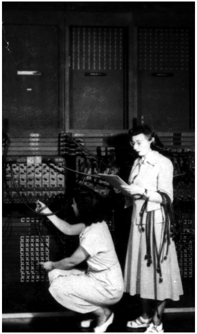

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Each Week:

- **You must independently read through the weekly online Lab.**
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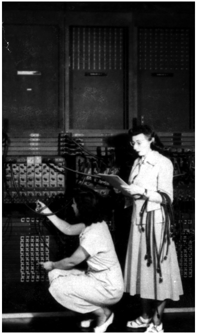
- Set aside about 1 hour each week, preferably at the same time, add it to your schedule.
- Lab content directly supports weekly programming assignments.

3 - Online Lab



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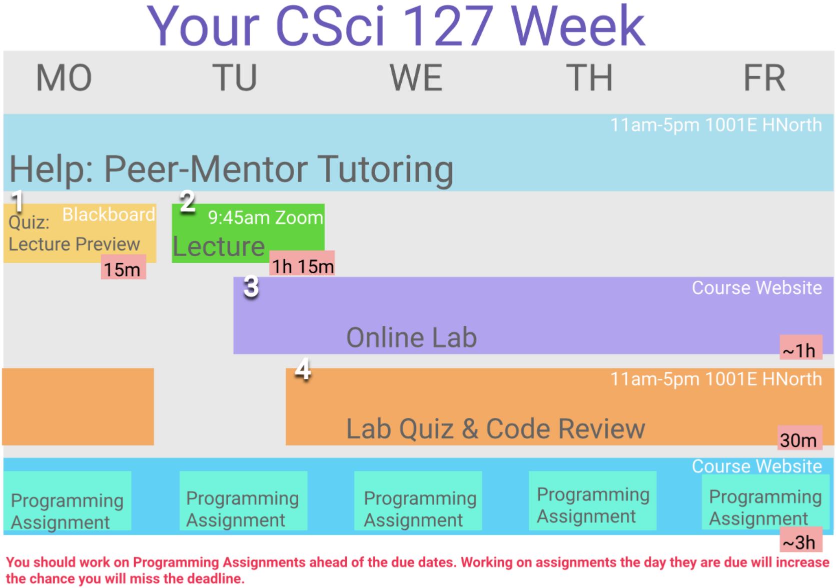
- Set aside about 1 hour each week, preferably at the same time, add it to your schedule.
- Lab content directly supports weekly programming assignments.
- Labs found on course website (Handouts column in Course Outline)

Course Structure



Your CSci 127 Week

MO TU WE TH FR

Help: Peer-Mentor Tutoring — 11am-5pm 1001E HNorth

1 Quiz: Lecture Preview — Blackboard — 15m

2 Lecture — 9:45am Zoom — 1h 15m

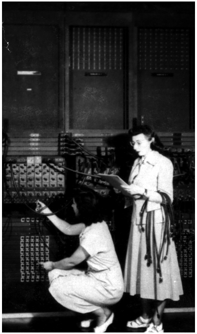
3 Online Lab — Course Website — ~1h

4 Lab Quiz & Code Review — 11am-5pm 1001E HNorth — 30m

Programming Assignment · Programming Assignment · Programming Assignment · Programming Assignment · Programming Assignment — Course Website — ~3h

You should work on Programming Assignments ahead of the due dates. Working on assignments the day they are due will increase the chance you will miss the deadline.

4 -In-person Quiz & Code Review



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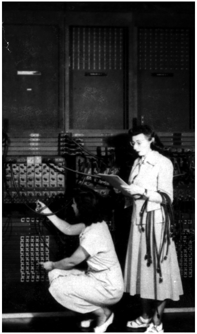
- **Every week you must take a paper quiz** in Lab 1001E Hunter North

4 -In-person Quiz & Code Review



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- Quizzes are directly related to the current week's lab content

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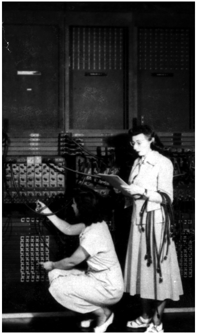

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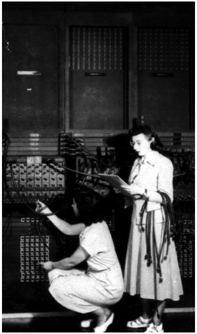

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- You **must make an appointment** for taking quiz and code review (two separate appointments, you can make them back to back)

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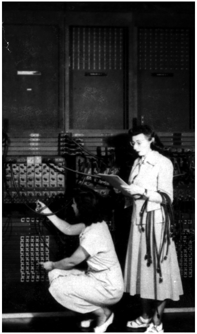

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- You **must make an appointment** for taking quiz and code review (two separate appointments, you can make them back to back)
- There is limited availability, plan ahead and don't miss your appointments!

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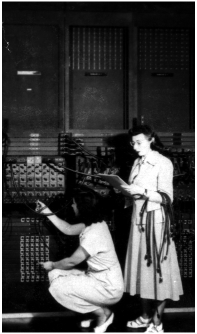

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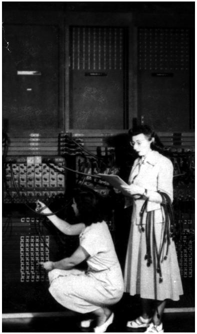
- You **must make an appointment** for taking quiz and code review (two separate appointments, you can make them back to back)
- There is limited availability, plan ahead and don't miss your appointments!
- Links to make appointments will be available on Blackboard

4 -In-person Quiz & Code Review



First "computers"

ENIAC, 1945.

