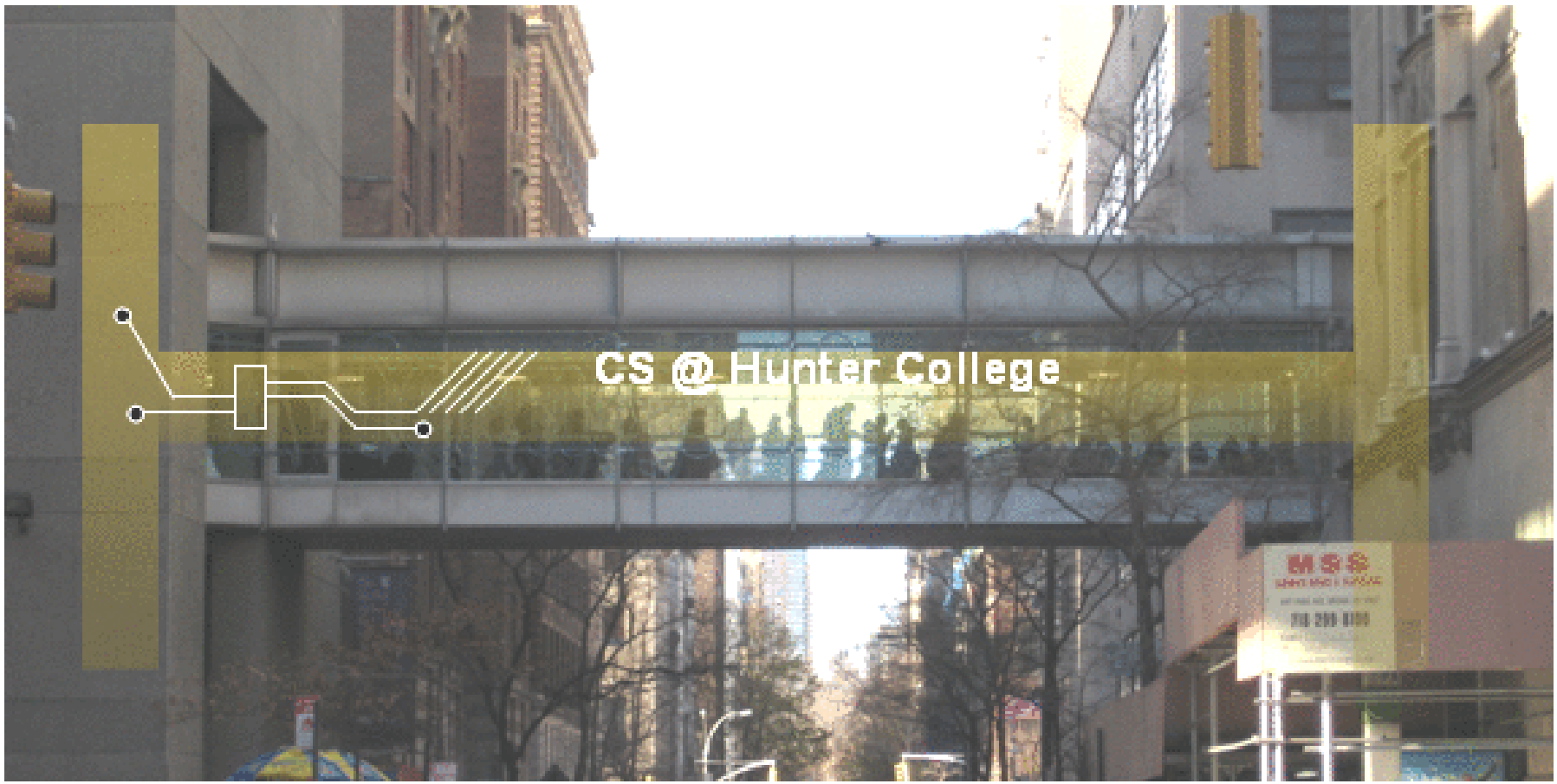
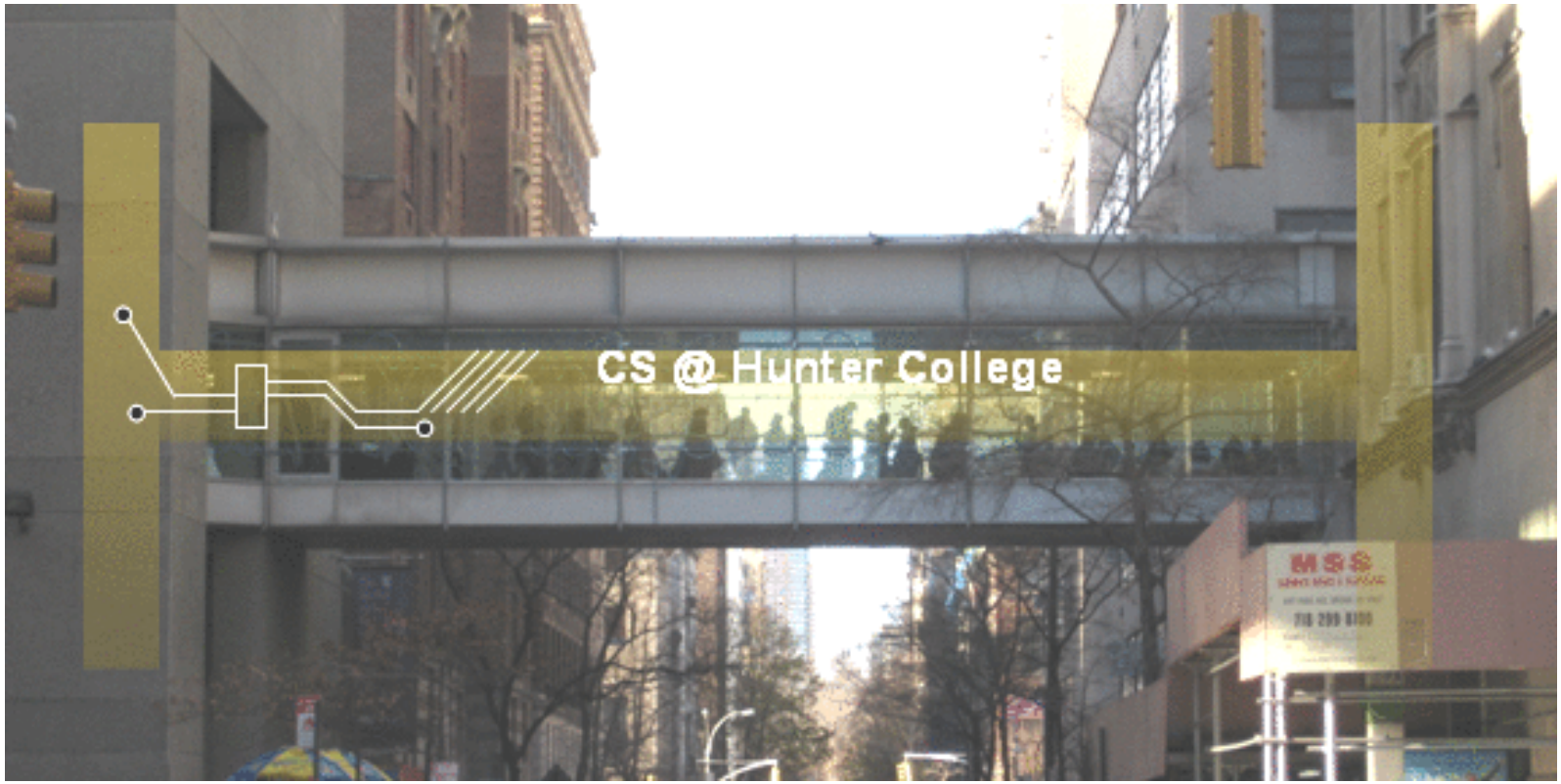
CSci 127: Introduction to Computer Science



