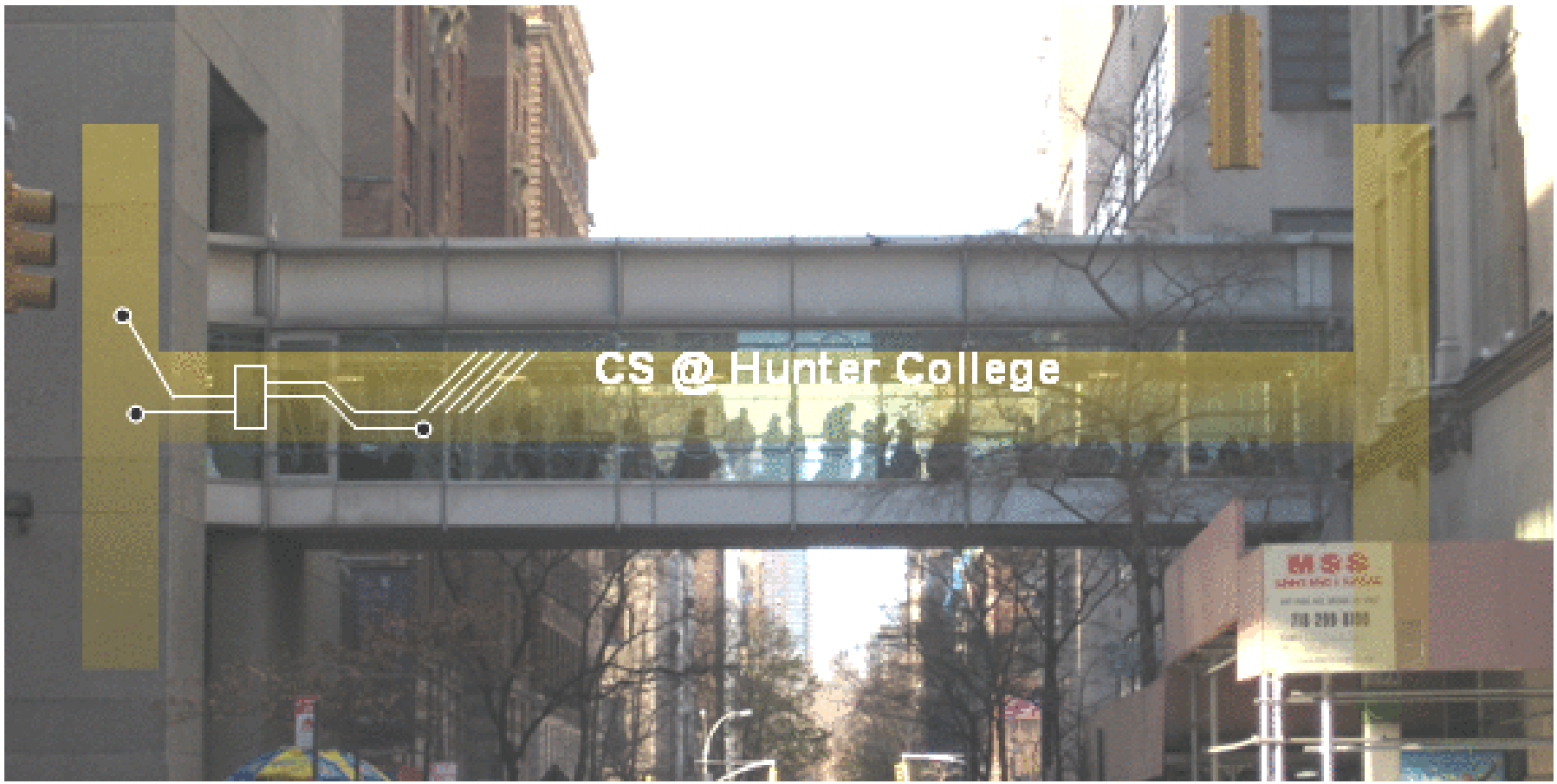
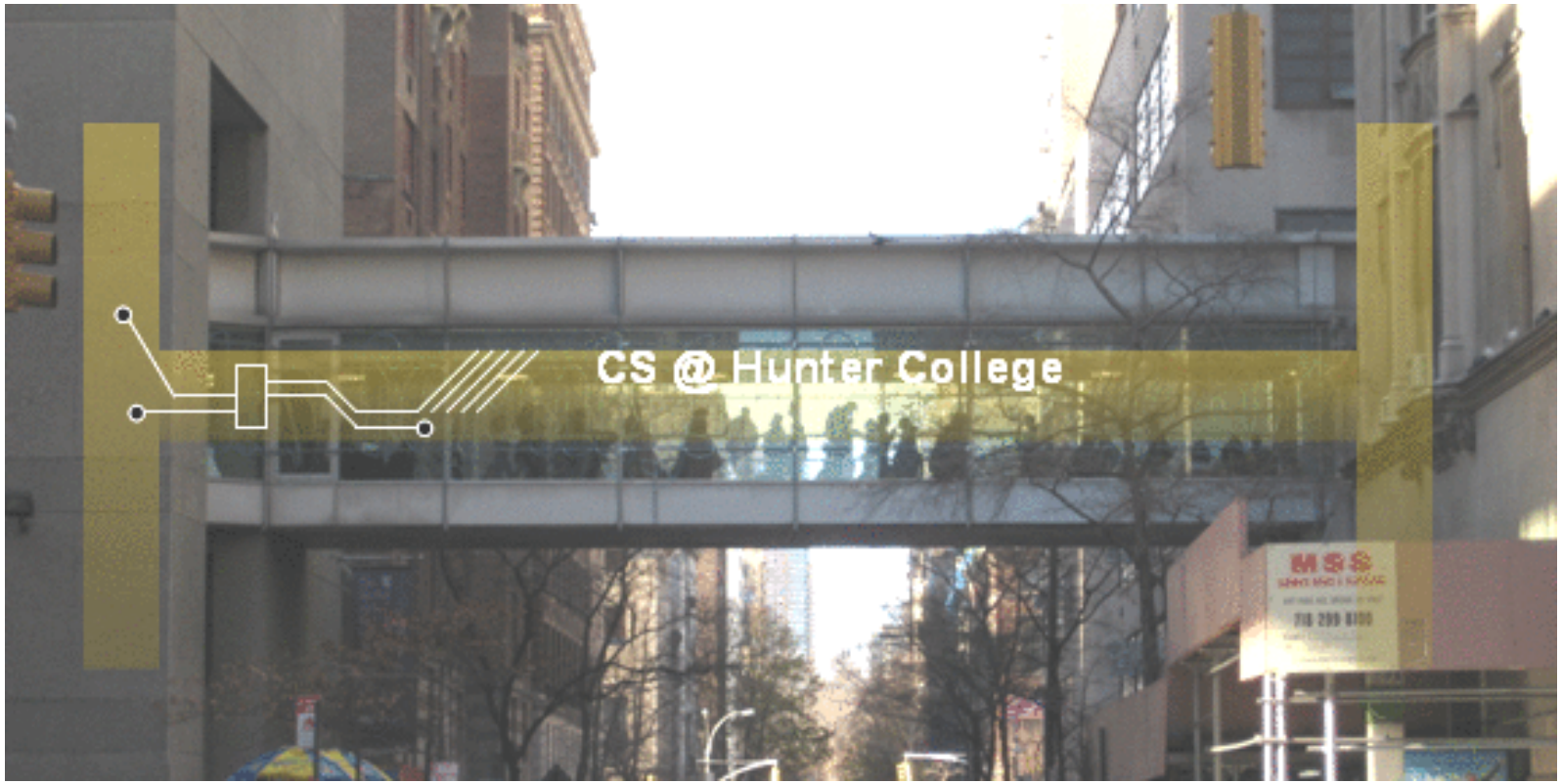
CSci 127: Introduction to Computer Science



hunter.cuny.edu/csci

Welcome



Acknowledgments

Thank you to the amazing support of:

President Raab

Dean Polsky
Arts & Science

Judy Spitz
Break Through Tech

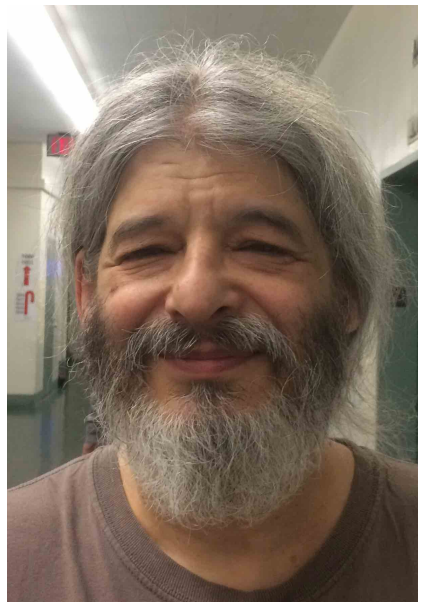
Introductions: Course Designers

Dr. Katherine St. John

Professor,
Course Coordinator

Dr. William Sakas

Associate Professor,
Chair



Prof. Eric Schweitzer

Undergraduate Program
Coordinator

Introductions: Instructors

Katherine Howitt

Early College Initiative

Dr. Tiziana Ligorio

Large Lecture
Macaulay Honors Section

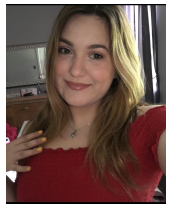
Introductions: Undergraduate Teaching Assistants

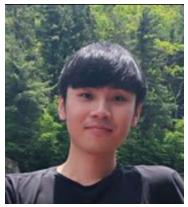

Aida Jevric

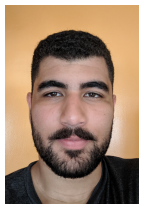

Ajani Stewart


Arterio Rodrigues


Brian Chambers

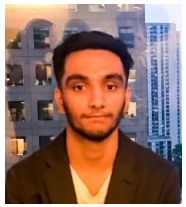

Caiitlin Selca

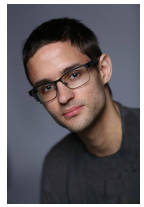

Chi Shing Lee


David Moncayo


David Yuen

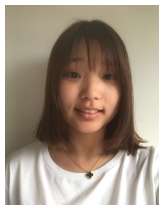

Destiny Barbery


Ghazanfar Shahbaz


Illya Baburashvili

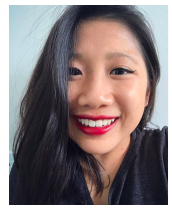

Kevin Wong


Leonardo Matone


Liulan Zheng


Lola Samigjonova

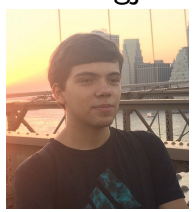

Mandy Yu


Nancy Ng

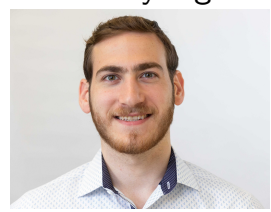

Nga Yu Lo


Owen Kunhardt


Patrick Chaca

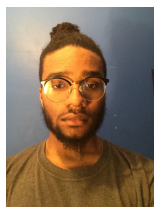

Ryan Chevarria

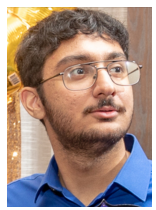

Sadab Hafiz


Seth Spiegel


Shantel Dixon

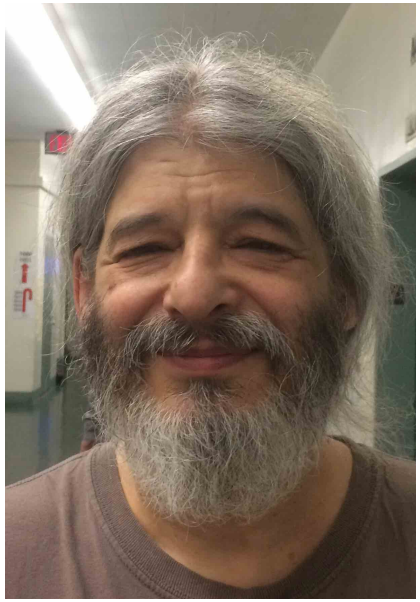

Stephanie Yung


Tyler Robinson


Yash Mahtani

Introductions: Advisors

Emely Peguero
Pre-majors &
Early Majors



Eric Schweitzer
Undergraduate Program
Coordinator

Justin Tojeira
Internships &
Upper Division

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.*

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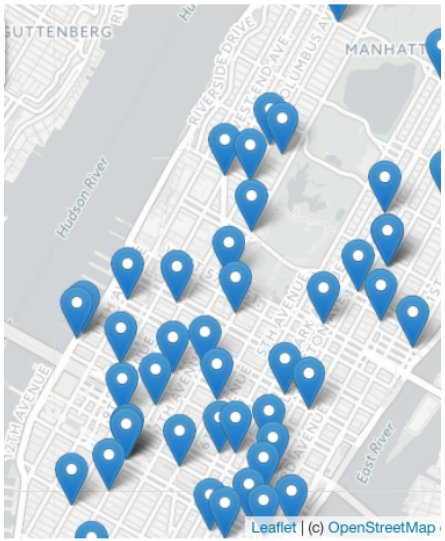
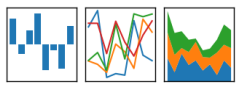
(Show syllabus webpage)

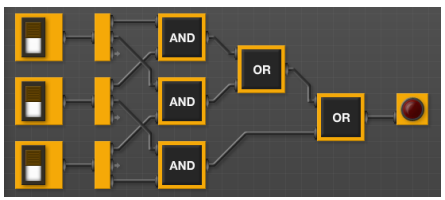
Syllabus: Topics



pandas

$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$





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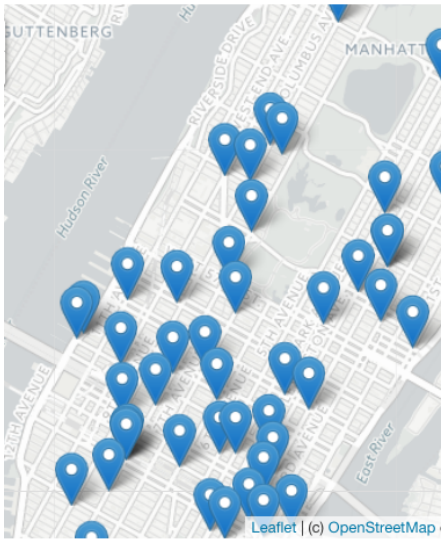
Syllabus: Topics



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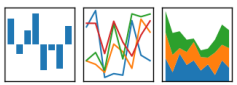

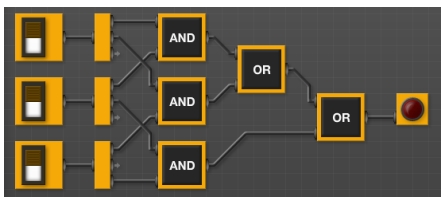

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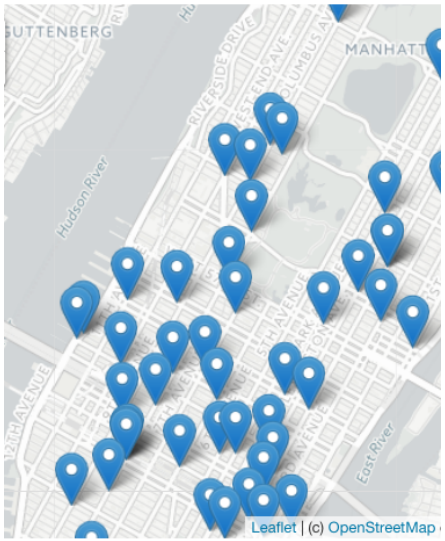
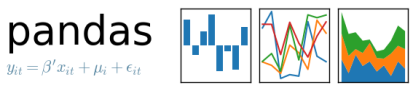
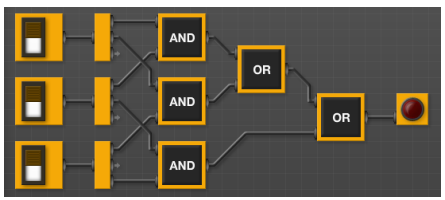
Syllabus: Topics

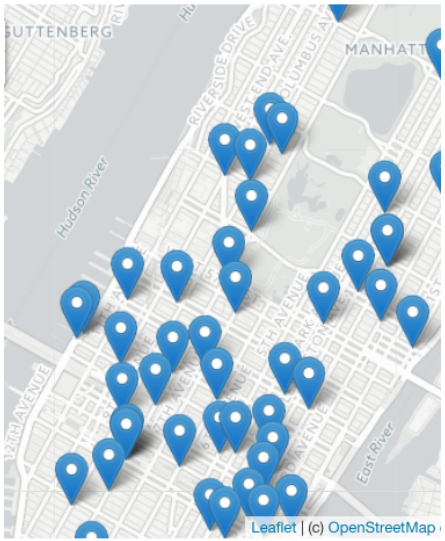


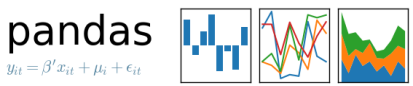


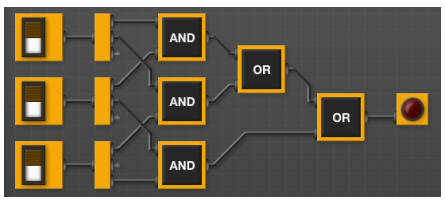


- **This course assumes no previous programming experience.**
- "... Emphasis on problem-solving and computational thinking through 'coding': computer programming for beginners..."
- Organized like a fugue, with variations on this theme:

Syllabus: Topics







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- "... Emphasis on problem-solving and computational thinking through 'coding': computer programming for beginners..."
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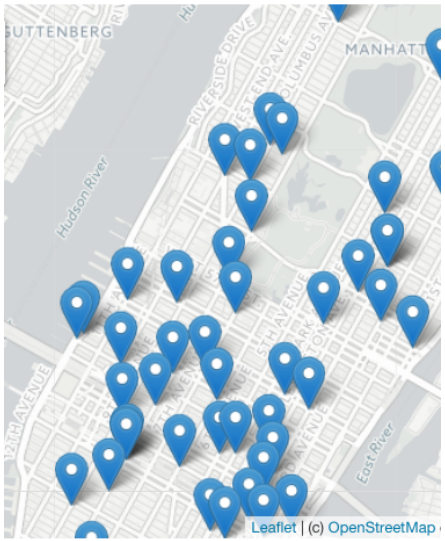
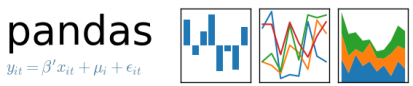
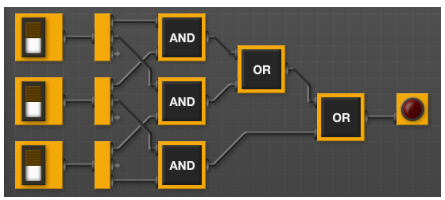
  - Introduce coding constructs in Python,

Syllabus: Topics







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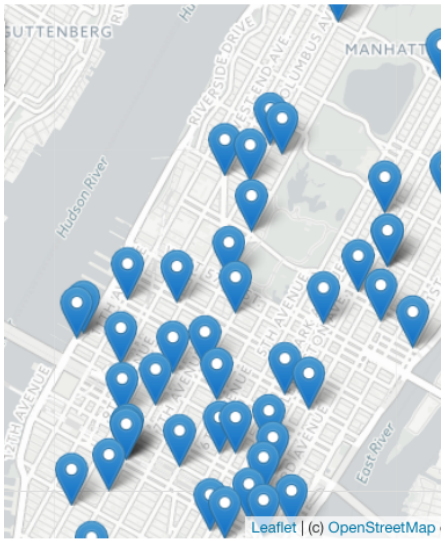
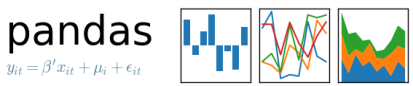
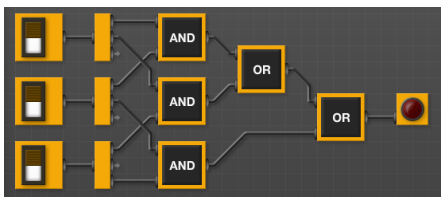
Syllabus: Topics







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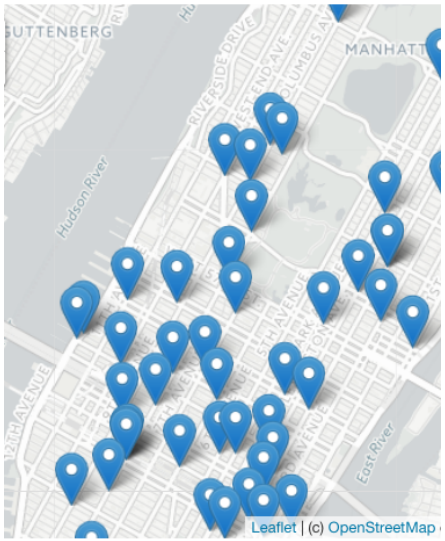
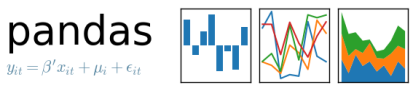
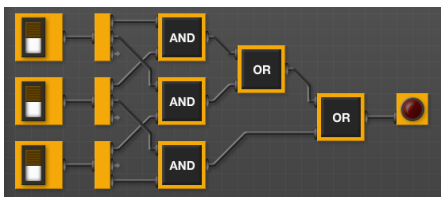
Syllabus: Topics







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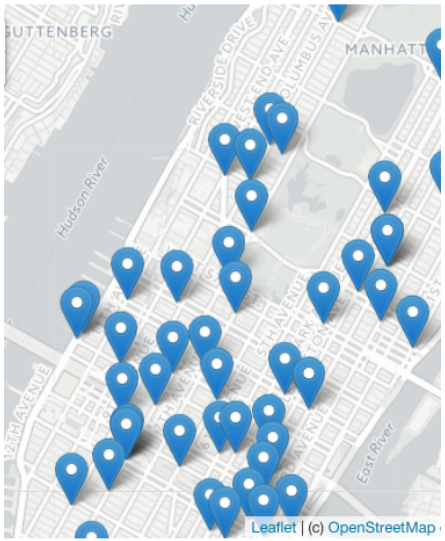
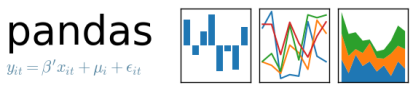
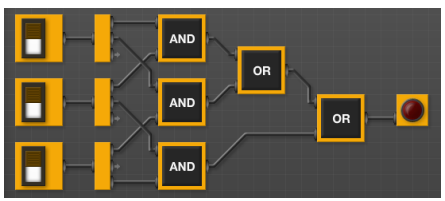
Syllabus: Topics







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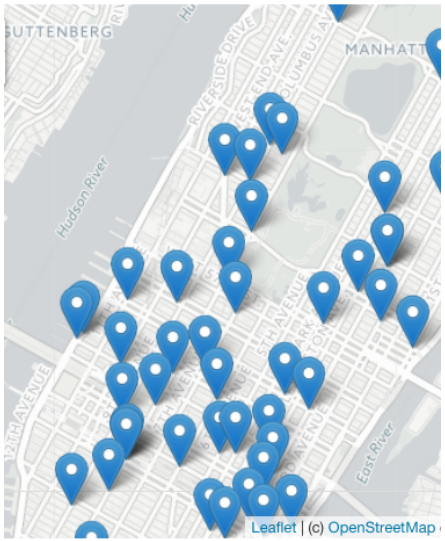
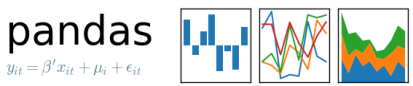
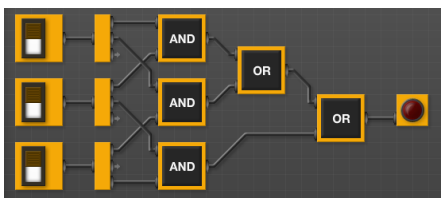
Syllabus: Topics







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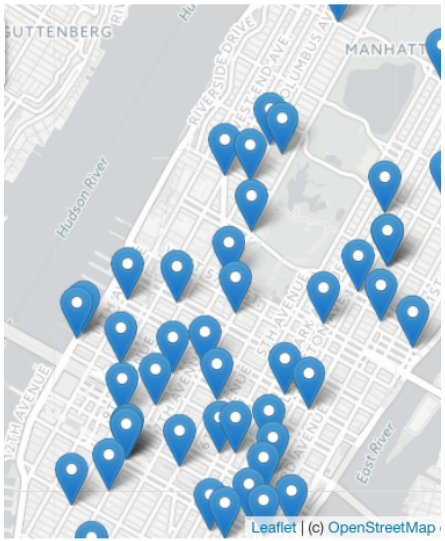
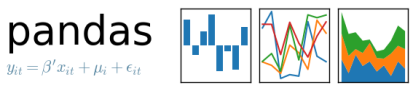
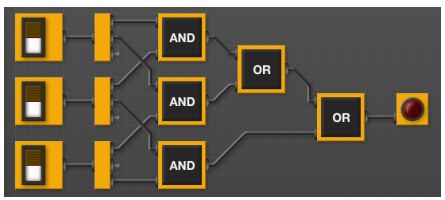
    - ★ for the markup language for github,

Syllabus: Topics







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- Organized like a fugue, with variations on this theme:
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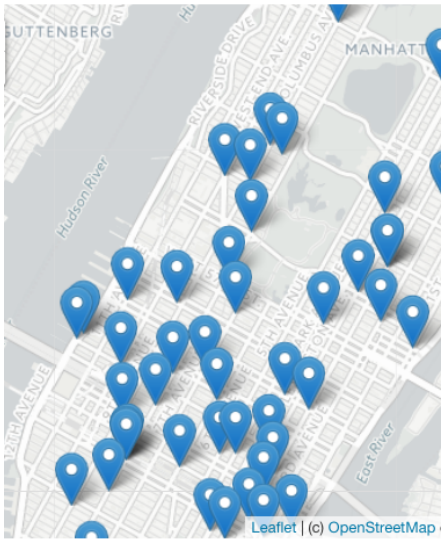
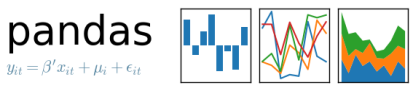
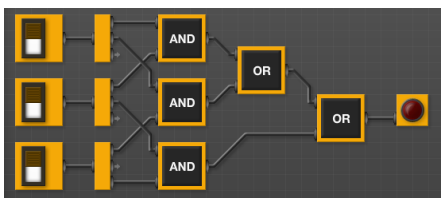
Syllabus: Topics







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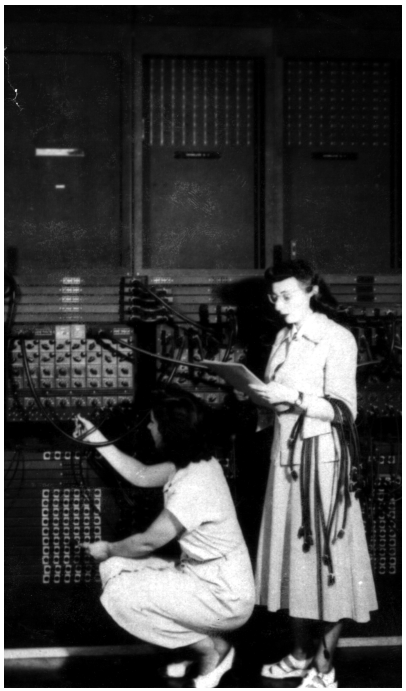

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Lecture:

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

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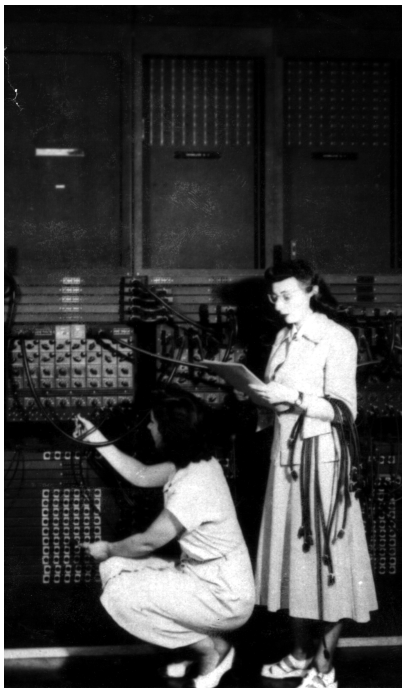

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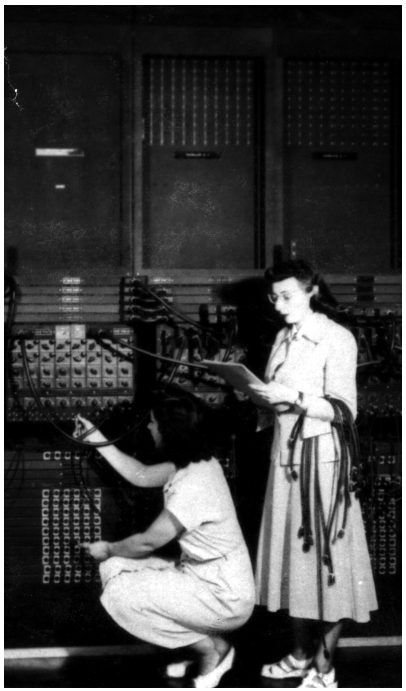

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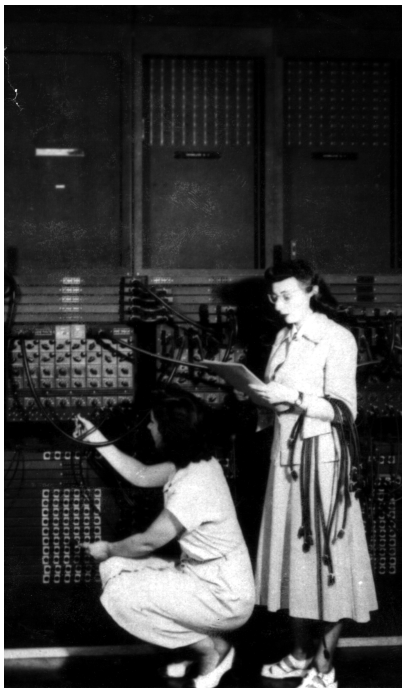

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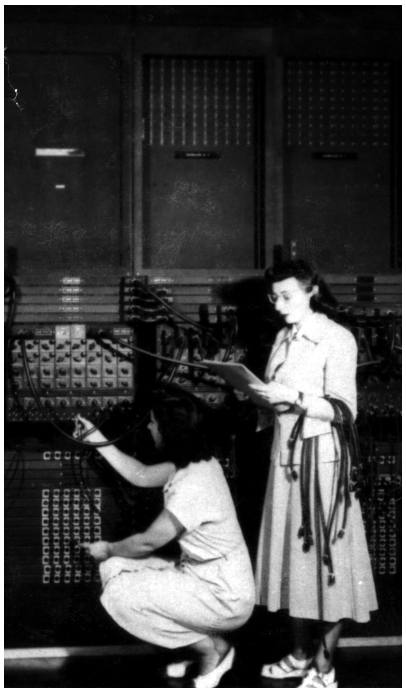

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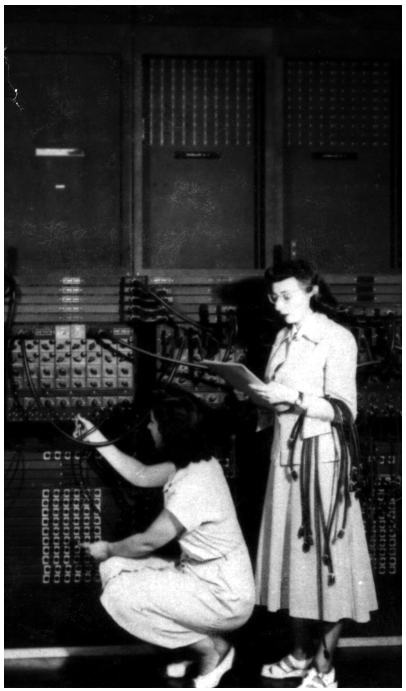

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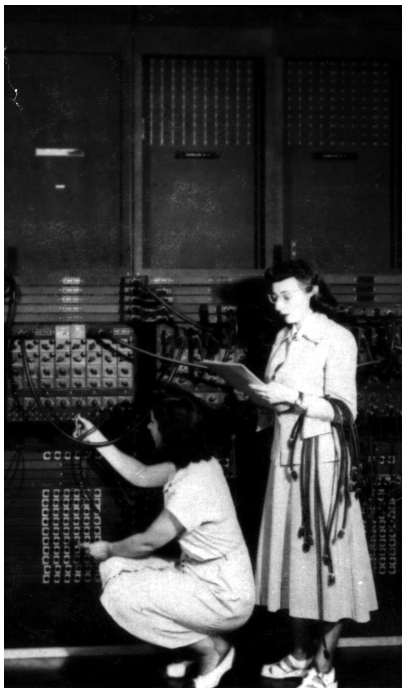

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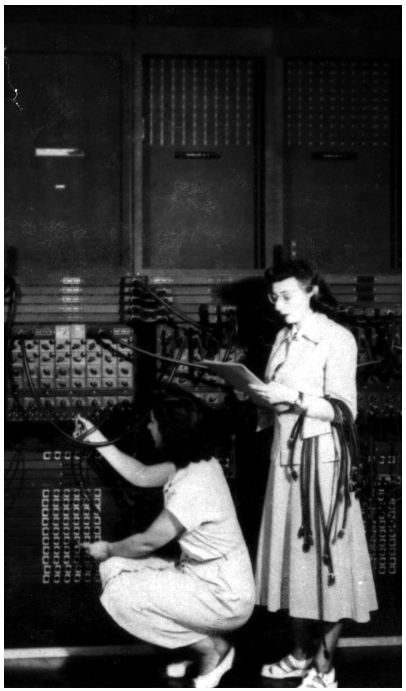