- **Every week you must take a paper quiz** in Lab 1001E Hunter North
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- You **must make an appointment** for taking quiz and code review (two separate appointments, you can make them back to back)
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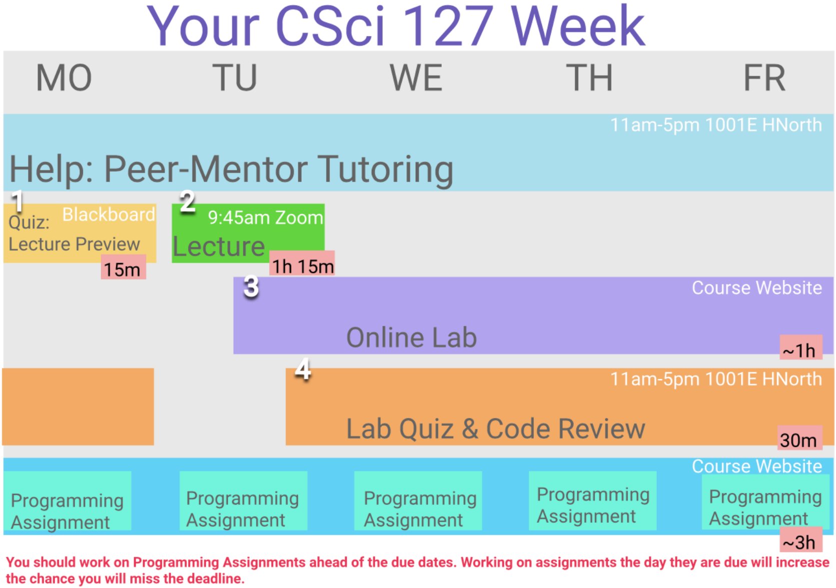
- Links to make appointments will be available on Blackboard
- Quiz and code review topics and due dates can also be found on the course website

Course Structure



Your CSci 127 Week

MO TU WE TH FR

11am-5pm 1001E HNorth

Help: Peer-Mentor Tutoring

1 Quiz: Blackboard
Lecture Preview
15m

2 9:45am Zoom
Lecture
1h 15m

3 Course Website
Online Lab
~1h

4 11am-5pm 1001E HNorth
Lab Quiz & Code Review
30m

Course Website
Programming Assignment
Programming Assignment
Programming Assignment
Programming Assignment
Programming Assignment
~3h

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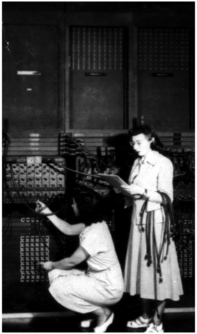
Homework



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Each Week:

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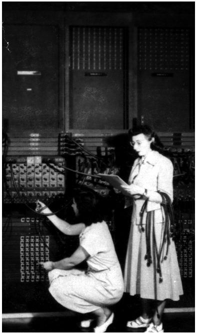

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- **5 Programming Assignments.**

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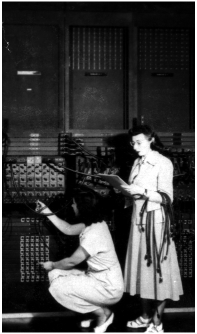

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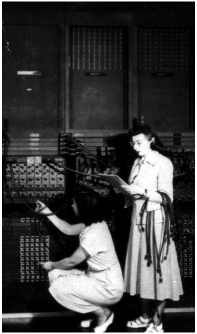

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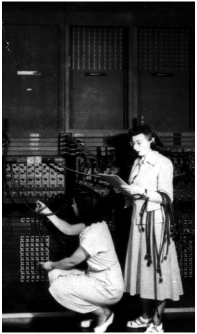

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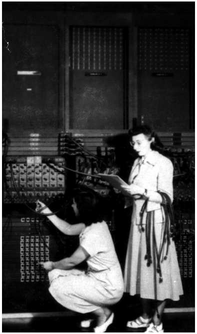

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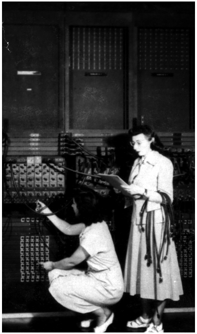

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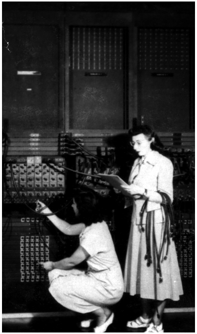

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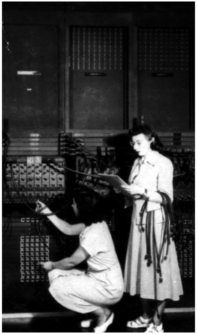
- Multiple submissions accepted.
- For help to run and submit programming assignments, please visit the 1001E lab.

Make Your Schedule!



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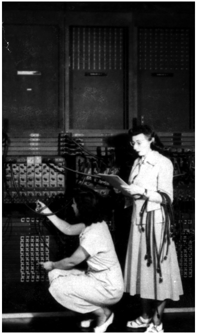

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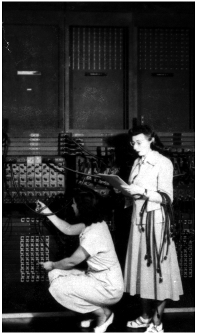

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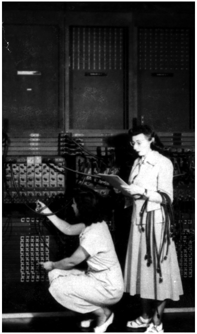

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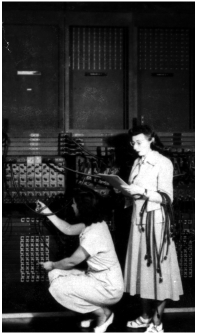