hunter.cuny.edu/csci

Welcome



Acknowledgments

Thank you to the amazing support of:

President Raab

Dean Polsky
Arts & Science

Judy Spitz
Break Through Tech

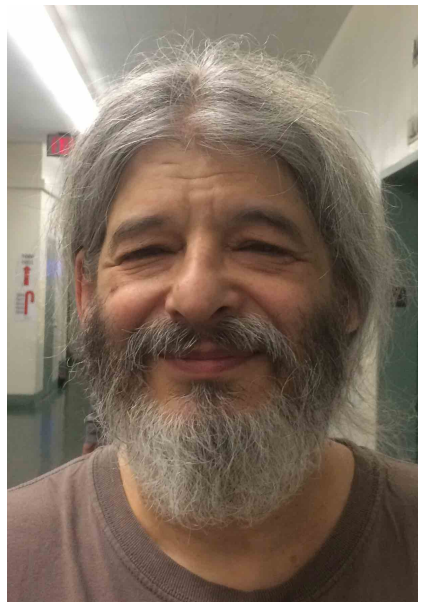
Introductions: Course Designers

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

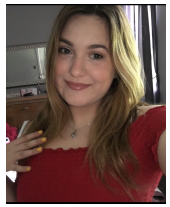
Introductions: Undergraduate Teaching Assistants

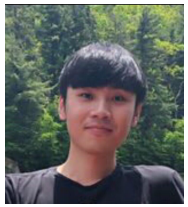

Aida Jevric

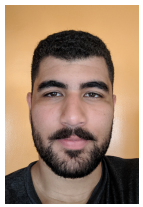

Ajani Stewart


Arterio Rodrigues


Brian Chambers

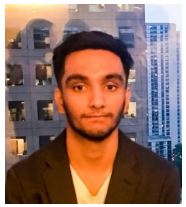

Caiitlin Selca

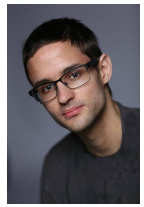

Chi Shing Lee


David Moncayo


David Yuen

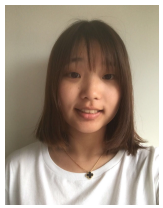

Destiny Barbery


Ghazanfar Shahbaz


Illya Baburashvili

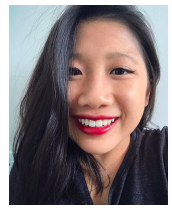

Kevin Wong


Leonardo Matone


Liulan Zheng


Lola Samigjonova

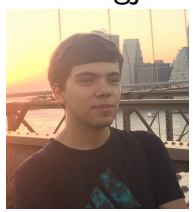

Mandy Yu


Nancy Ng

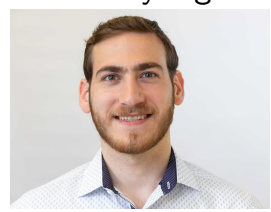

Nga Yu Lo


Owen Kunhardt


Patrick Chaca

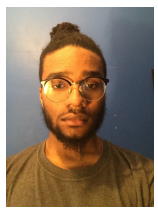

Ryan Chevarria

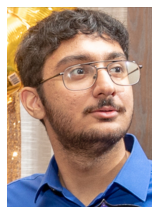

Sadab Hafiz


Seth Spiegel


Shantel Dixon


Stephanie Yung


Tyler Robinson

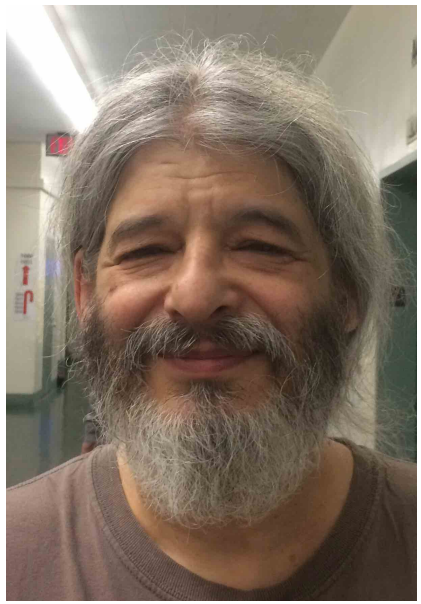

Yash Mahtani

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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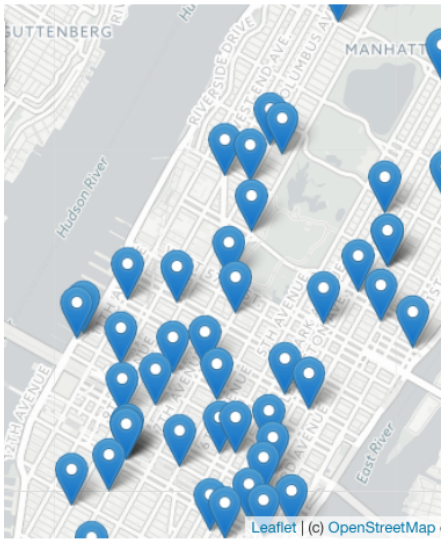
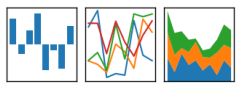
(Show syllabus webpage)