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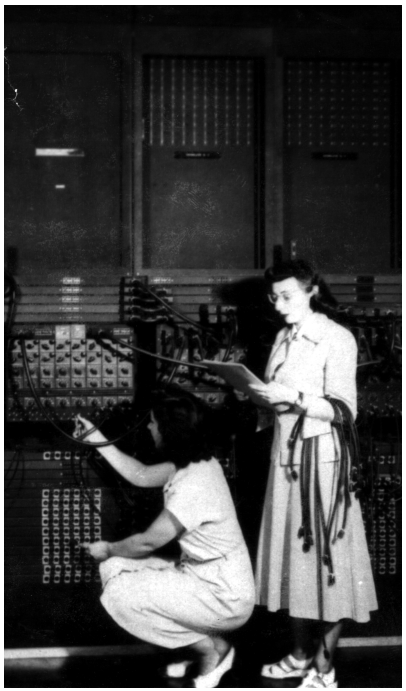

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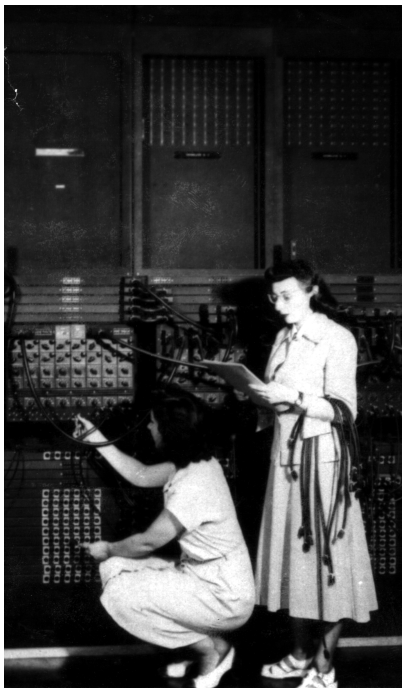

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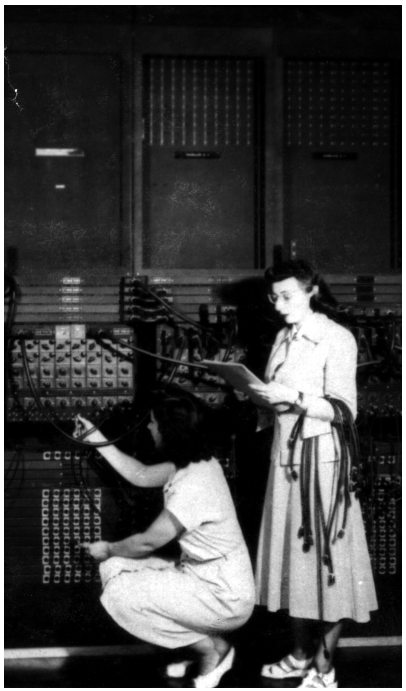

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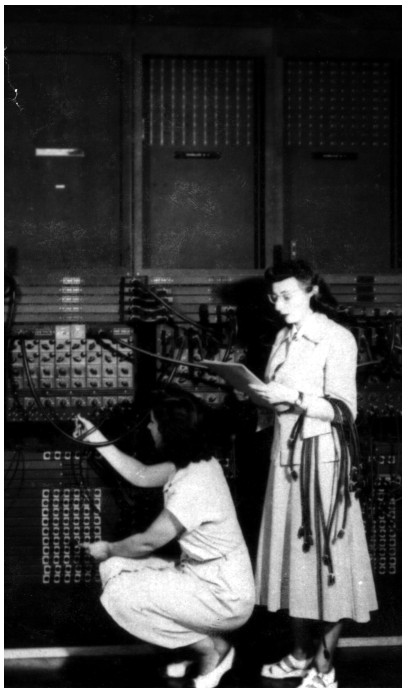

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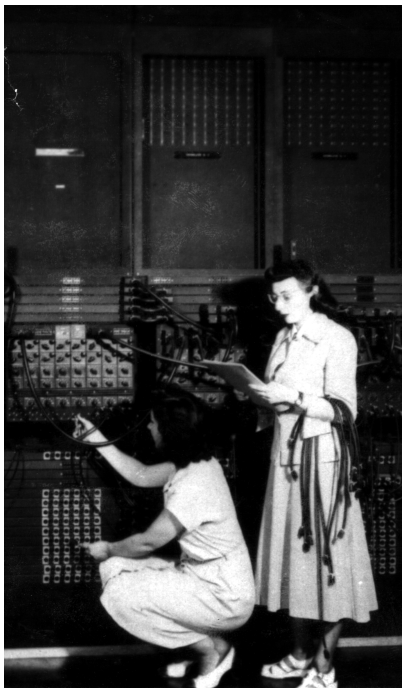

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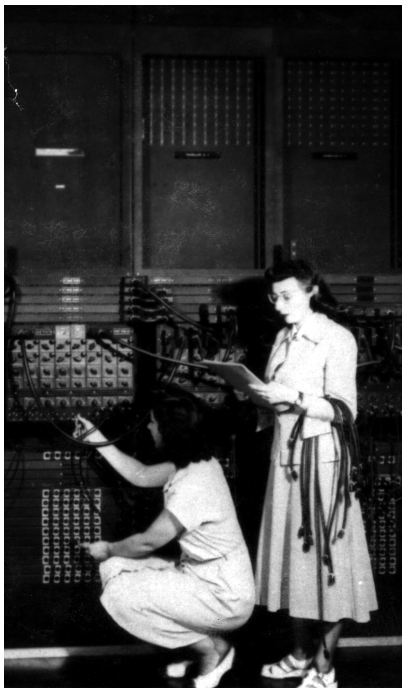

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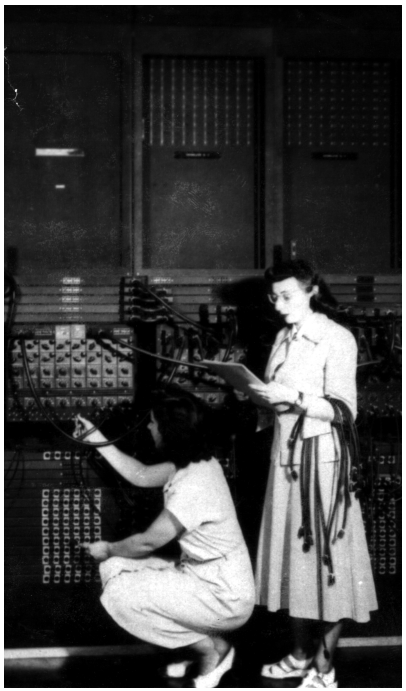

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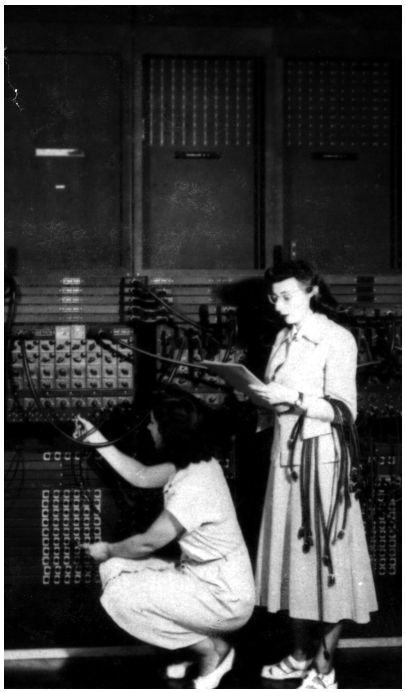
Class Structure

Help:



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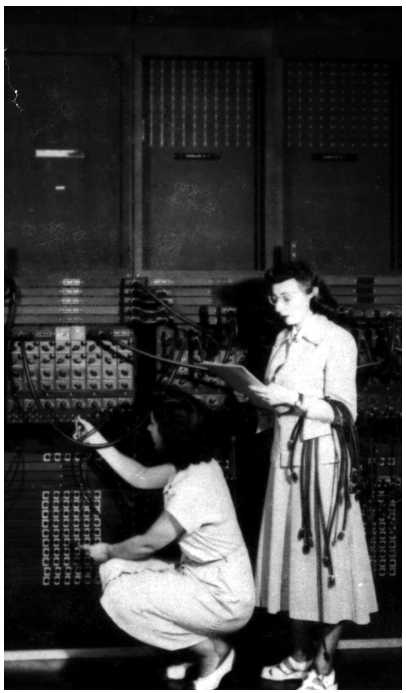

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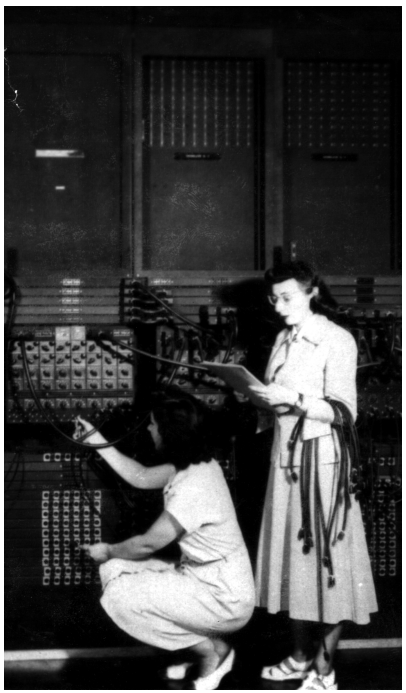

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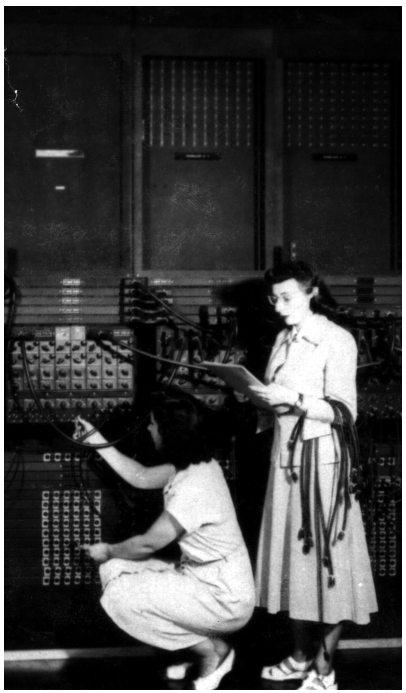

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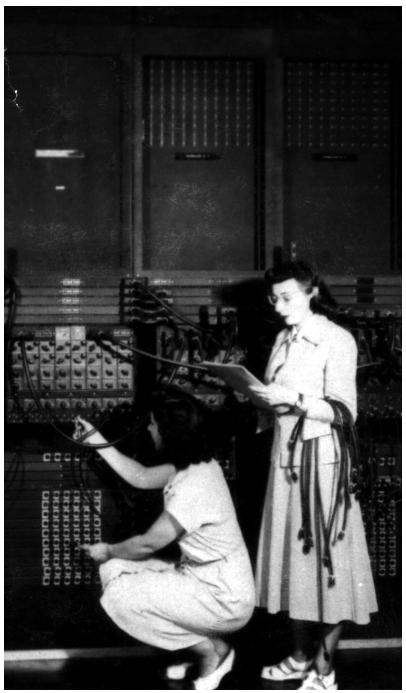

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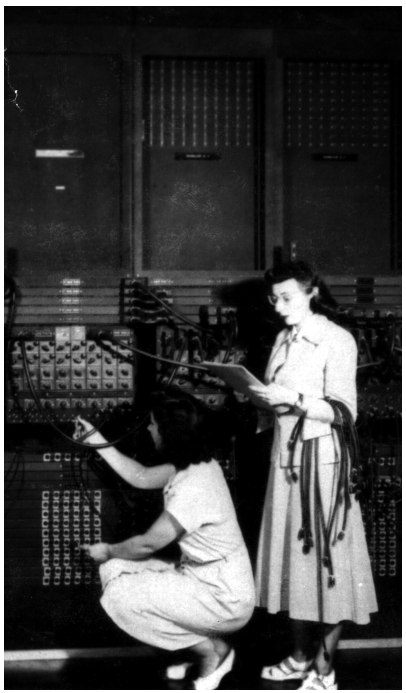

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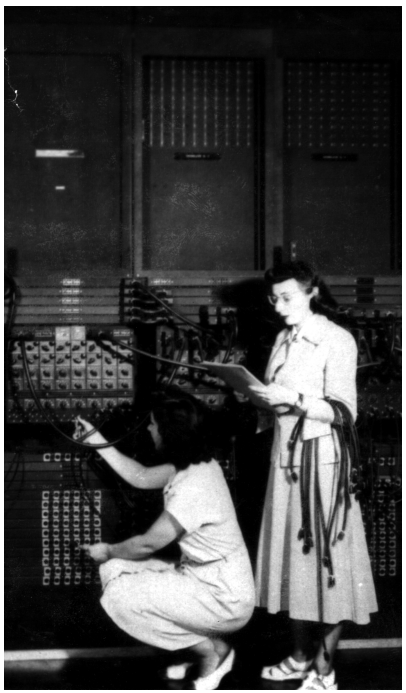

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- Ask for help from our UTAs in Drop-in Tutoring or Discussion Board.

Philosophy (Or Why We Do What We Do)

Grading:

- Do you curve grades?

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  No, we grade on your mastery of the material and do not have a set number of A's, B's, C's that we curve grades to match (i.e. your demonstrated mastery over your relative performance to the class).

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Course Structure:

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  Active group work and discussion increases student performance.
  Also, it provides excellent practice explaining technical ideas (i.e. tech interviews).

Philosophy (Or Why We Do What We Do)

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Philosophy (Or Why We Do What We Do)

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Today's Topics

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

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- 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`

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

print("Hello, World!")
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- 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,')
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Spring18 here in Assembly Hall
Who is L-M Miranda?

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- Results in three lines of output.
- Can use single or double quotes, just need to match.

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- Definite Loops (`for`-loops)
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Turtles Introduction

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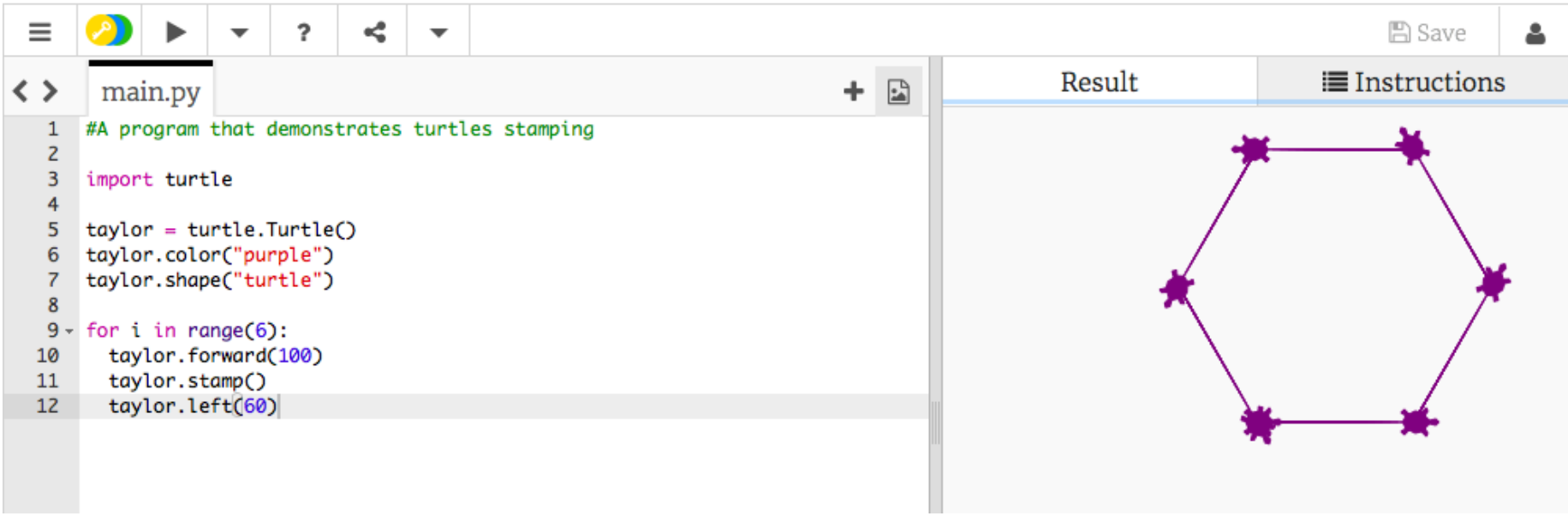