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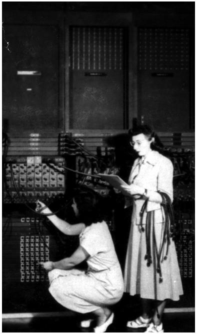

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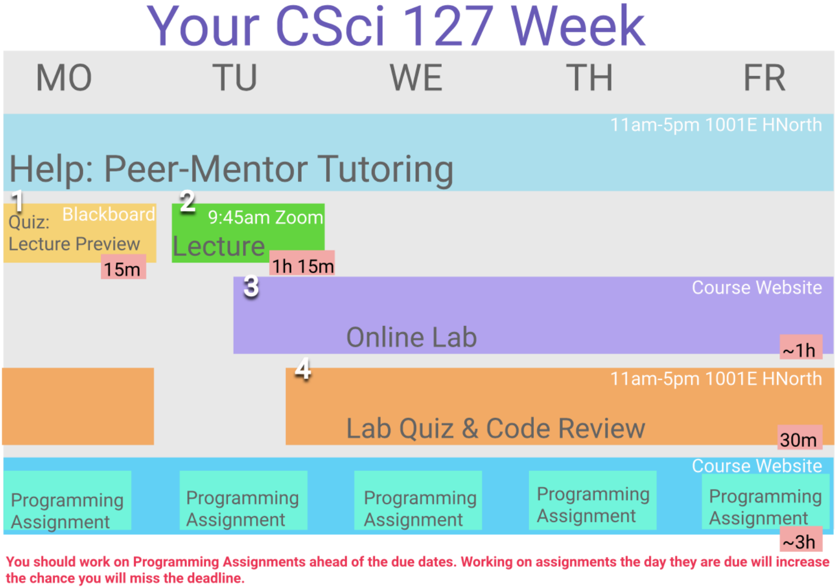
- Put them in your calendar now and then adjust if necessary.

Course Structure



Your CSci 127 Week

MO TU WE TH FR

Help: Peer-Mentor Tutoring — 11am-5pm 1001E HNorth

1 Quiz: Lecture Preview — Blackboard — 15m

2 Lecture — 9:45am Zoom — 1h 15m

3 Online Lab — Course Website — ~1h

4 Lab Quiz & Code Review — 11am-5pm 1001E HNorth — 30m

Programming Assignment — Programming Assignment — Programming Assignment — Programming Assignment — Programming Assignment — Course Website — ~3h

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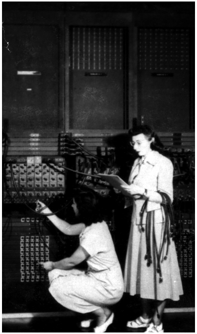

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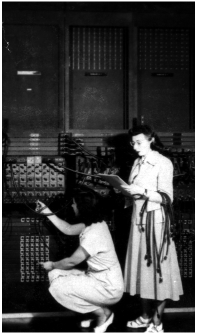

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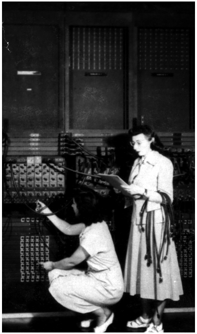

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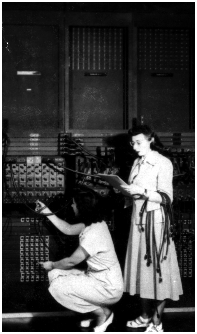

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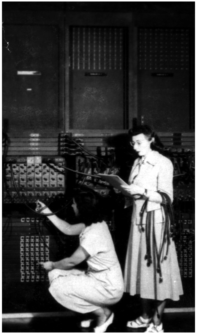

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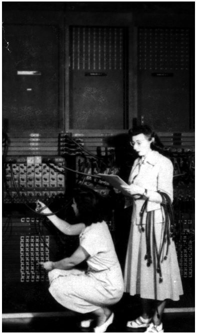

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- Office Hours with Prof. Ligorio
  - Drop-in Hours: **Tuesday 11am-1pm**
  - Zoom link on Blackboard under *L*ecture & Recordings

Benefits of Tutoring and Code Review

Explain Technical Concepts

Develop your Technical Vocabulary

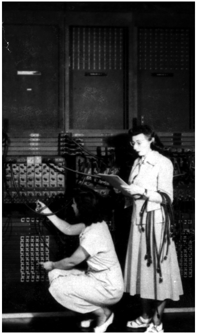
Expert Help

Procedural Thought Organization

Learn Debugging

Build Community

Academic Dishonesty



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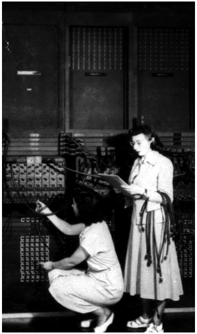

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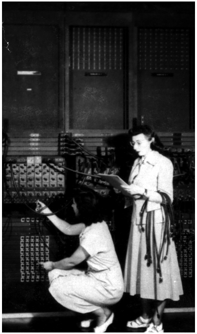

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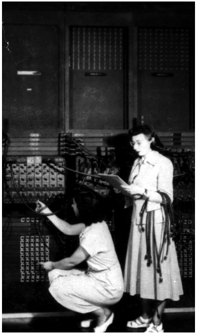

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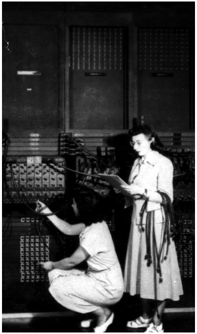

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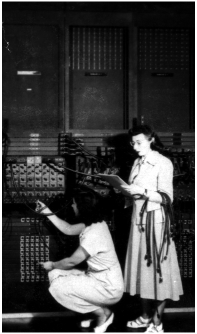