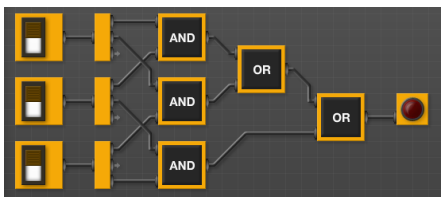
Syllabus: Topics



pandas

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





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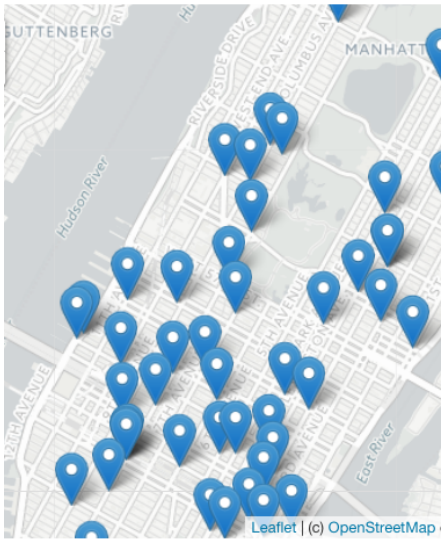

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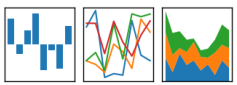

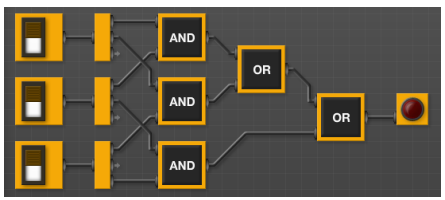

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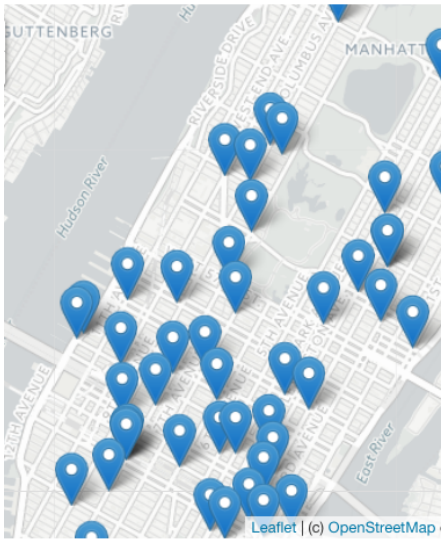

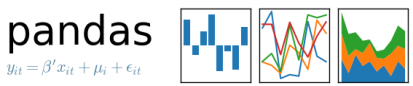

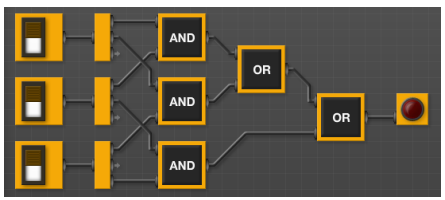

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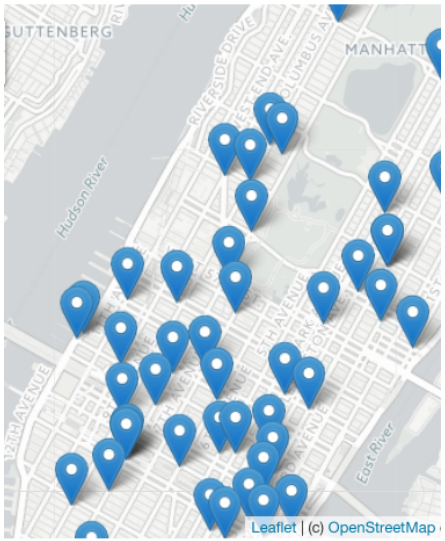
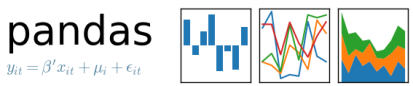
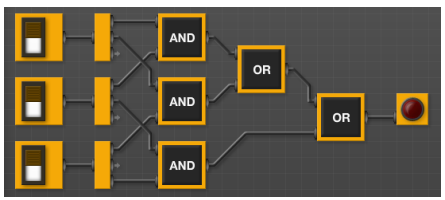
Syllabus: Topics







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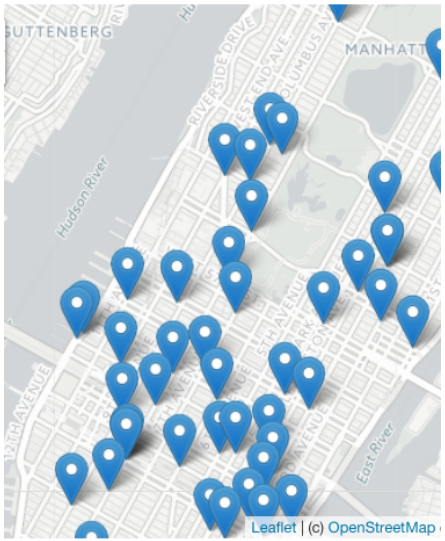