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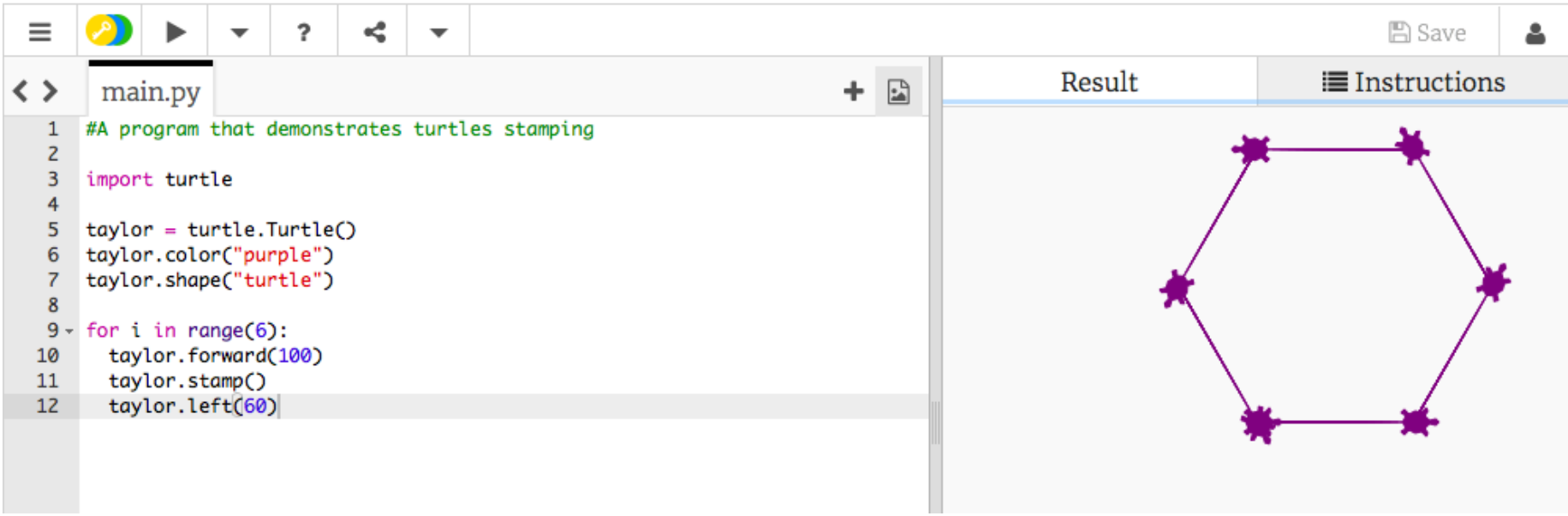

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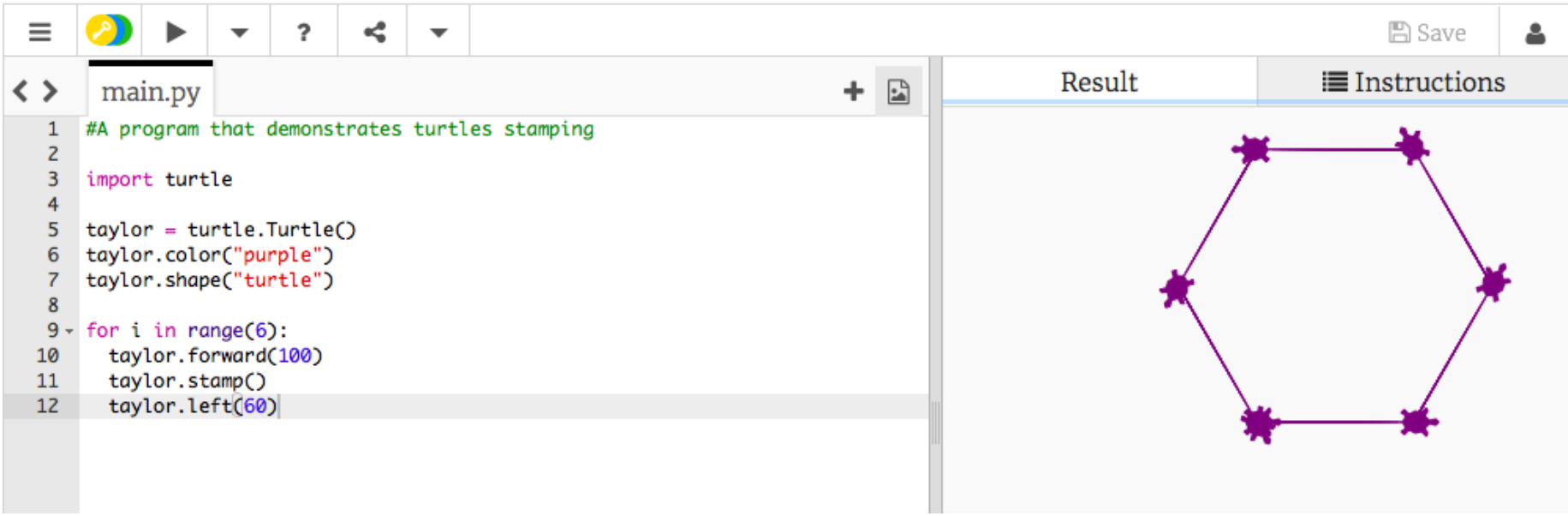

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- Repeats 6 times:

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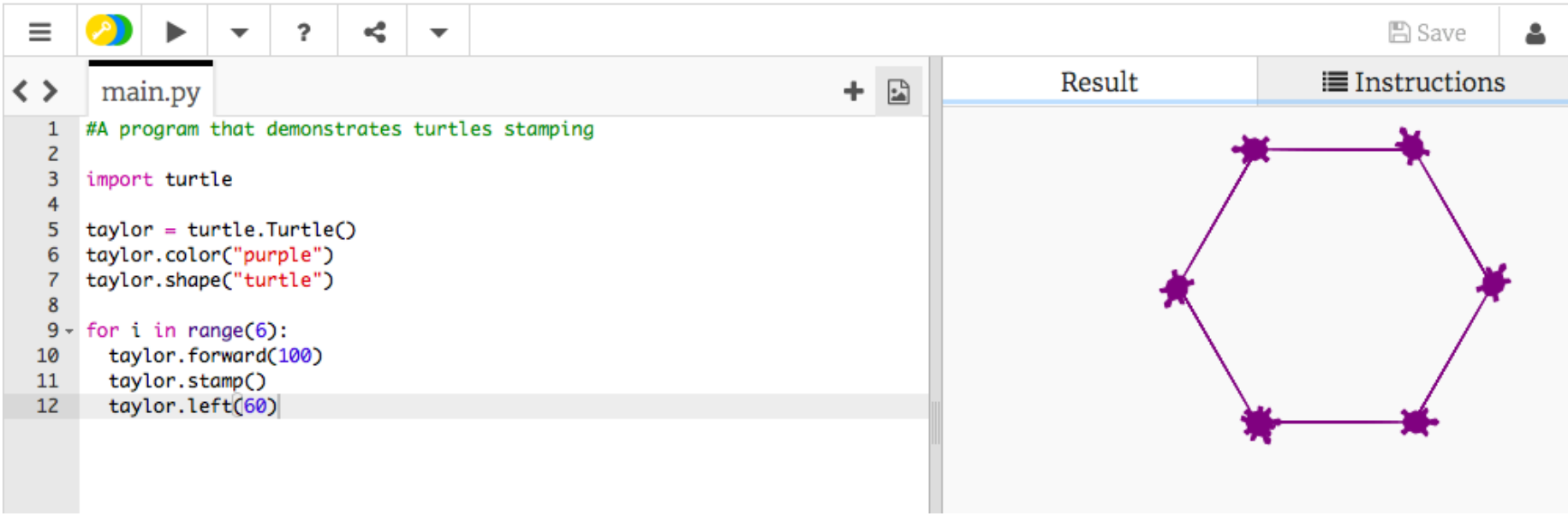

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- Repeats 6 times:
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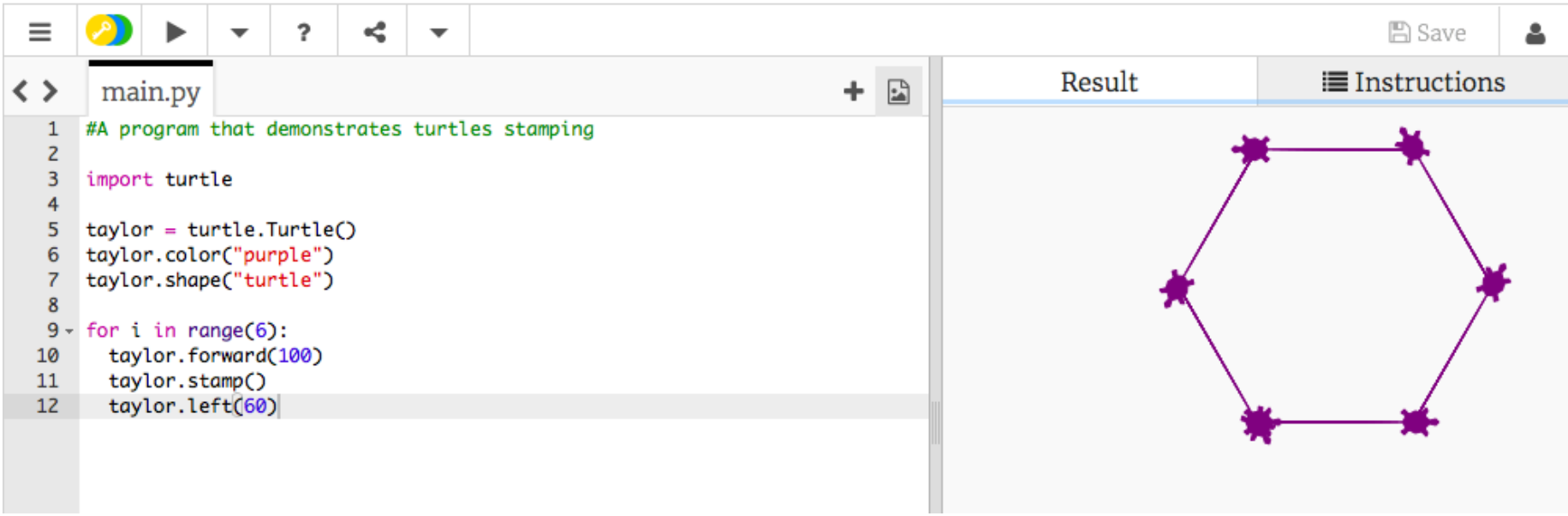

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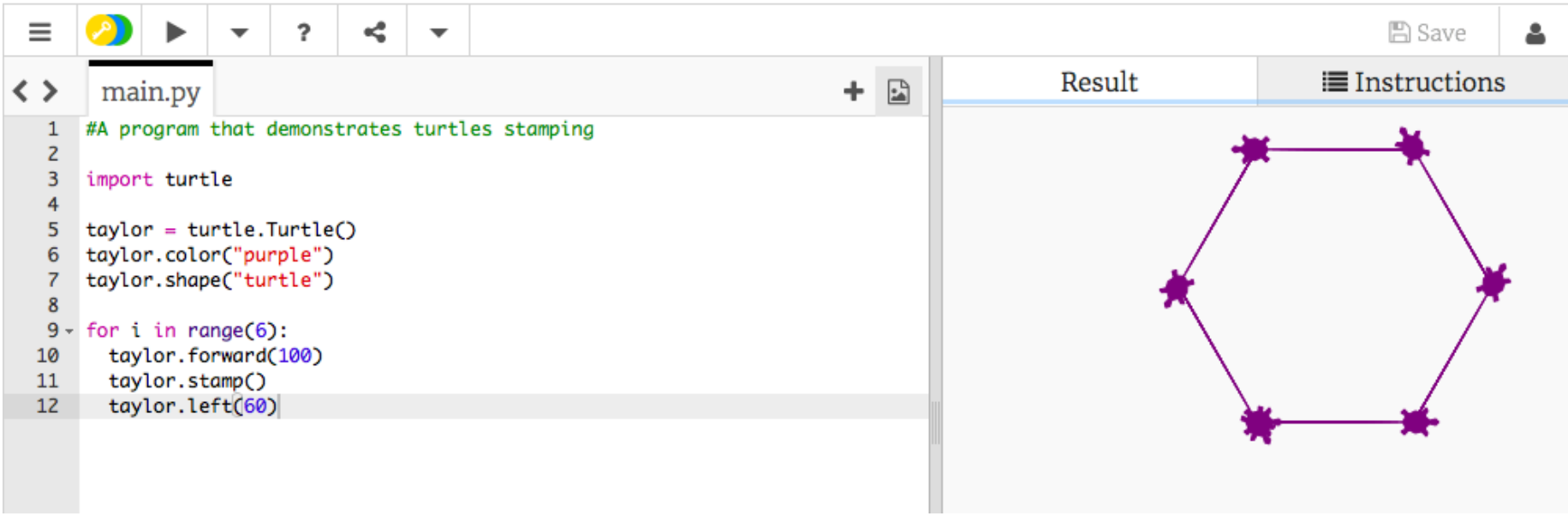

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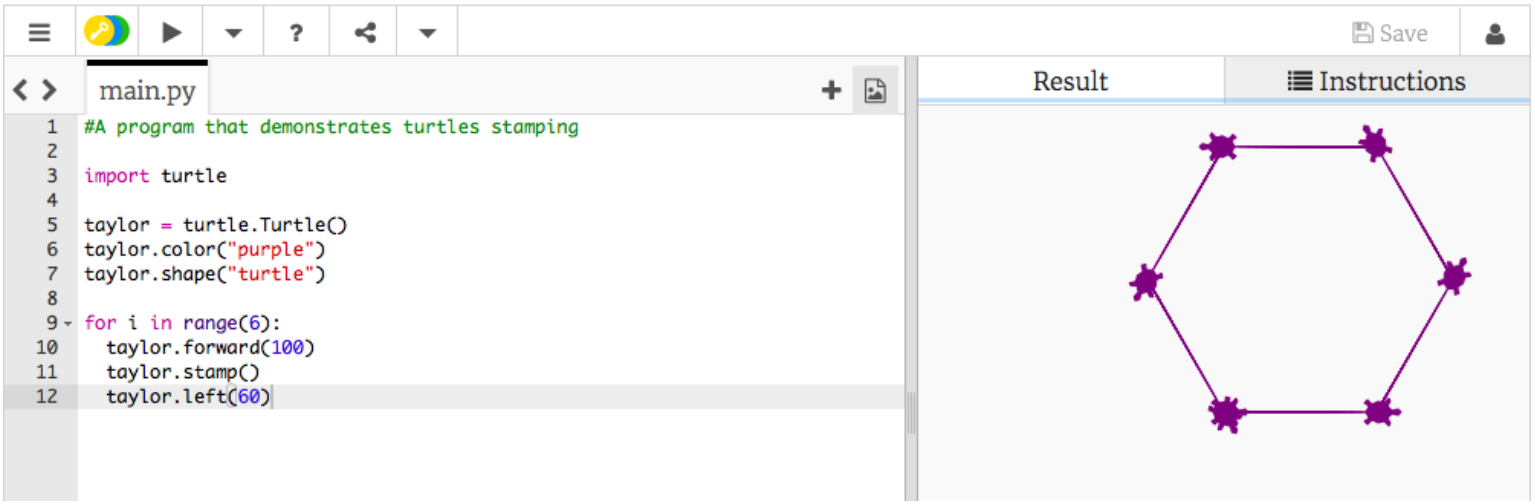
- This is a **definite** loop because it repeats a fixed number of times

Your Turn!!!

Try to solve this challenge:

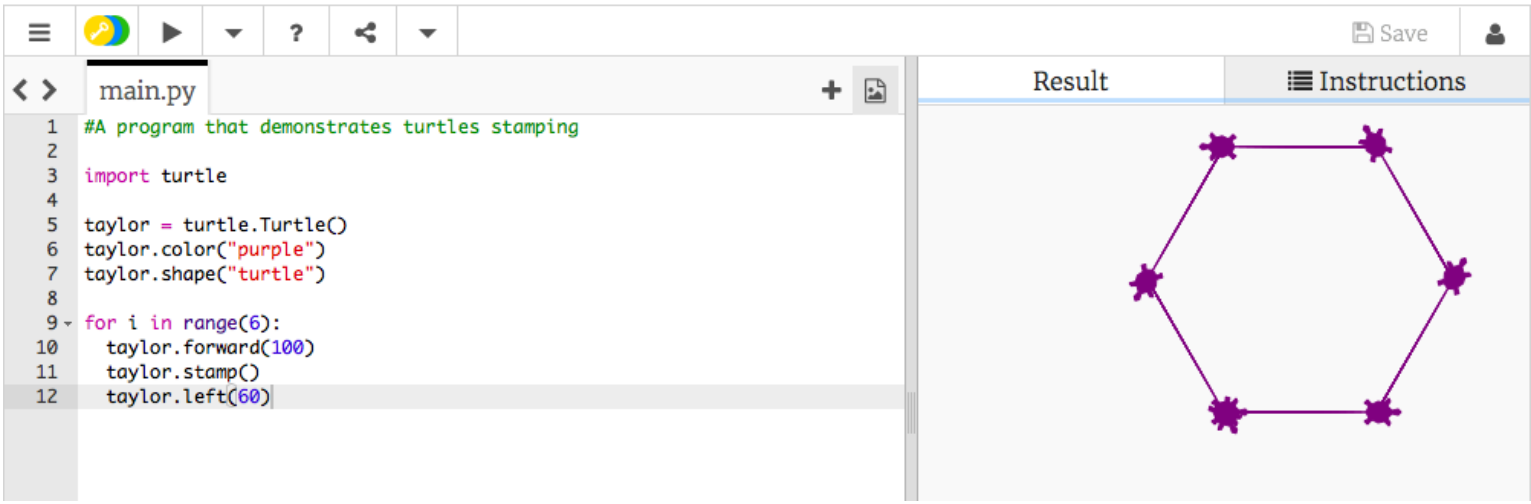
1. Write a program that will draw a 10-sided polygon.
2. Write a program that will repeat the line:
   `I'm lookin' for a mind at work!`
   three times.