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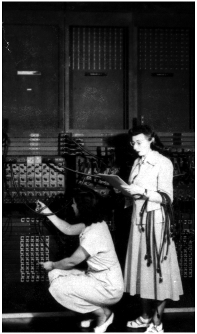

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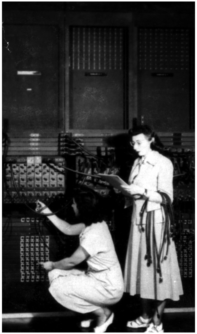
- **All instances of academic dishonesty will be reported to the office of Student Affairs**

Communication



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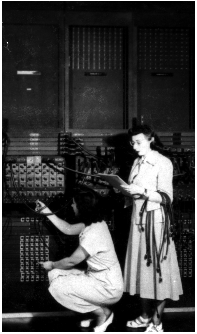

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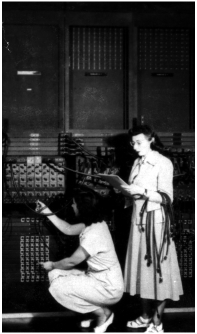

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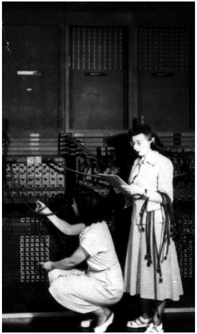

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- Instructions for changing your email on Blackboard announcements

Today's Topics

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

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- The first lab goes into step-by-step details of getting Python running.
- We'll look at the design and basic structure (no worries if you haven't tried it yet).

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!")
```

First Program: `Hello, World!`

```
#Name:  Thomas Hunter                           ← These lines are comments
#Date:  September 1, 2017                       ← (for us, not computer to read)
#This program prints:  Hello, World!            ← (this one also)

print("Hello, World!")                          ← Prints the string "Hello, World!" to the screen
```

- Output to the screen is: `Hello, World!`

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← (for us, not computer to read)

← (this one also)

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

- Output to the screen is: `Hello, World!`
- We know that `Hello, World!` is a **string** (a sequence of characters) because it is surrounded by quotes
- 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,’)
```

Spring18 here in Assembly Hall

Variations on `Hello, World!`

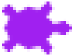
```
#Name:  L-M Miranda
#Date:  Hunter College HS ‘98
#This program prints intro lyrics

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.

Today's Topics

- Introduction to Python
- **Turtle Graphics**
- Definite Loops (`for`-loops)
- Algorithms

Turtles Introduction



- A simple, whimsical graphics package for Python.

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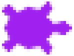

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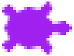

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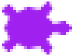
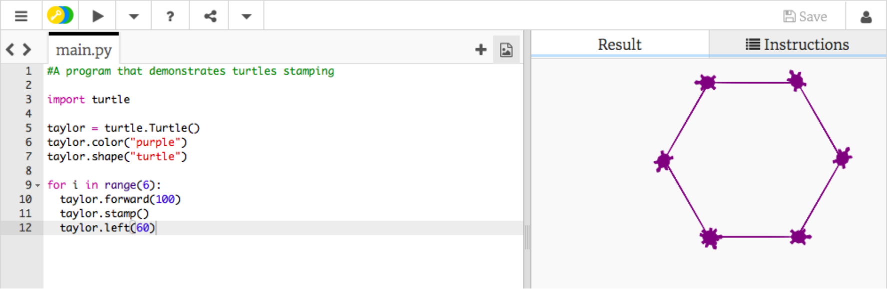


- A simple, whimsical graphics package for Python.
- Dates back to Logo Turtles in the 1960s.
- (Demo from webpage)
- (Fancier turtle demo)

Today's Topics

- Introduction to Python
- Turtle Graphics
- **Definite Loops (`for`-loops)**
- Algorithms

Turtles Introduction



```
#A program that demonstrates turtles stamping

import turtle

taylor = turtle.Turtle()
taylor.color("purple")
taylor.shape("turtle")

for i in range(6):
  taylor.forward(100)
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- Creates a turtle **variable**, called `taylor`.

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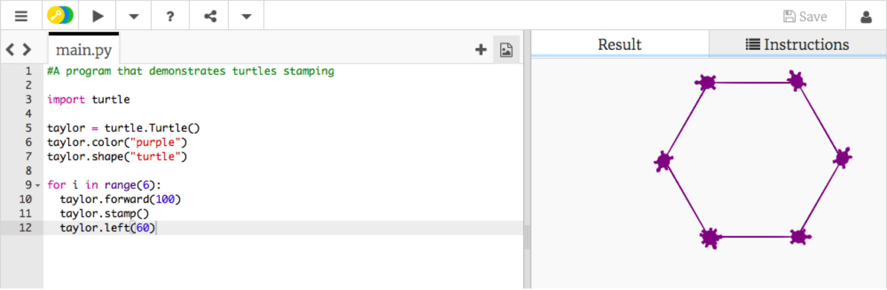

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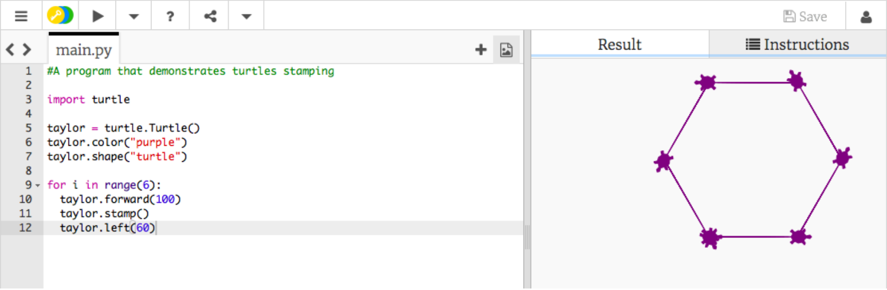