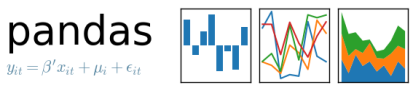

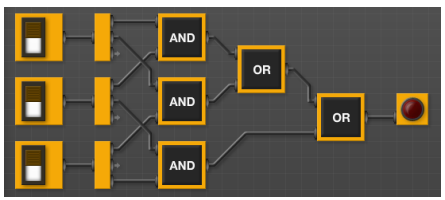

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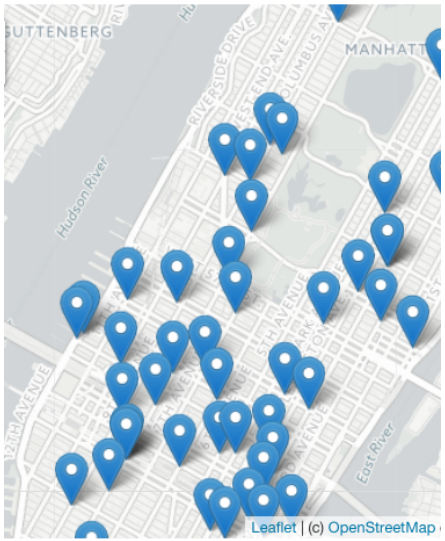

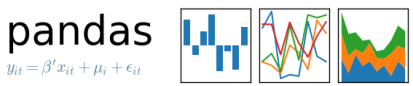

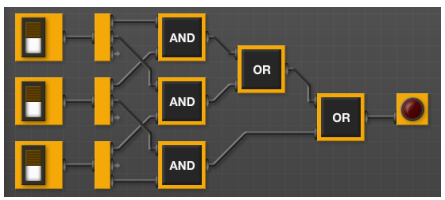

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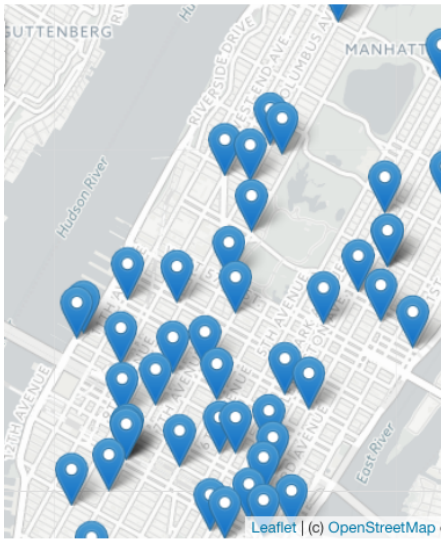
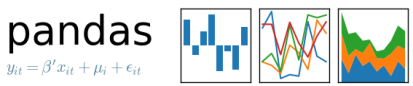
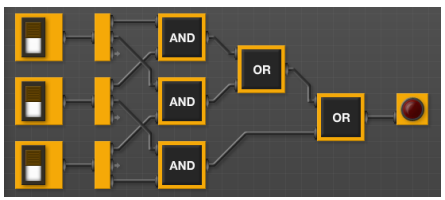
Syllabus: Topics







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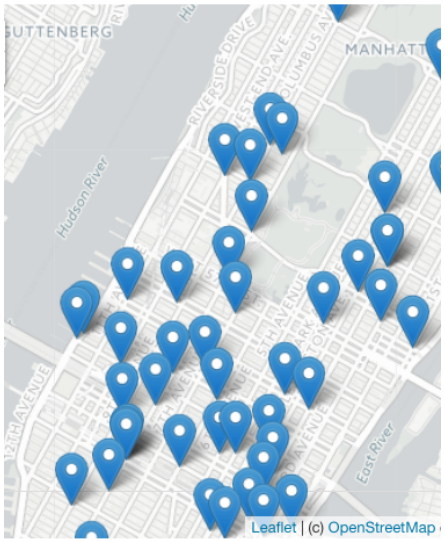
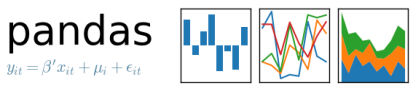
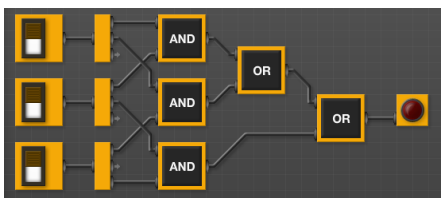
Syllabus: Topics







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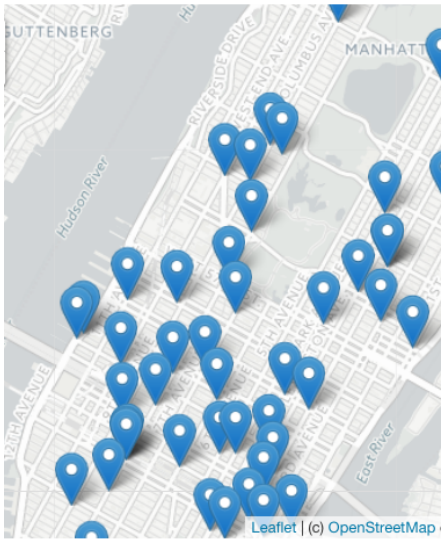
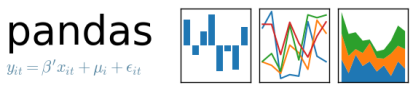
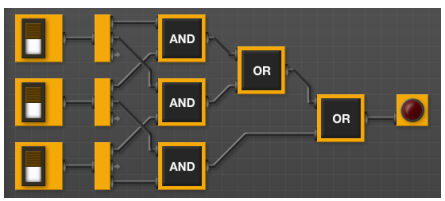
Syllabus: Topics







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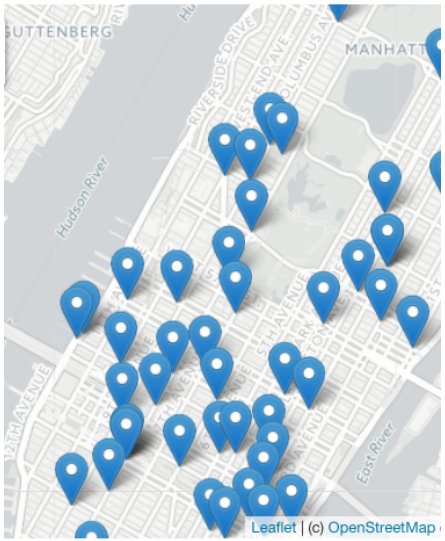
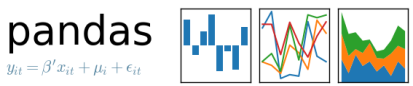
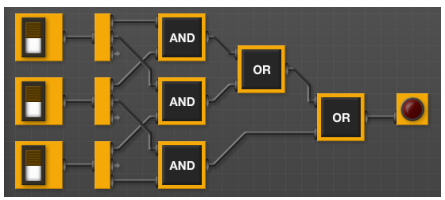
Syllabus: Topics