Decagon Program



- Start with the hexagon program.

Decagon Program



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

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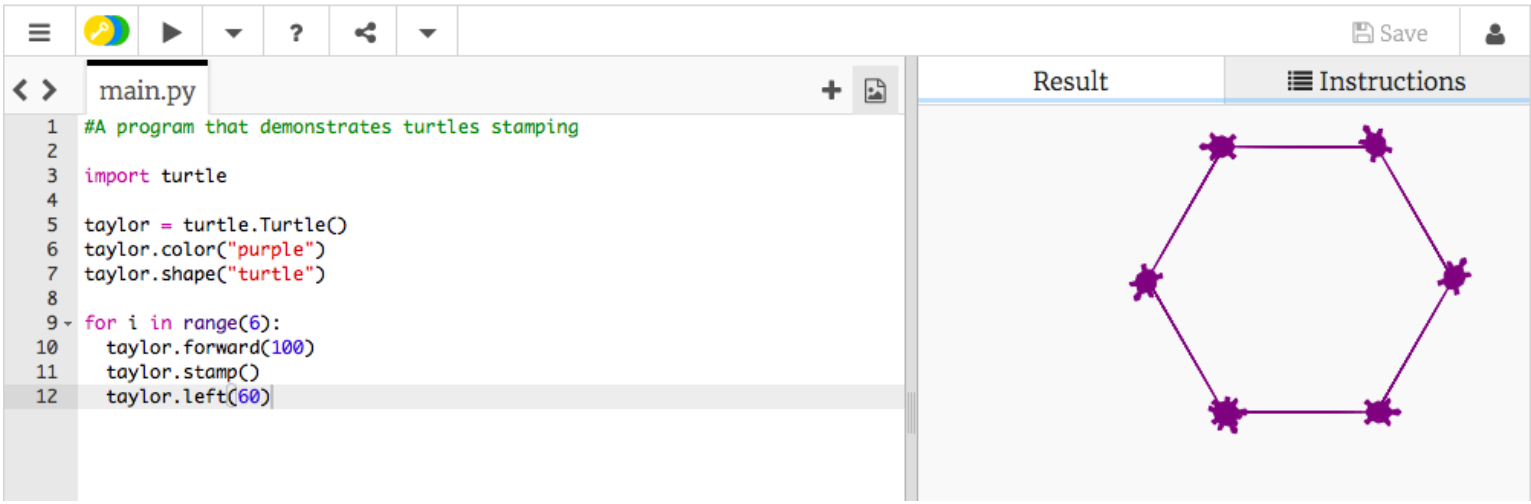

- Start with the hexagon program.
- Has 10 sides (instead of 6), so change the `range(6)` to `range(10)`.
- Makes 10 turns (instead of 6),
  so change the `taylor.left(60)` to `taylor.left(360/10)`.

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- 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

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From our textbook:

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- 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.

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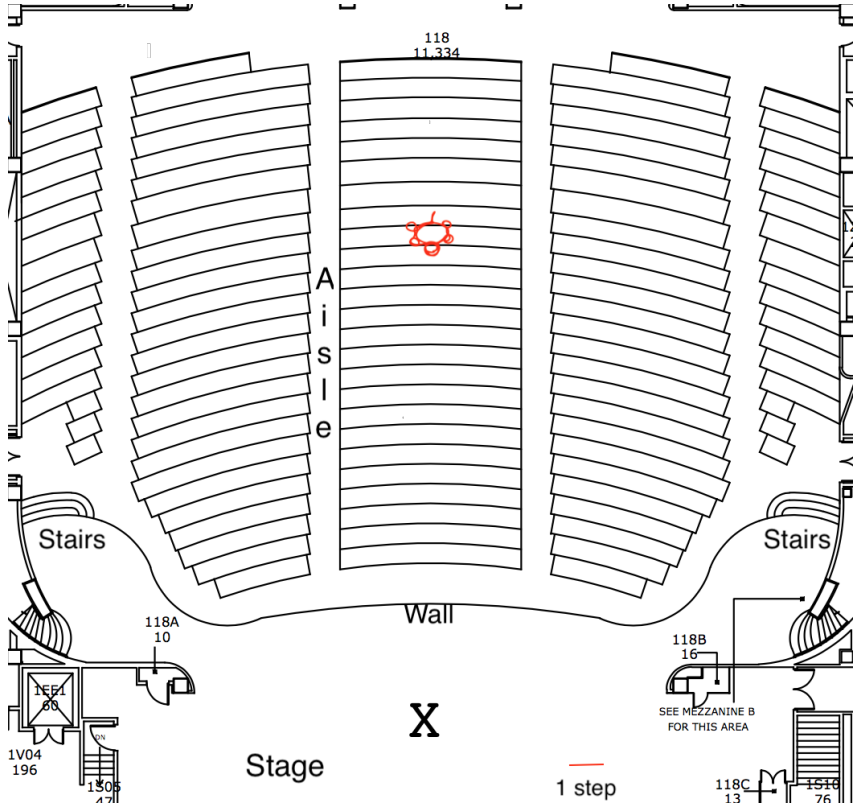

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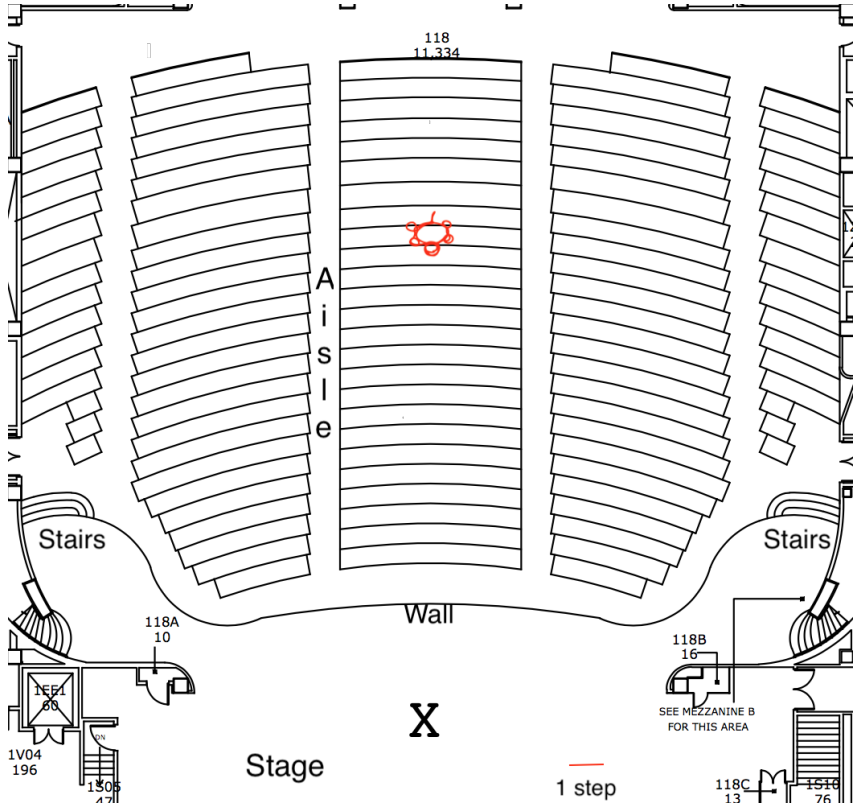

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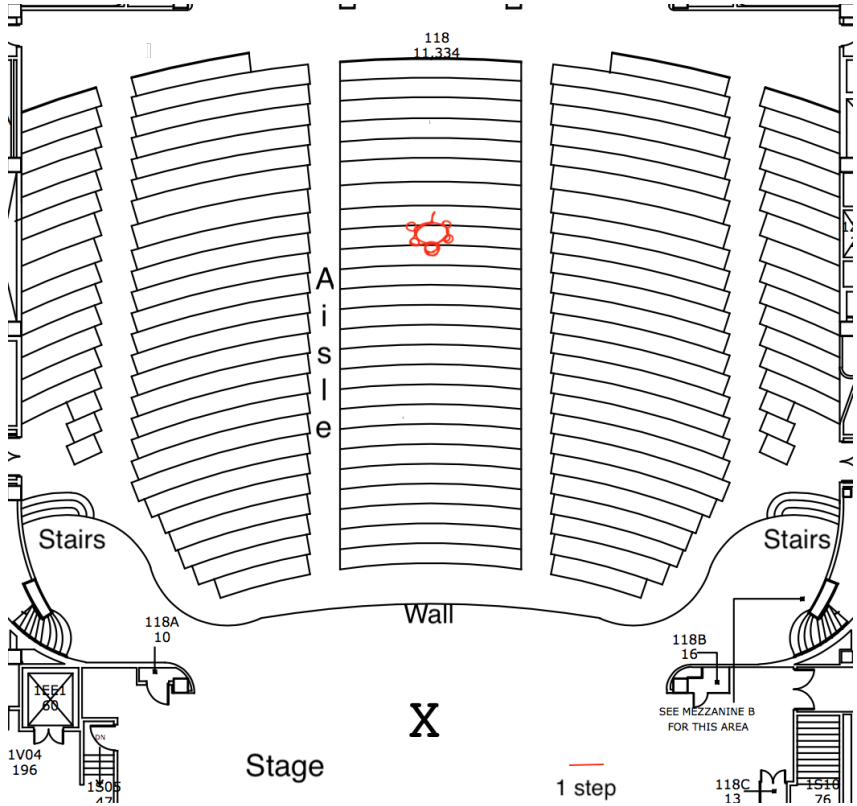

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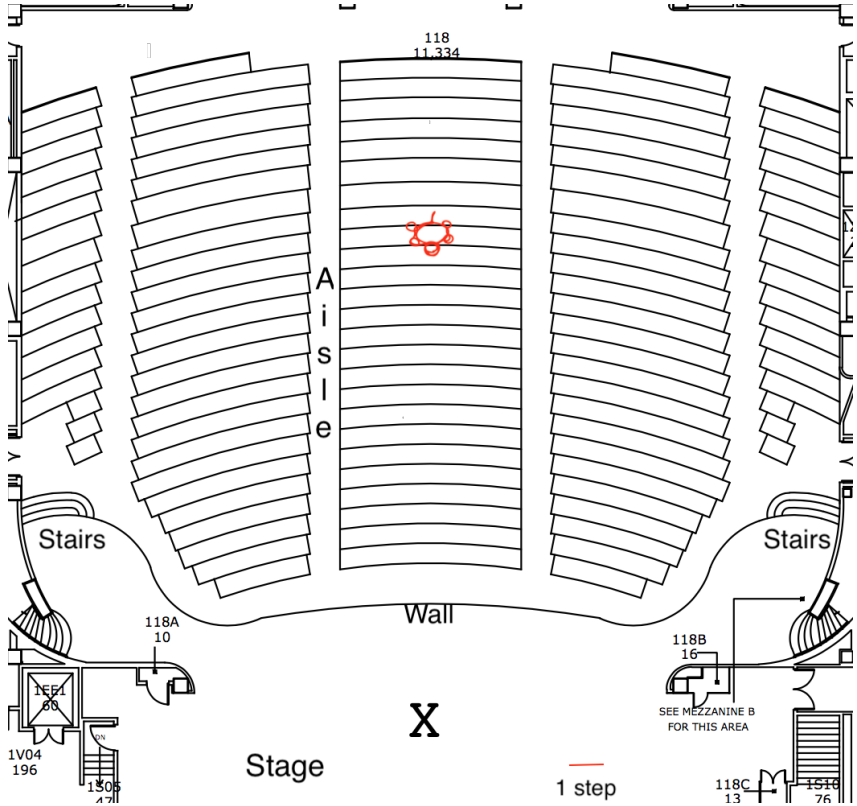

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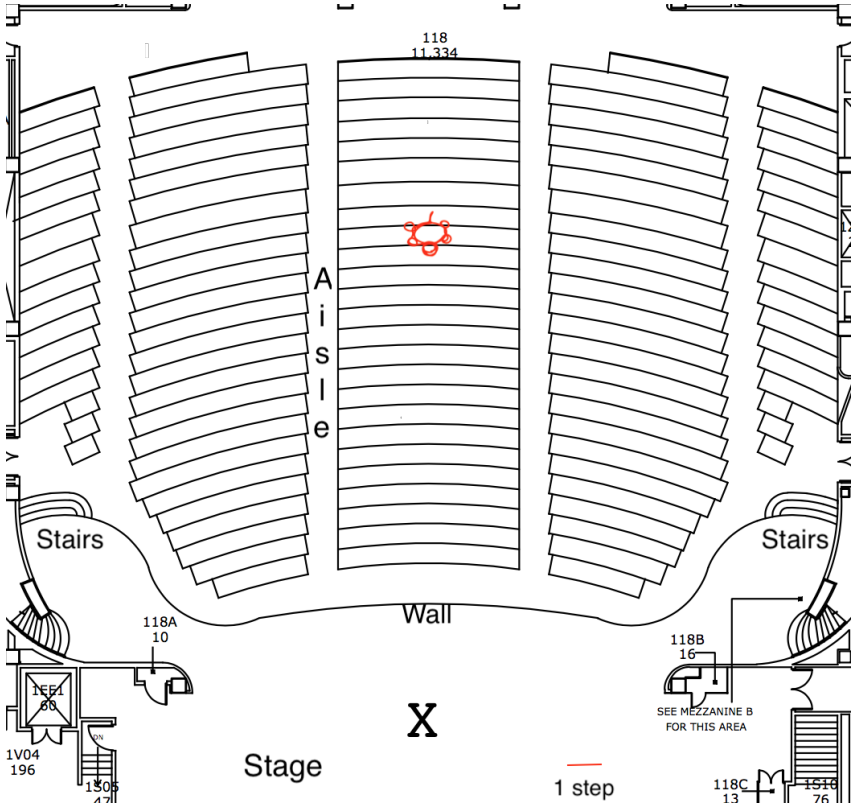
   - Use `turtle` commands.

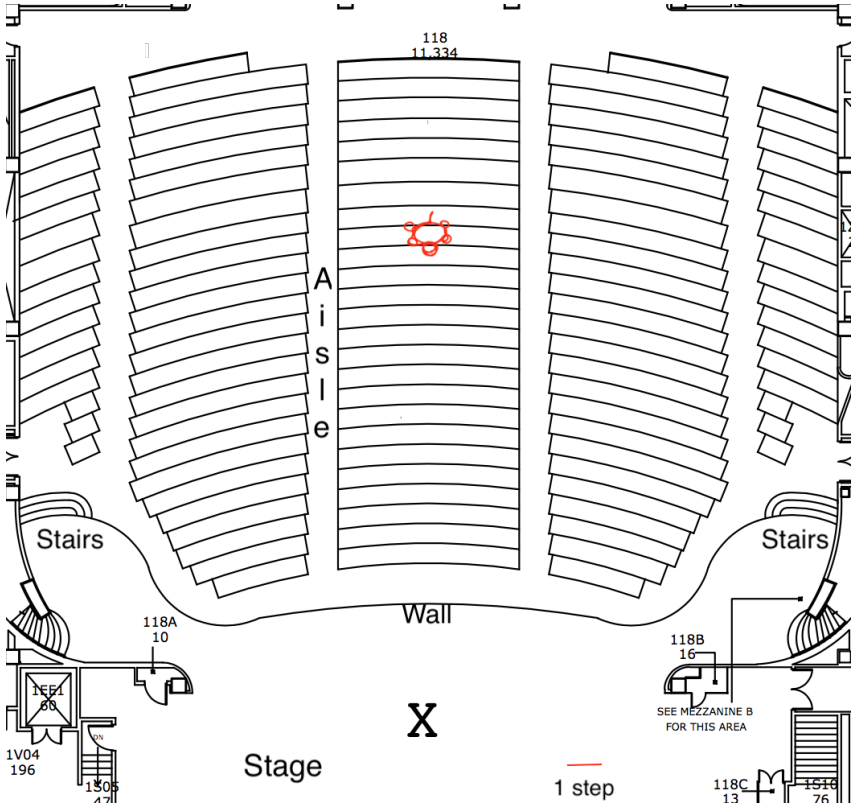
Your Turn!!!