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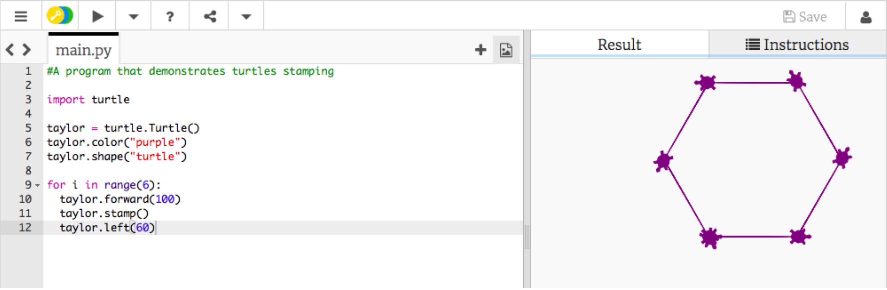

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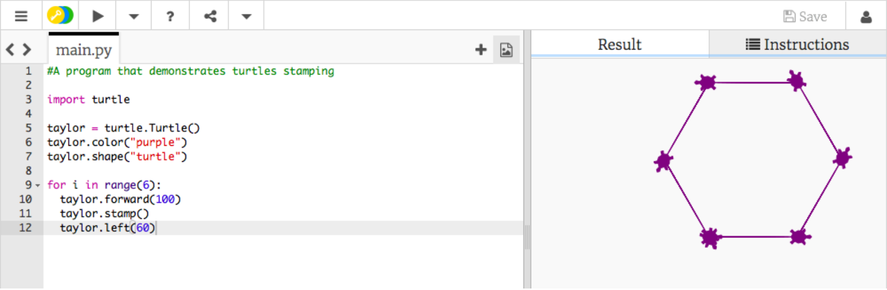

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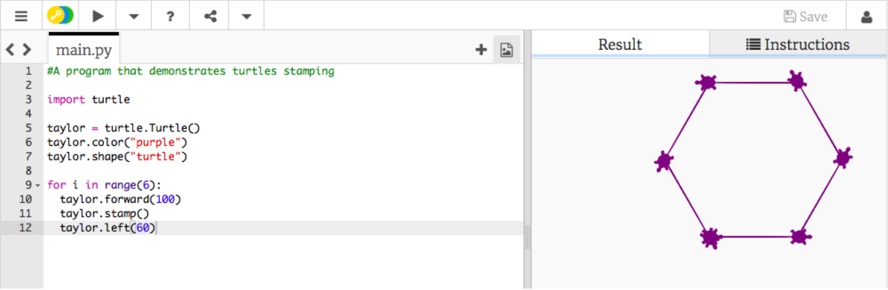

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- Repeats 6 times:
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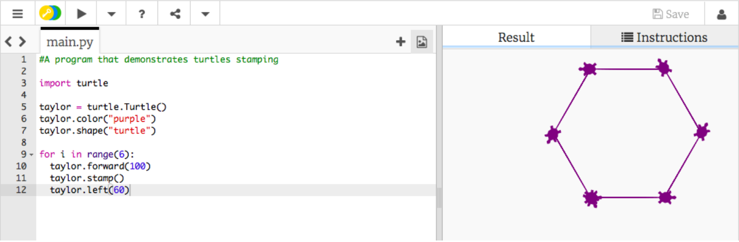
- Repeats any instructions **indented** in the "loop block"
- This is a **definite** loop because it repeats a fixed number of times

Your Turn!!!

Try to solve this challenge:

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



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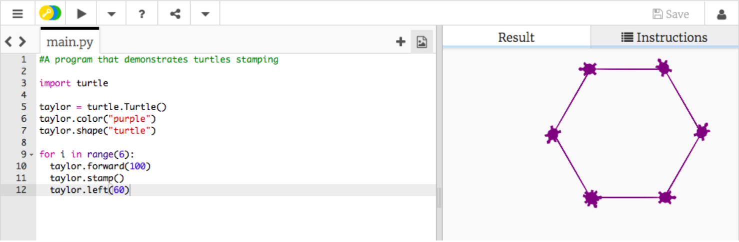

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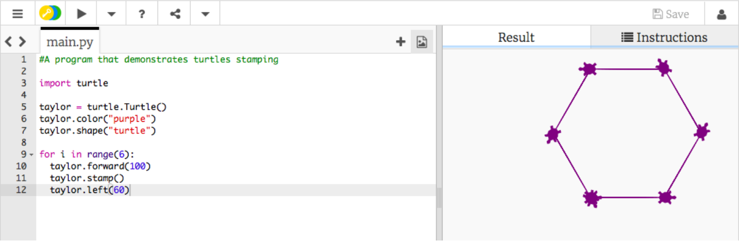
- Has 10 sides (instead of 6), so change the `range(6)` to `range(10)`.

Decagon Program



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- 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!`

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Work Program

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

```
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- Instead of turtle commands, repeating a print statement.

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```
    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!")
```

Lecture Quiz

Log-in to Gradescope

- Find Lecture 1 Quiz

Lecture Quiz

Log-in to Gradescope

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- Take the quiz

Lecture Quiz

Log-in to Gradescope

- Find Lecture 1 Quiz
- Take the quiz
- You have 3 minutes

Today's Topics

- Introduction to Python
- Turtle Graphics
- Definite Loops (`for`-loops)
- **Algorithms**

What is an Algorithm?