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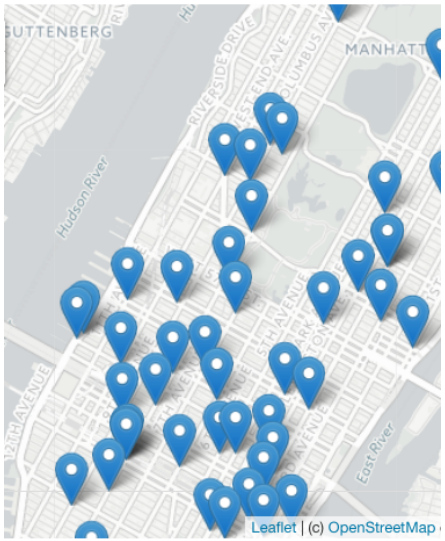
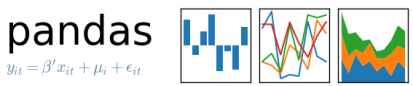
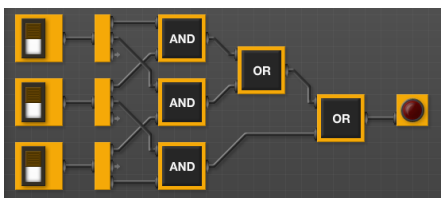
Syllabus: Topics







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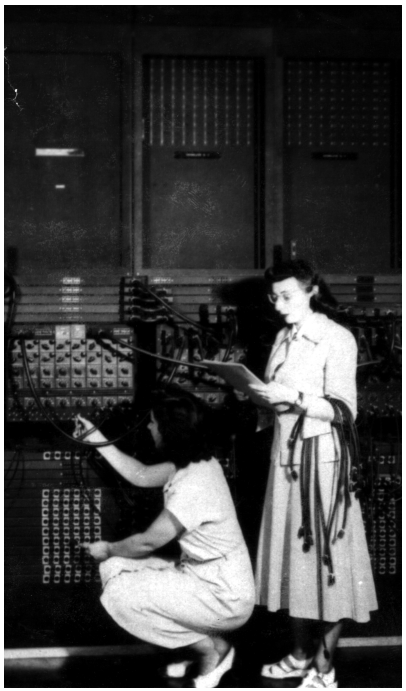
Class Structure



First "computers"

ENIAC, 1945.

Lecture:

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

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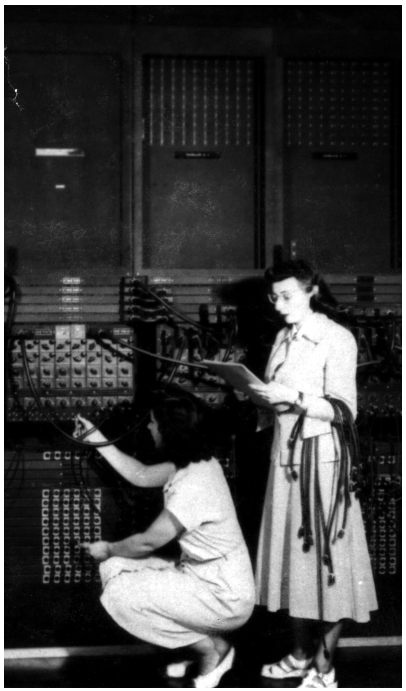

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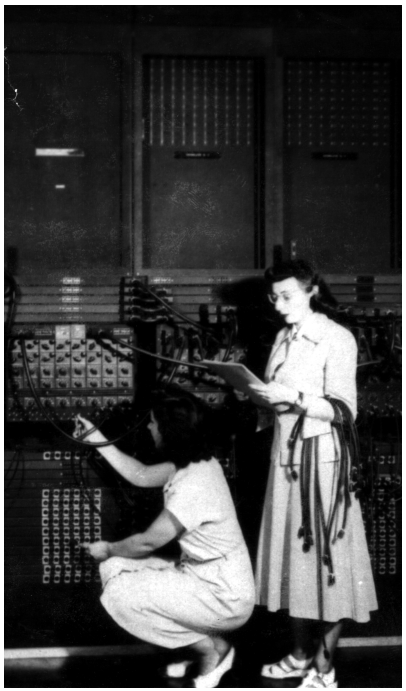

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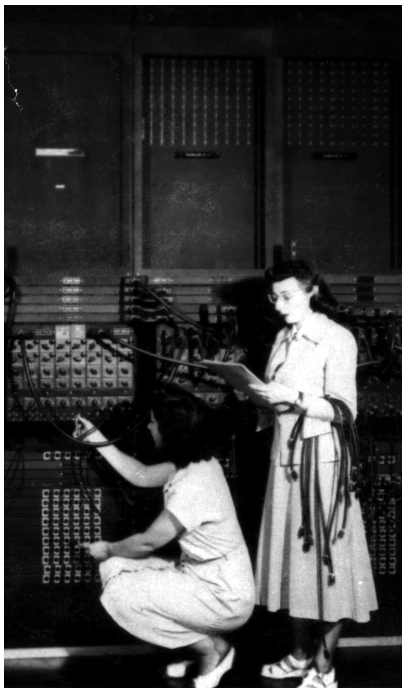

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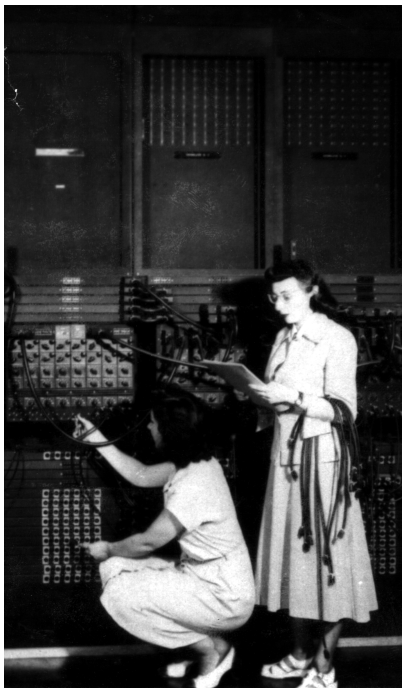