Try to solve this challenge:

1. This is the floor plan of Assembly Hall at Hunter College.
2. Write an algorithm (step-by-step directions) to the red turtle to the `X` on Stage.
3. Basic Rules:
   - Use `turtle` commands.
   - Do not run turtles into walls, chairs, obstacles, etc.

Your Turn!!!



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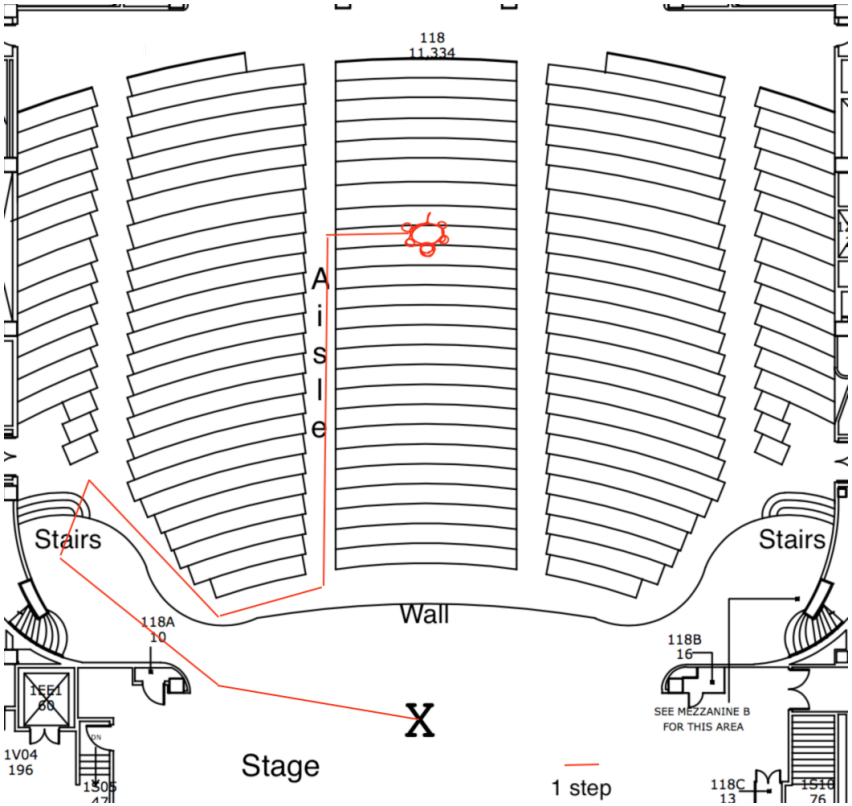
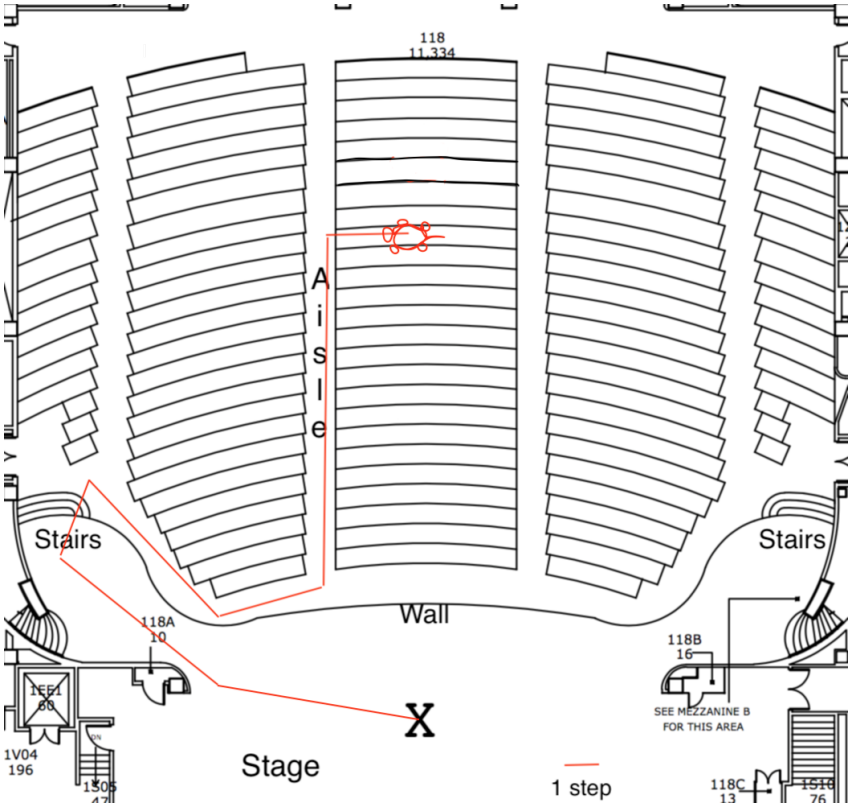
   - Turtles cannot climb walls, must use stairs (walk forward on steps).

Your Turn!!!



One possible solution:

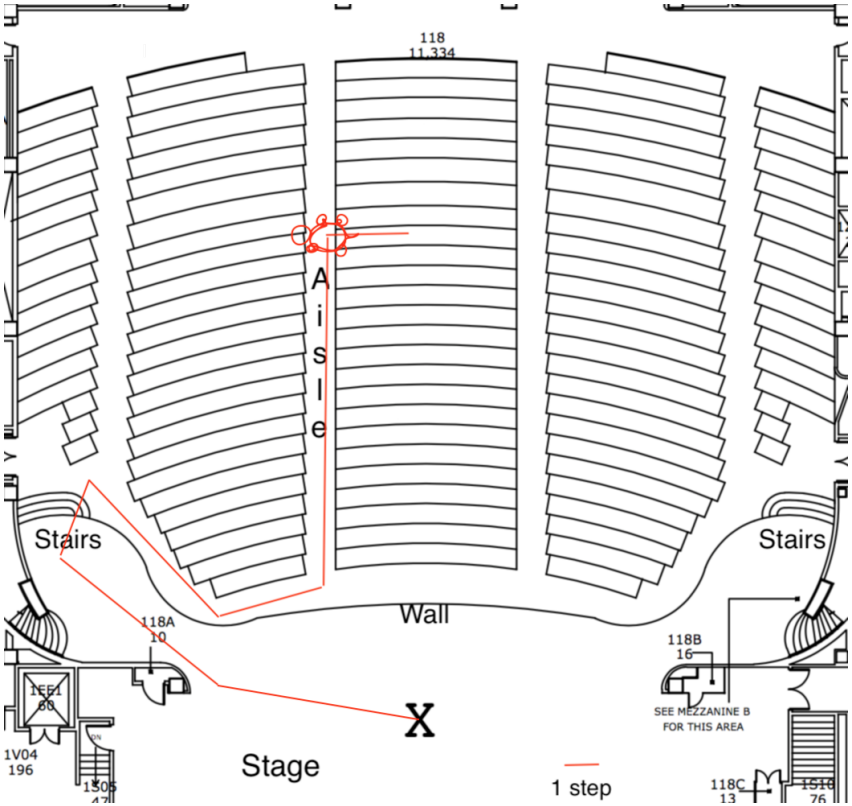
Your Turn!!!



One possible solution:

- Turn right 90 degrees.

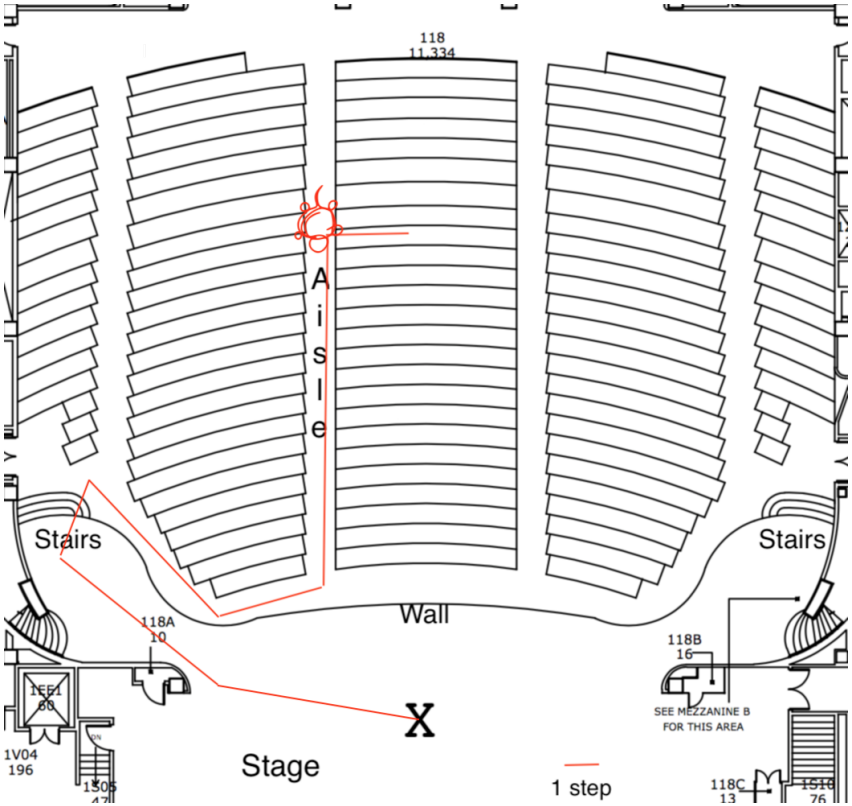
Your Turn!!!



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

One possible solution:

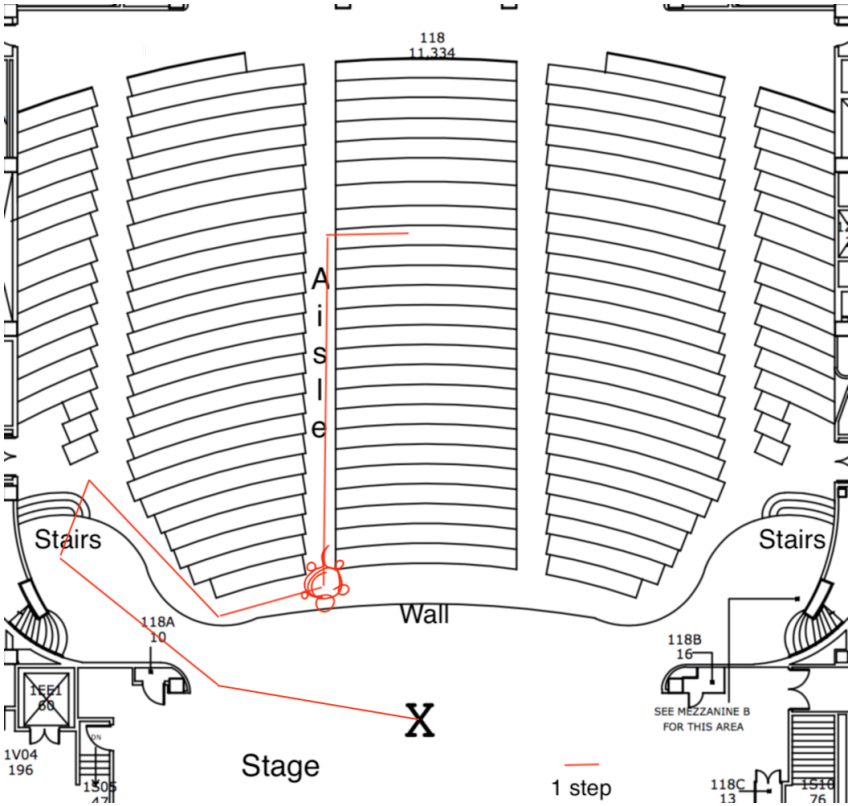
Your Turn!!!



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

One possible solution:

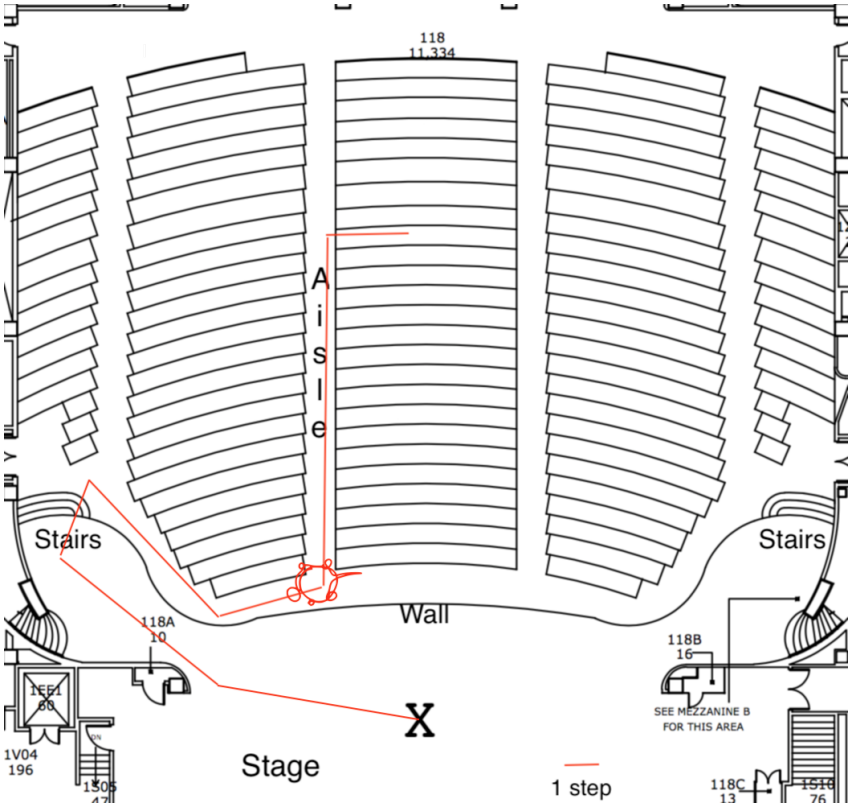
Your Turn!!!



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

One possible solution:

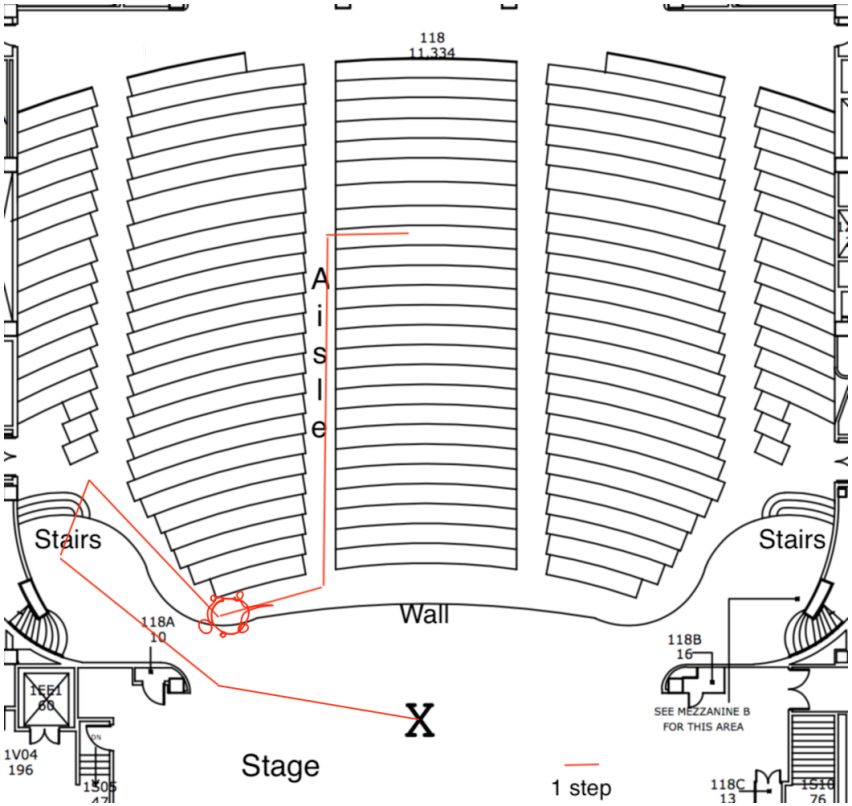
Your Turn!!!