From our textbook:

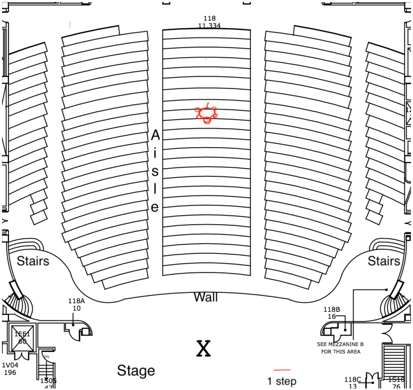
- An algorithm is a process or sequence of steps to be followed to solve a problem.

What is an Algorithm?

From our textbook:

- An algorithm is a process or sequence of steps 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 executed by a computer.

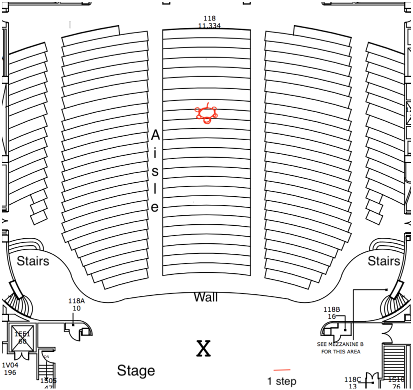
Your Turn!!!



Try to solve this challenge:

1. This is the floor plan of Assembly Hall at Hunter College.

Your Turn!!!



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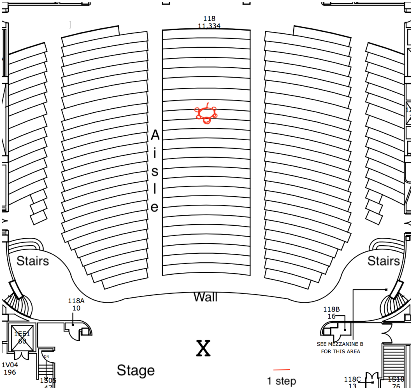

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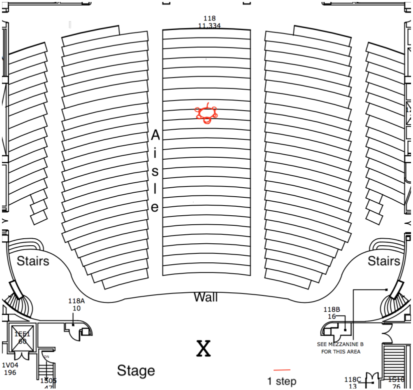

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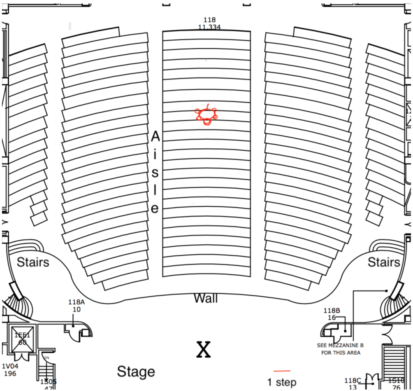

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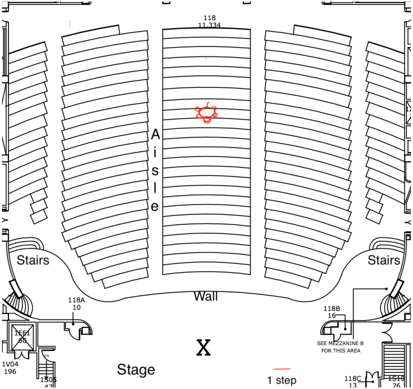

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    - Turtles cannot climb walls, must use stairs (walk forward on steps).

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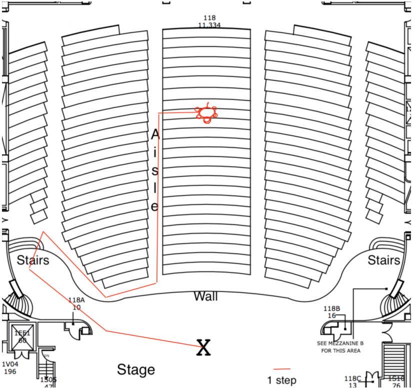
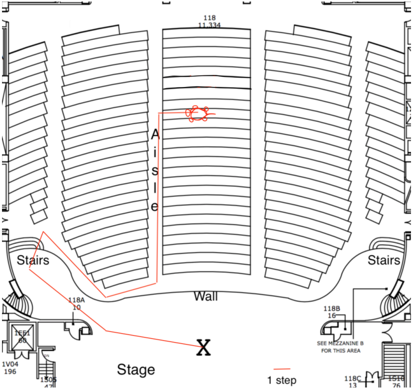


One possible solution:

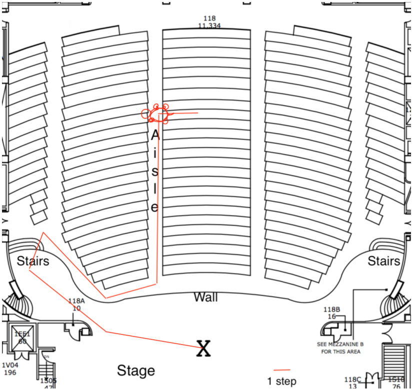
Your Turn!!!



One possible solution:

- Turn right 90 degrees.

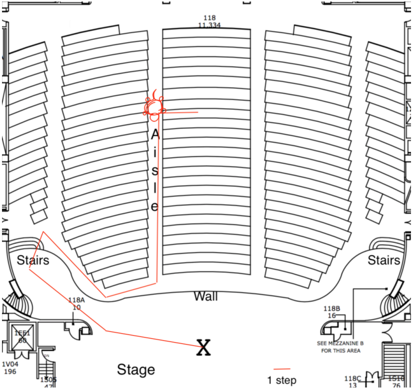
Your Turn!!!