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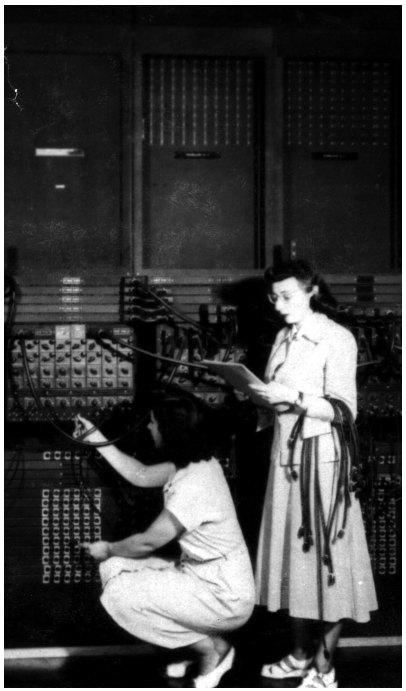

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- **You must independently read through the weekly online Lab.**

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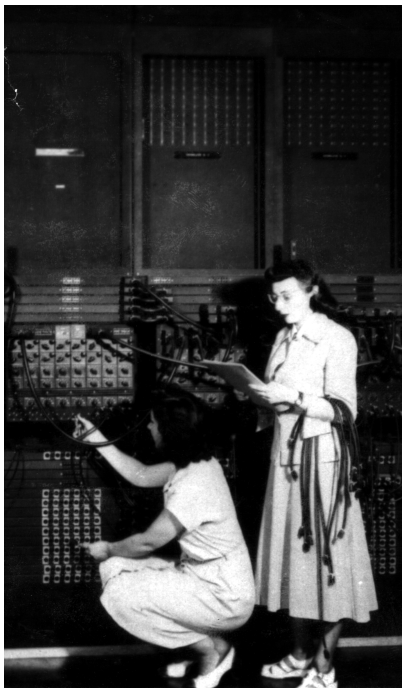

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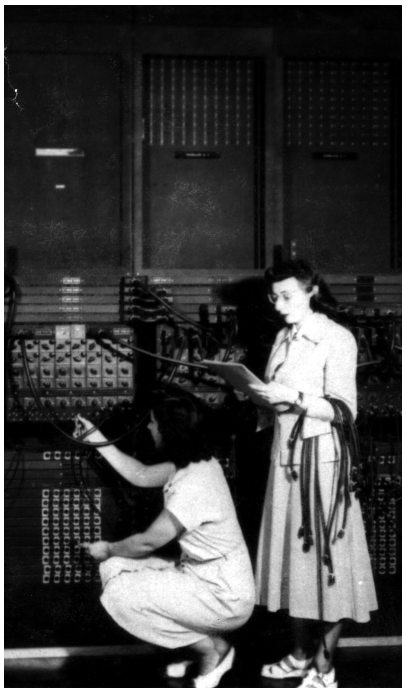

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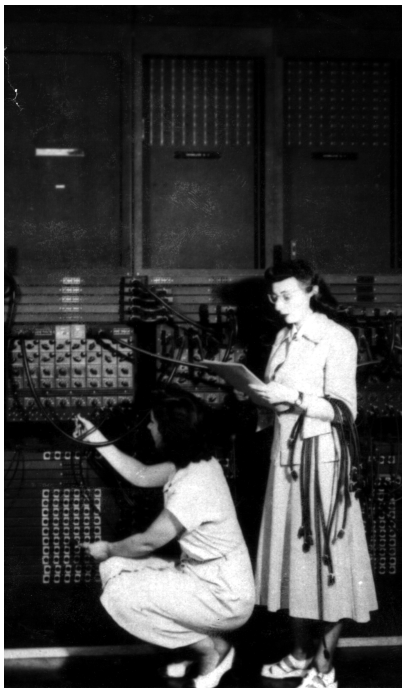

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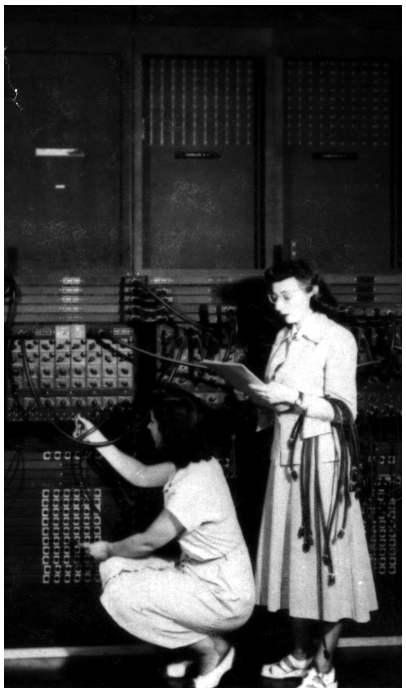

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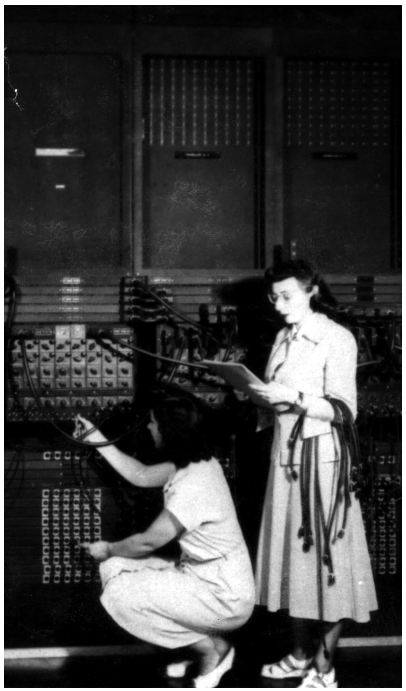