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

One possible solution:

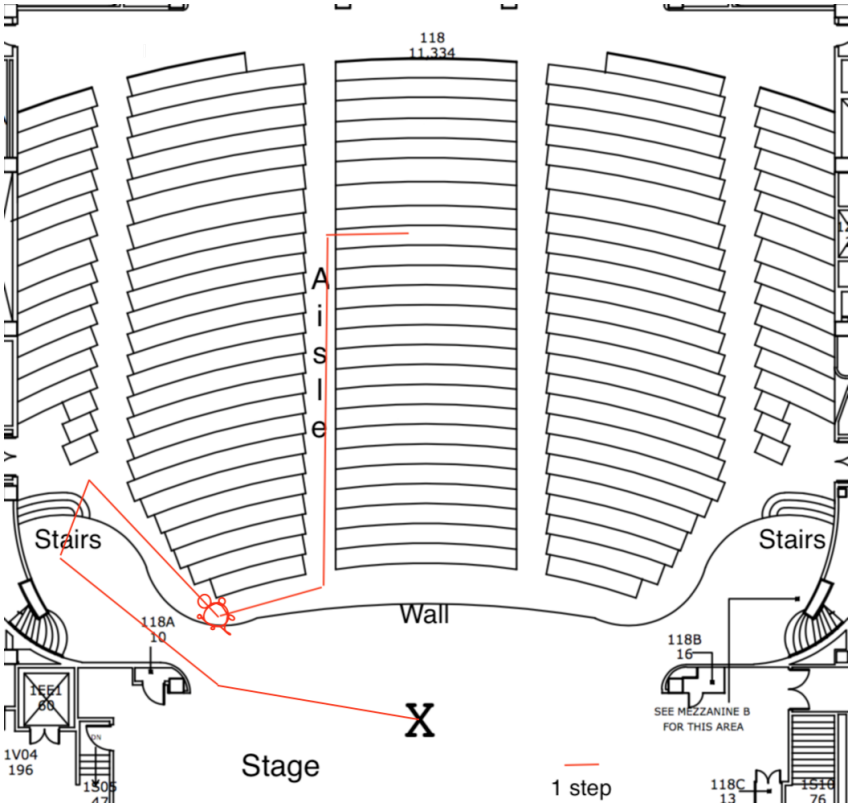
Your Turn!!!



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.

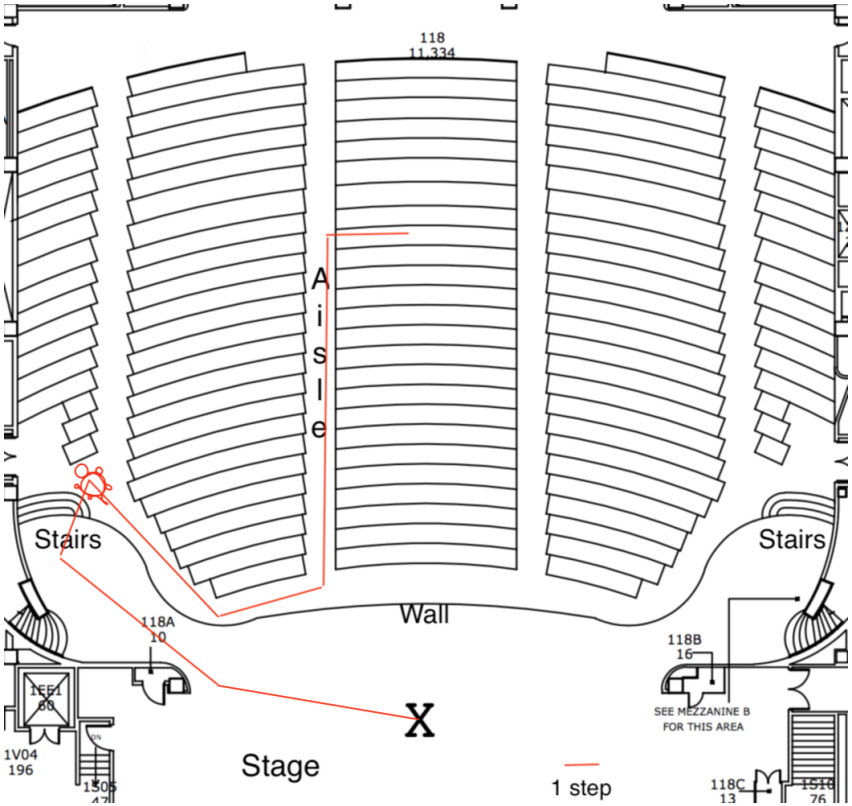
Your Turn!!!



- 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.

One possible solution:

Your Turn!!!



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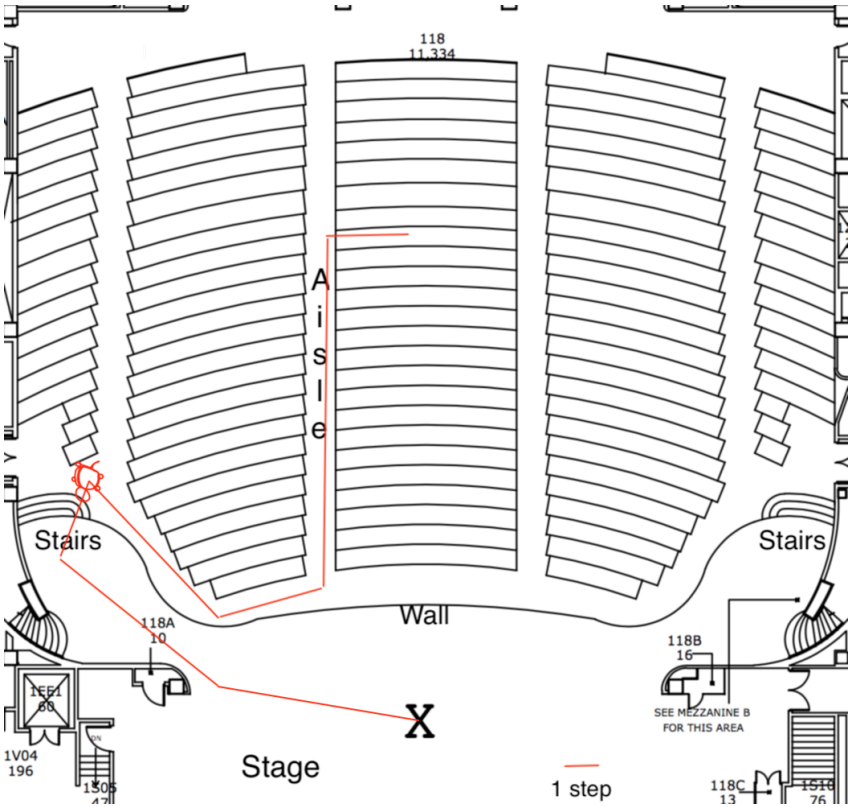

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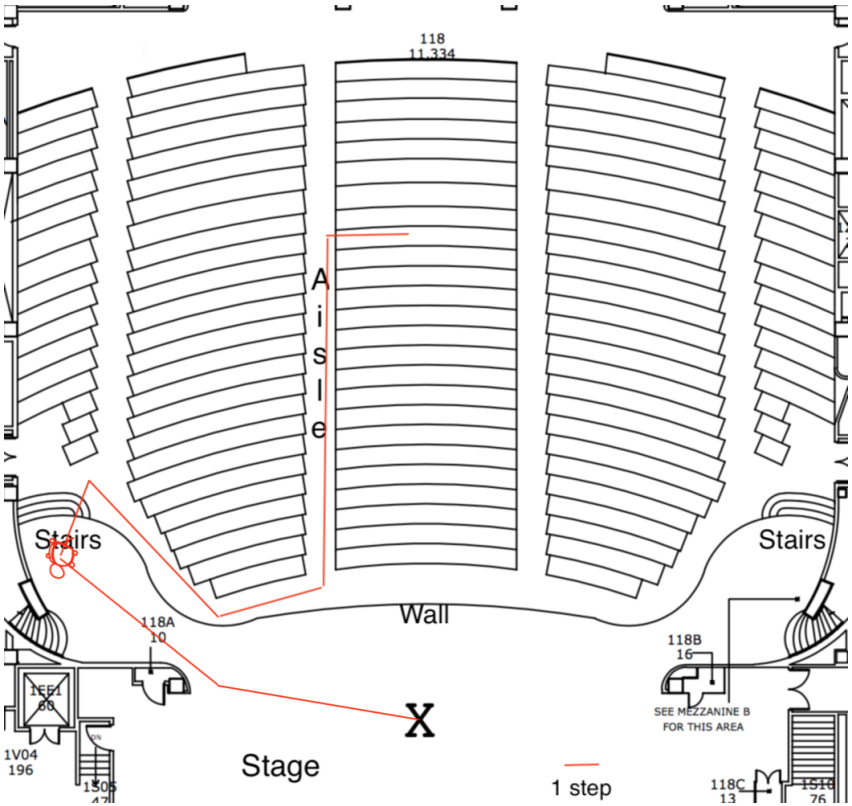
- Turn left 110 degrees.

Your Turn!!!



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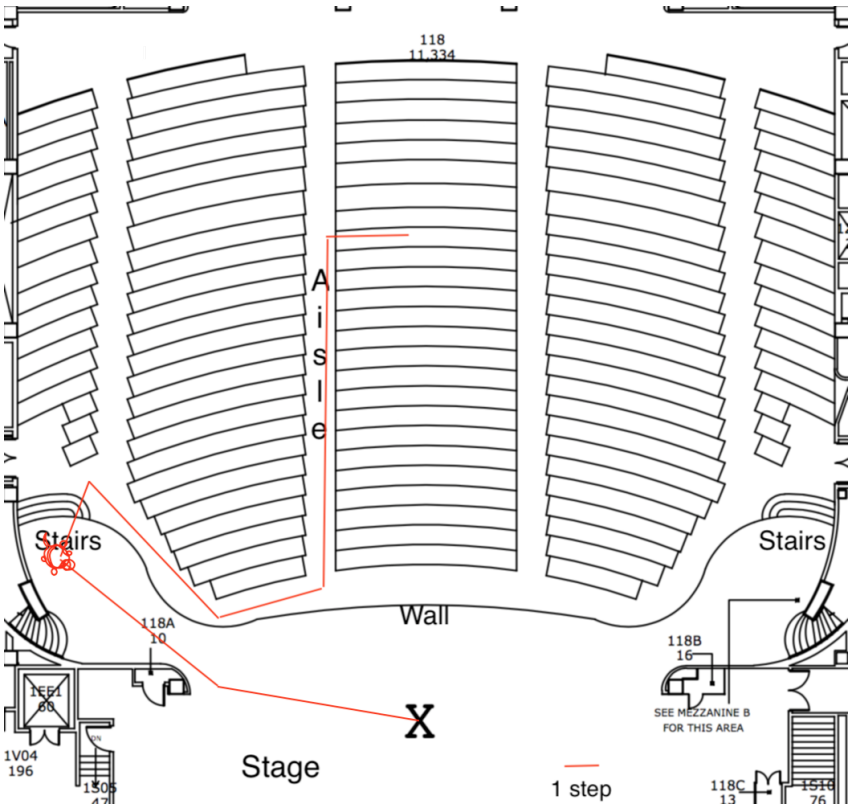

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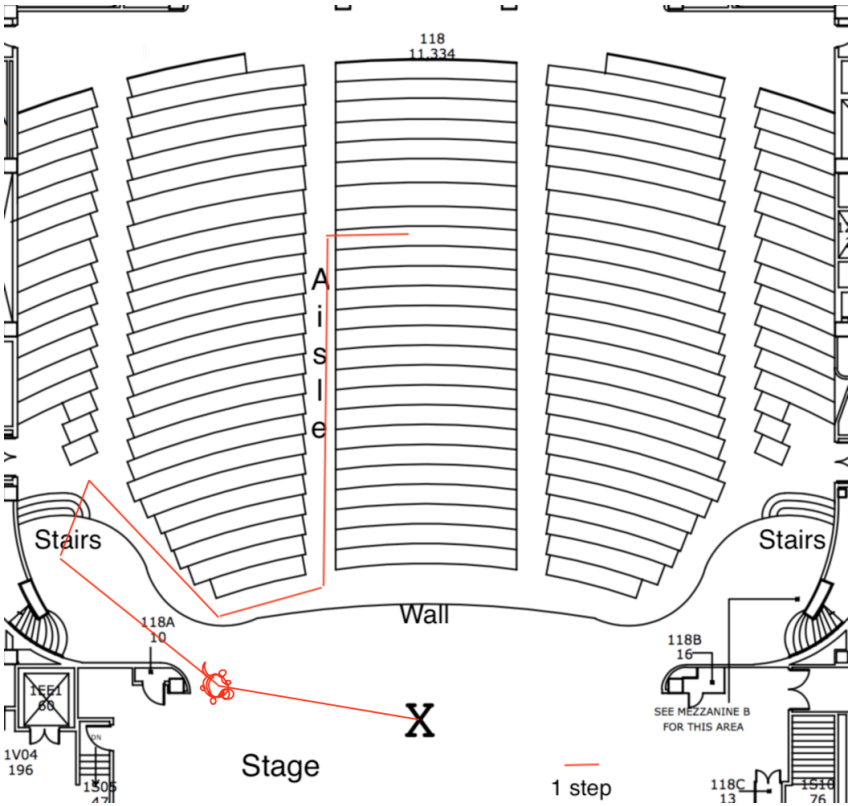
- Turn left 80 degrees.

Your Turn!!!



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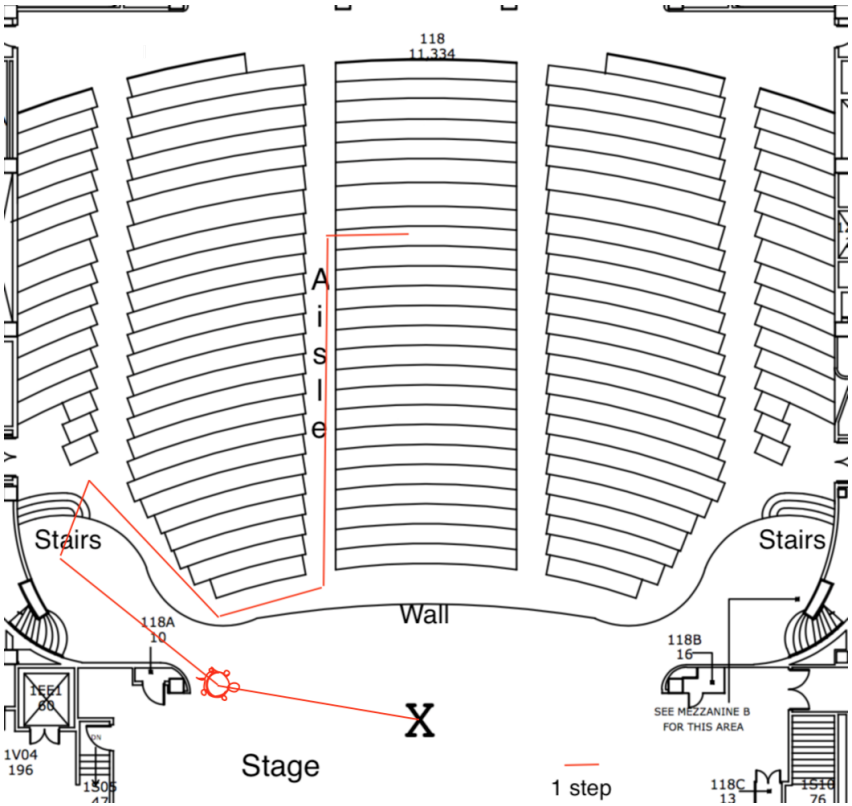

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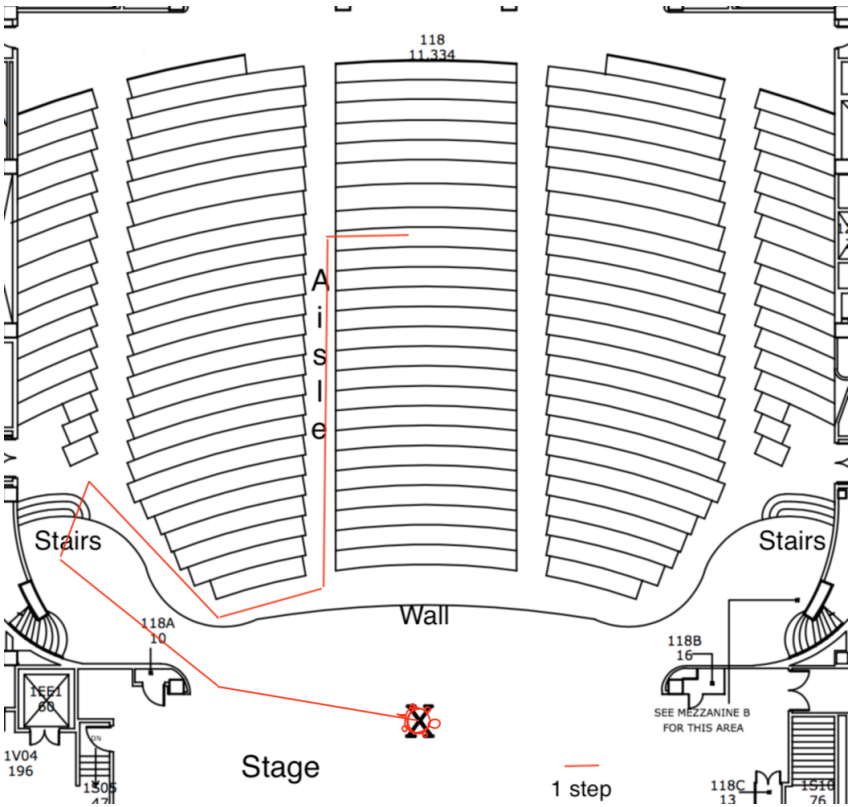
Your Turn!!!