One possible solution:

- Turn right 90 degrees.
- Walk forward 3 steps.

Your Turn!!!



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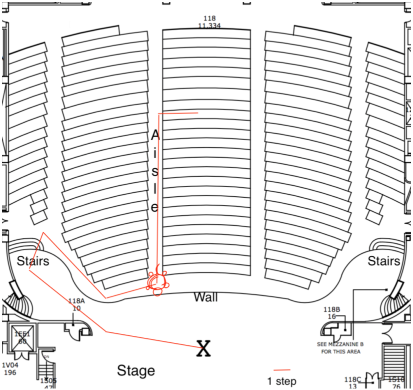
- Turn left 90 degrees.

Your Turn!!!



One possible solution:

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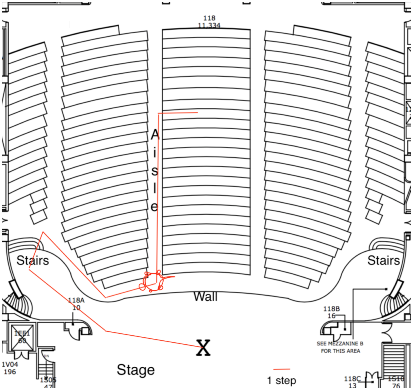
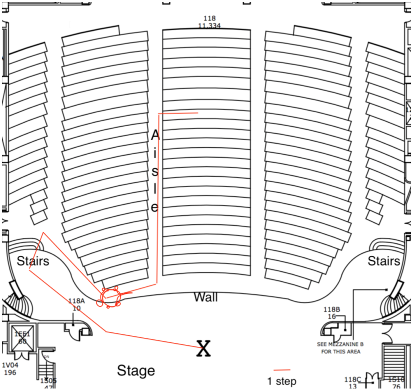


One possible solution:

- Turn right 90 degrees.
- Walk forward 3 steps.
- Turn left 90 degrees.
- Walk forward 10 steps.
- Turn right 65 degrees

Your Turn!!!



One possible solution:

- Turn right 90 degrees.
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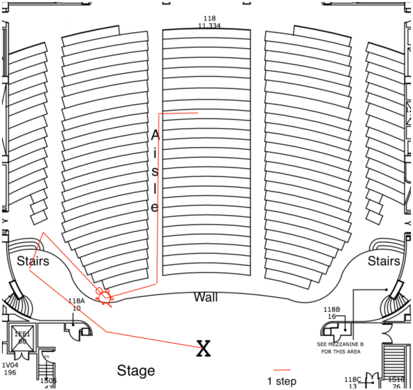
- Turn left 90 degrees.
- Walk forward 10 steps.
- Turn right 65 degrees.
- Walk forward 4 steps.

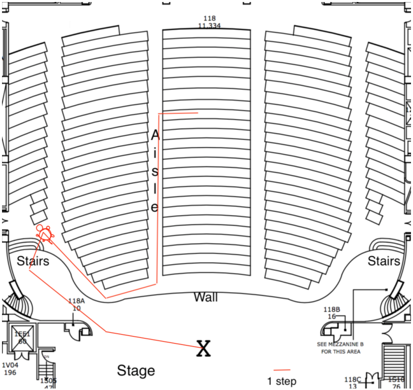
Your Turn!!!



One possible solution:

- Turn right 90 degrees.
- Walk forward 3 steps.
- Turn left 90 degrees.
- Walk forward 10 steps.
- Turn right 65 degrees.
- Walk forward 4 steps.
- Turn right 45 degrees.

Your Turn!!!



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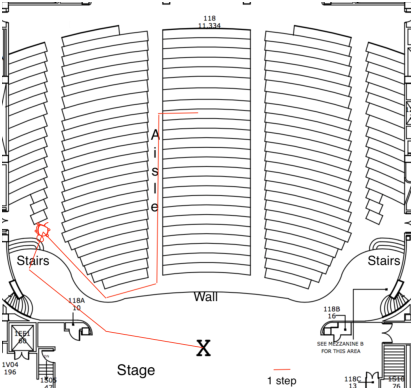

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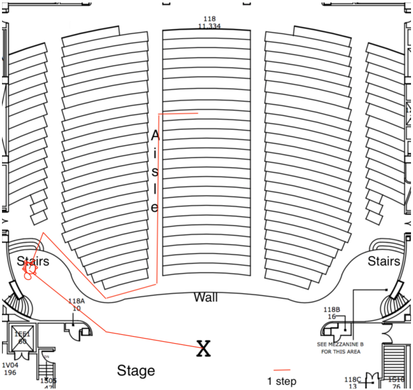
- Walk forward 6 steps.
- Turn left 110 degrees.

Your Turn!!!



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- Turn left 110 degrees.
- Walk forward 3 steps.

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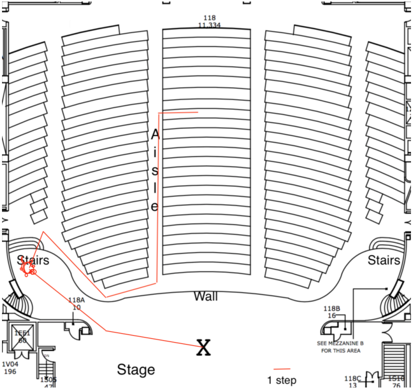

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- Turn left 110 degrees.
- Walk forward 3 steps.
- Turn left 80 degrees.