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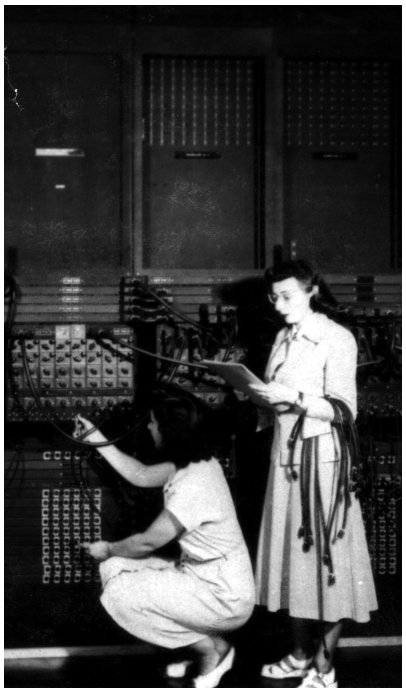

First "computers"

ENIAC, 1945.

Software Platforms:

- Blackboard
  - Important communication sent via Blackboard

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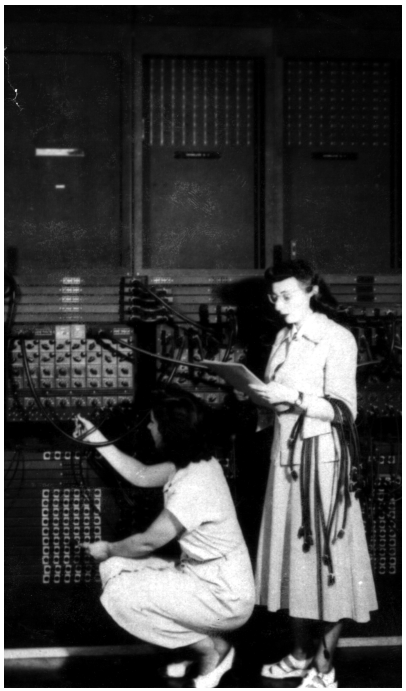

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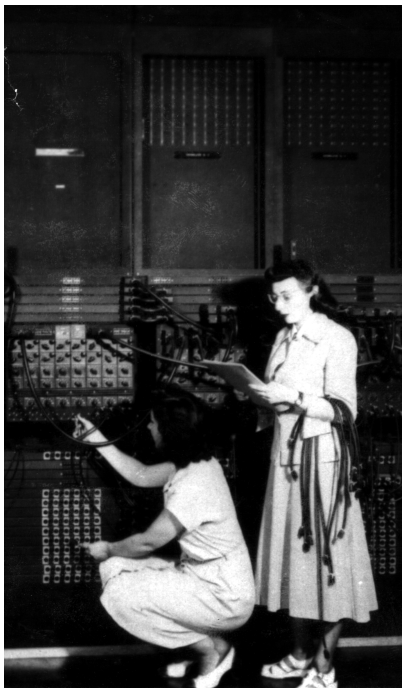

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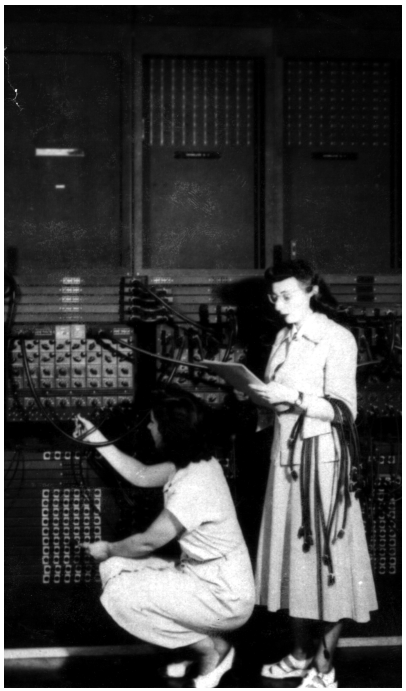

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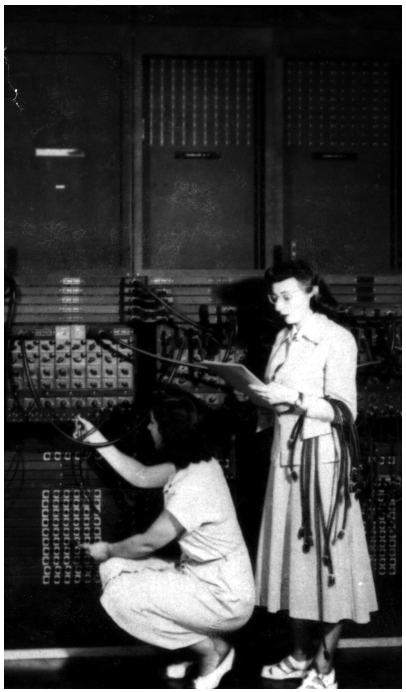
  - Email invite sent Monday.
  - Match to Blackboard email.

Class Structure

Help:



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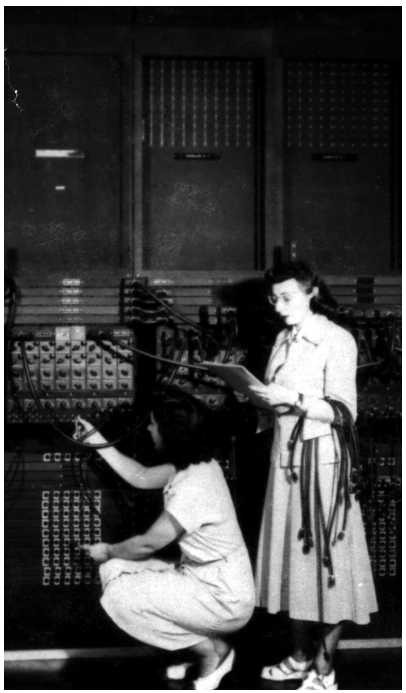

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  - Drop-in Tutoring: UTA-lead group work to solve programming assignments