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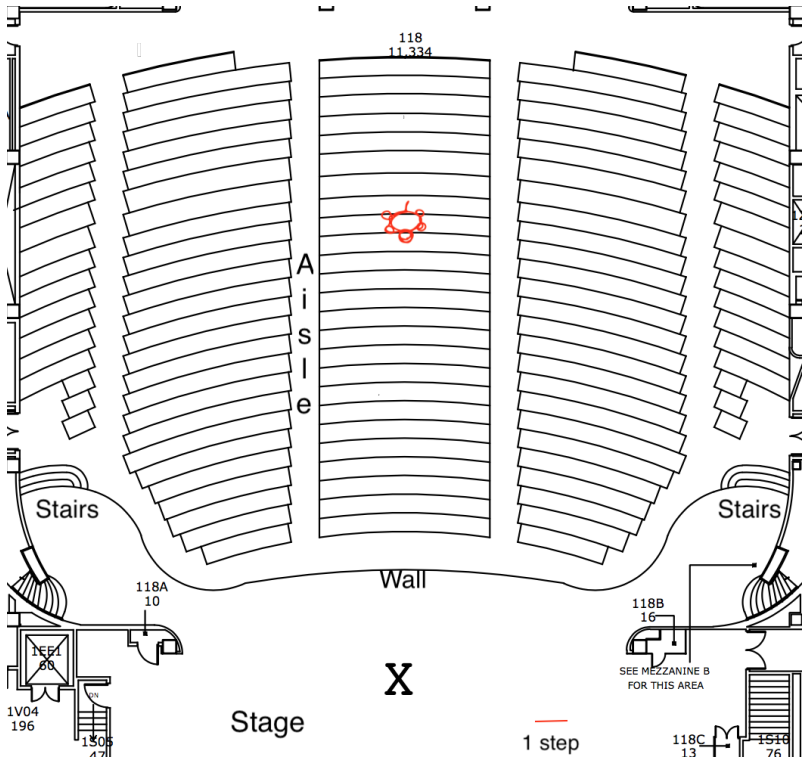
- Walk forward 6 steps. Reached X!!!

Your Turn!!!



- For fun, post your algorithm on the "Turtle on Stage" forum in the Discussion Board on Blackboard

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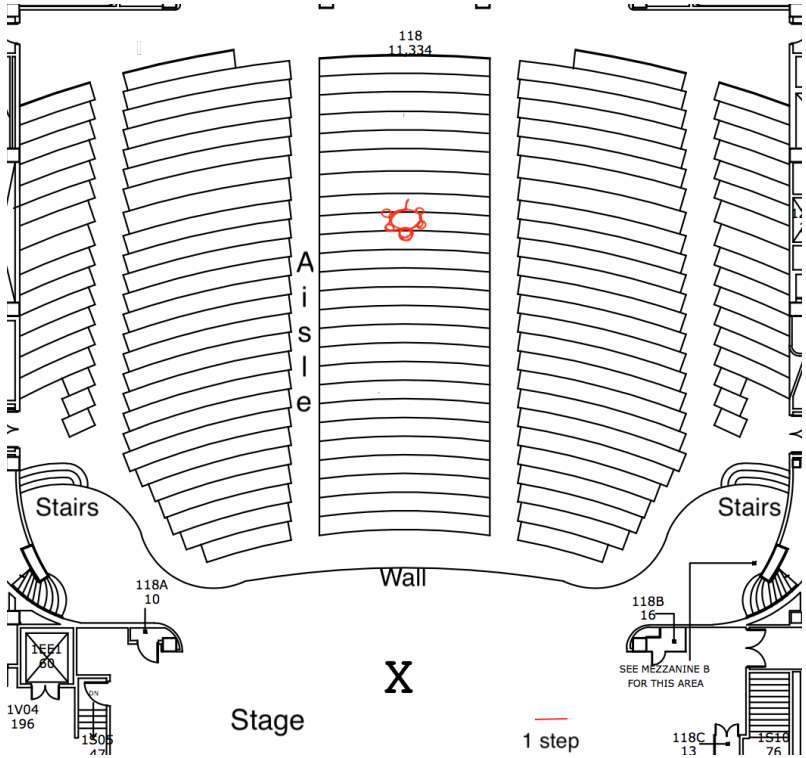

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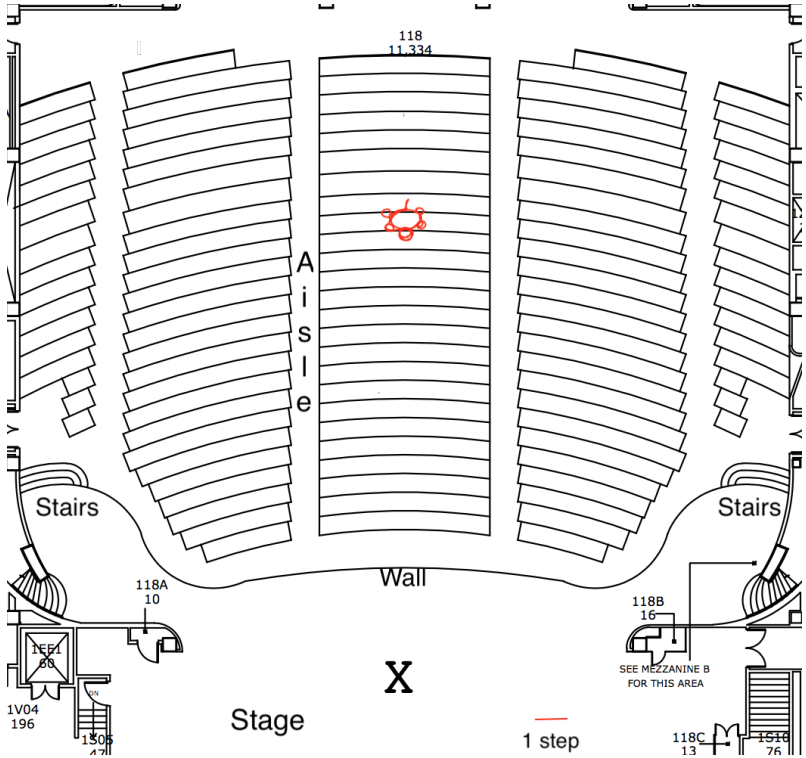

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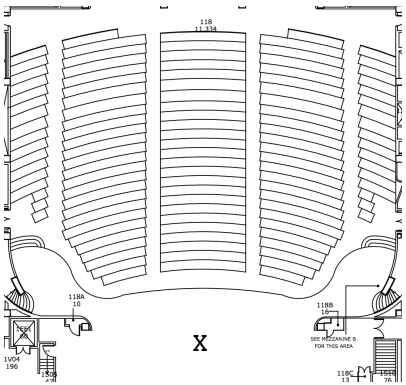
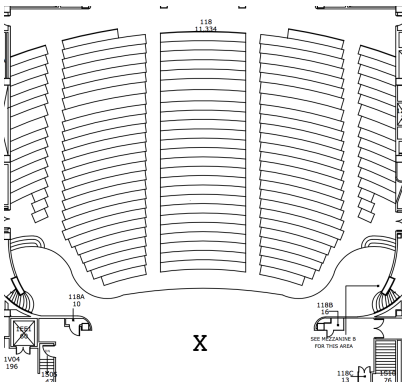
- "Test and Debug" other students' posted solutions and reply to their posts if you find a bug!
- Degrees the turtle turns are approximate, any good approximation is considered correct.

Recap



- Writing precise algorithms is difficult.

Recap



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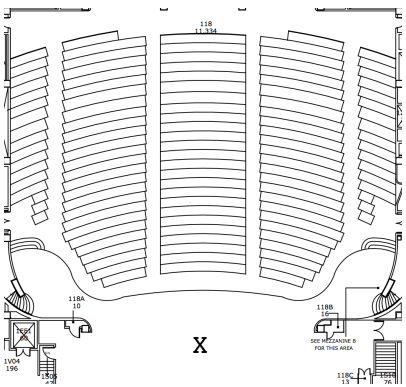

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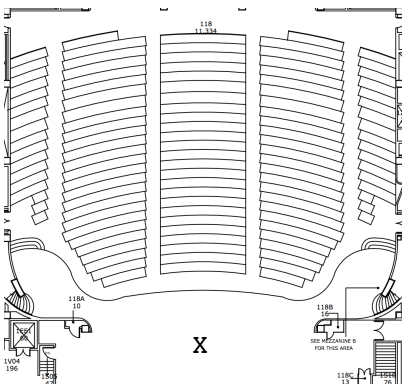

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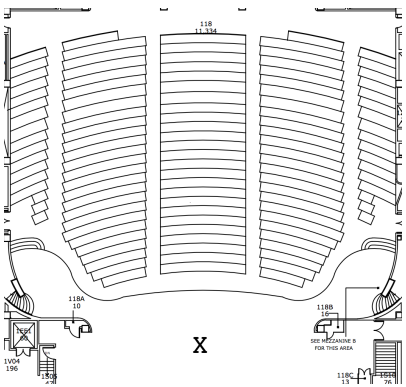

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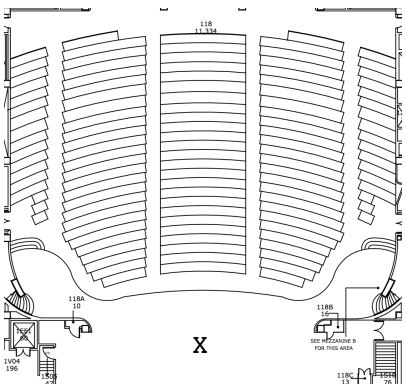

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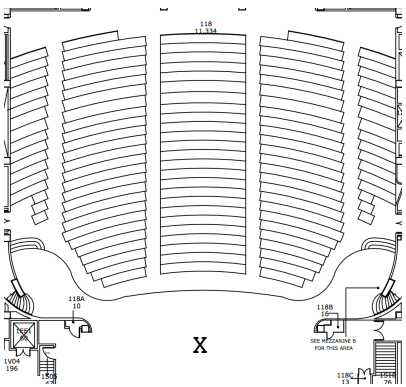
Recap



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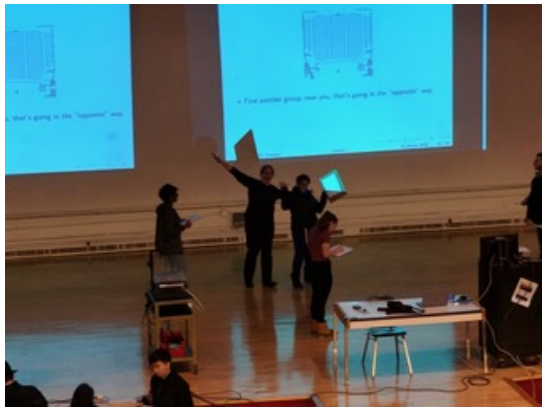
Practice Quiz & Final Questions



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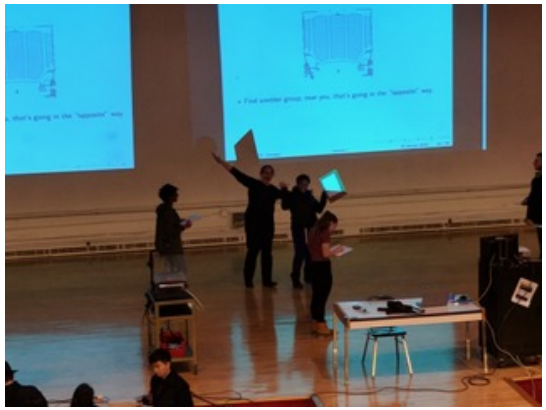
Practice Quiz & Final Questions



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- Pull out something to write on (not to be turned in).

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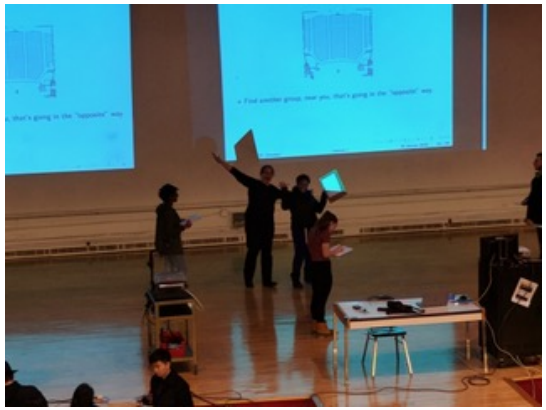

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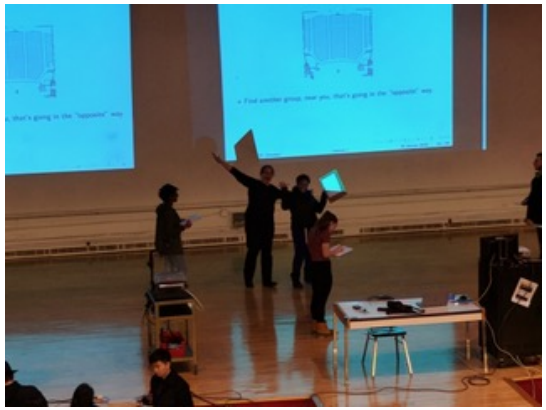

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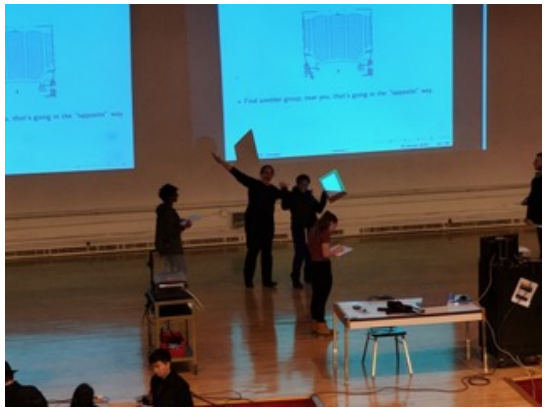

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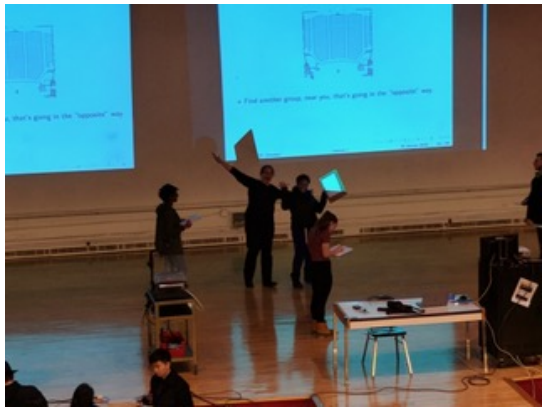

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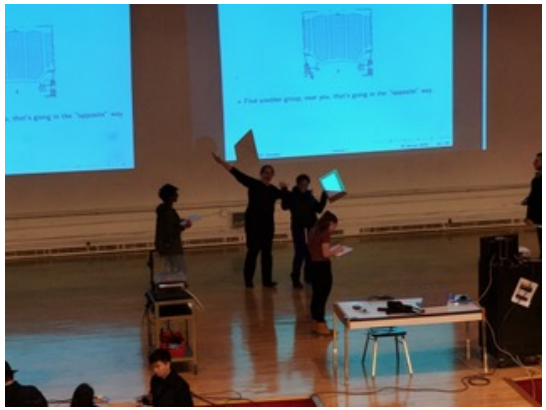

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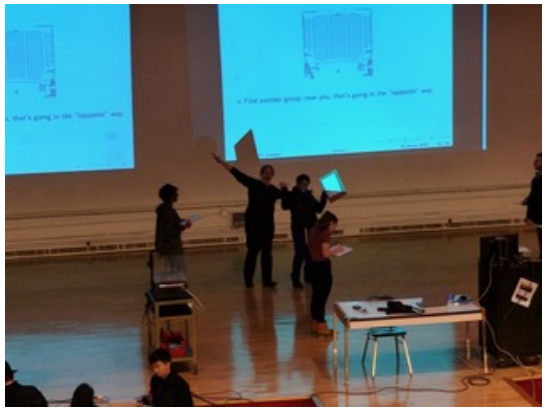

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- We're starting with Fall 2017, Version 1.

See you next week!

Before next lecture, don't forget to:

- Work on this week's Online Lab
- Take the Lab Quiz on Gradescope by 6pm on Wednesday
- Submit this week's 5 programming assignments