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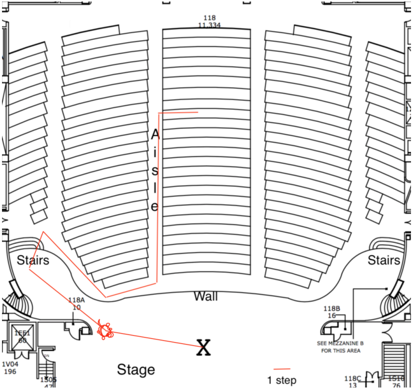

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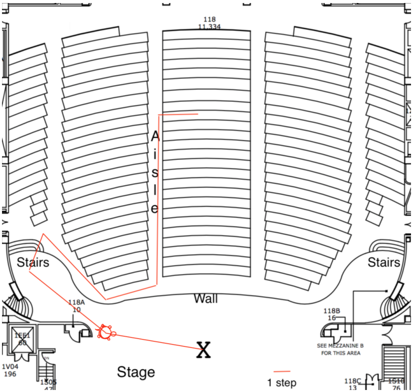

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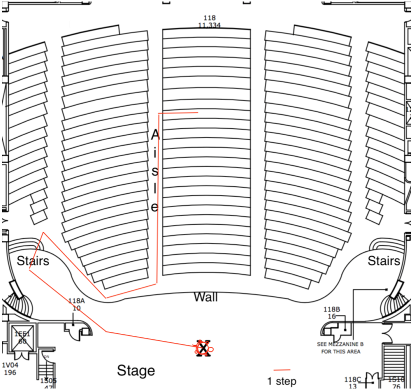

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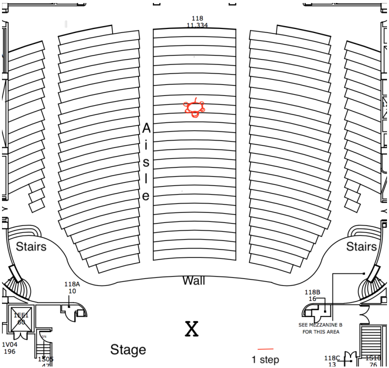
- Walk forward 6 steps. Reached X!!!

Your Turn!!!



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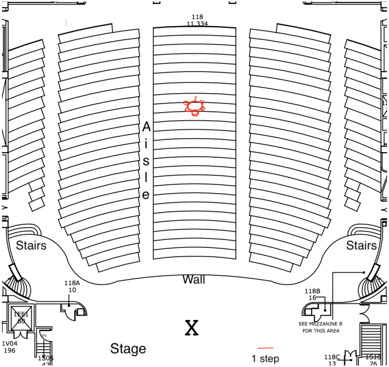
Your Turn!!!



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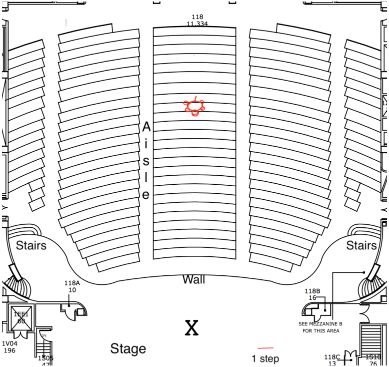
Your Turn!!!



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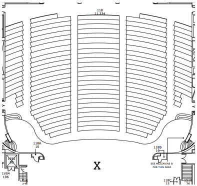
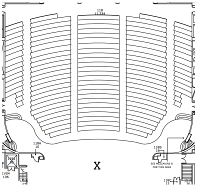
- "Test and Debug" other students' posted solutions and reply to their posts if you find a bug!
- Degrees the turtle turns are approximate, any good approximation is considered correct.

Recap



- Writing precise algorithms is difficult.

Recap



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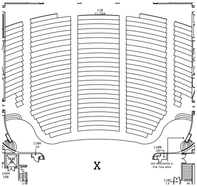
Recap



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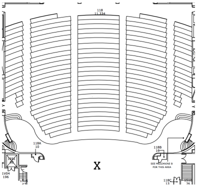

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  - strings, or sequences of characters,
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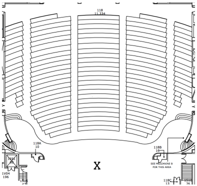
Recap



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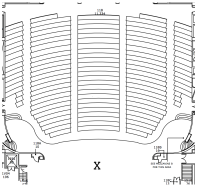

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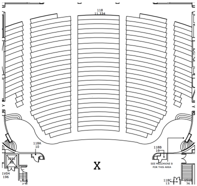

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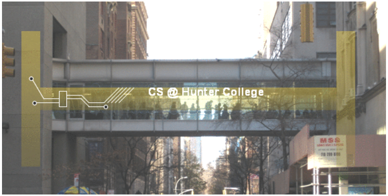

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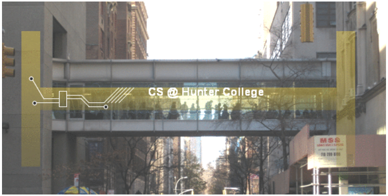

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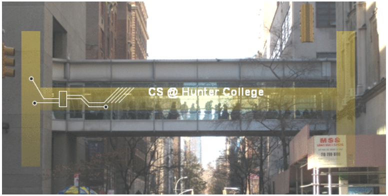

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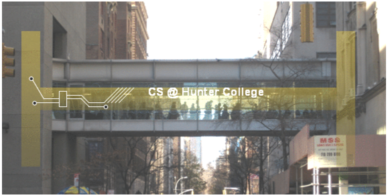

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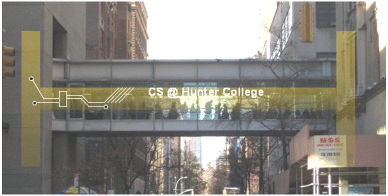

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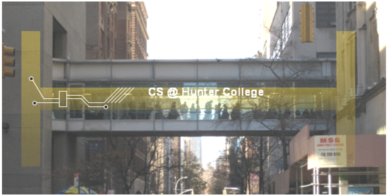

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