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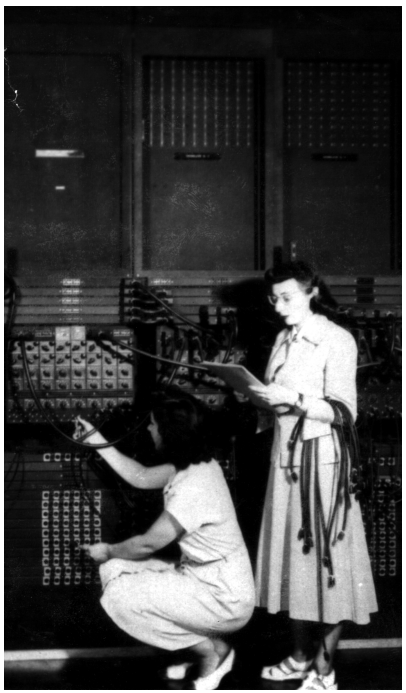

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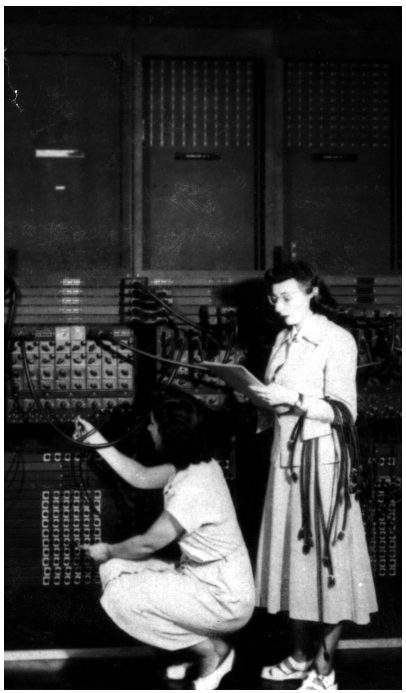

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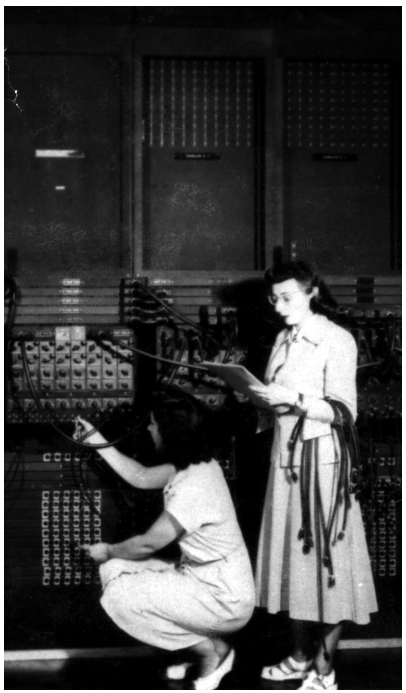

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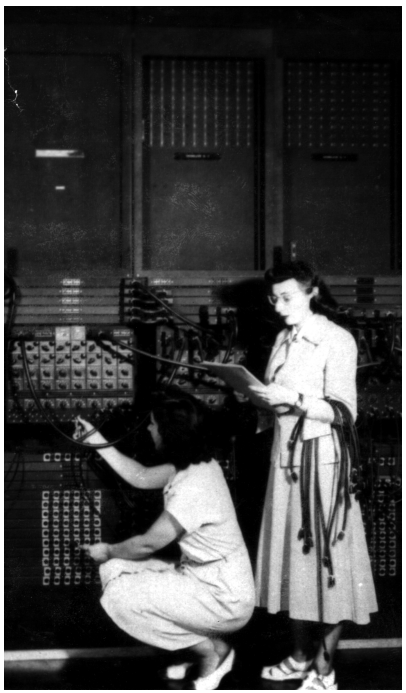

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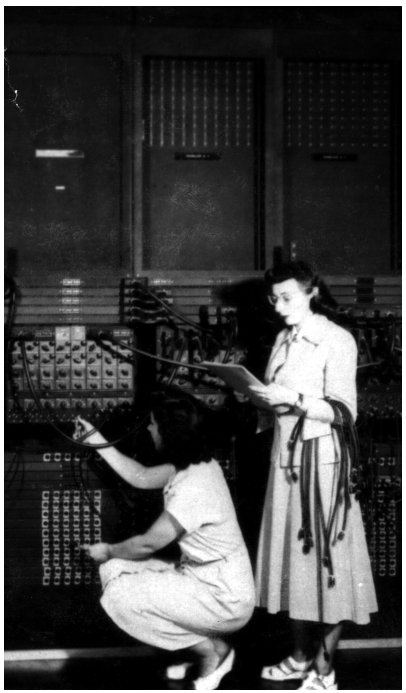

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- Work ahead on Programming Assignments.

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- Read the Online Labs.
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- Work ahead on Programming Assignments.
- 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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  Yes. *To demonstrate mastery, you must pass the final exam.*
  We will end most lectures with past final exam questions and review.

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Course Structure:

- Why 60 programs assignments? My friend only has to do 10.

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- I like working by myself. Why do I have to work in groups during drop-in tutoring?
  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)

Help:

- What's the best way to master the concepts in this course?

Philosophy (Or Why We Do What We Do)

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- What's the best way to master the concepts in this course?
  - *Most efficient way: do the programs*

Philosophy (Or Why We Do What We Do)

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- What's the best way to master the concepts in this course?
  - *Most efficient way: do the programs (more programs on old finals).*

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- If stuck:
  - *Review lecture notes (pdf on webpage) and Online Lab*

Philosophy (Or Why We Do What We Do)

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- What's the best way to master the concepts in this course?
  - *Most efficient way: do the programs (more programs on old finals).*
  - *Aim to complete programs the week related ideas are covered in lab.*
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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!")
```

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#Name:  Thomas Hunter                          ← These lines are comments
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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?

Variations on Hello, World!

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print(’Get your education,’)
print("don’t forget from whence you came, and")
```

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print(’Get your education,’)
print("don’t forget from whence you came, and")
print("The world’s gonna know your name.")
```

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- Each print statement writes its output on a new line.

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- Results in three lines of output.

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- 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.

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- **Turtle Graphics**
- Definite Loops (`for`-loops)
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Turtles Introduction

- A simple, whimsical graphics package for Python.

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- (Fancier turtle demo)

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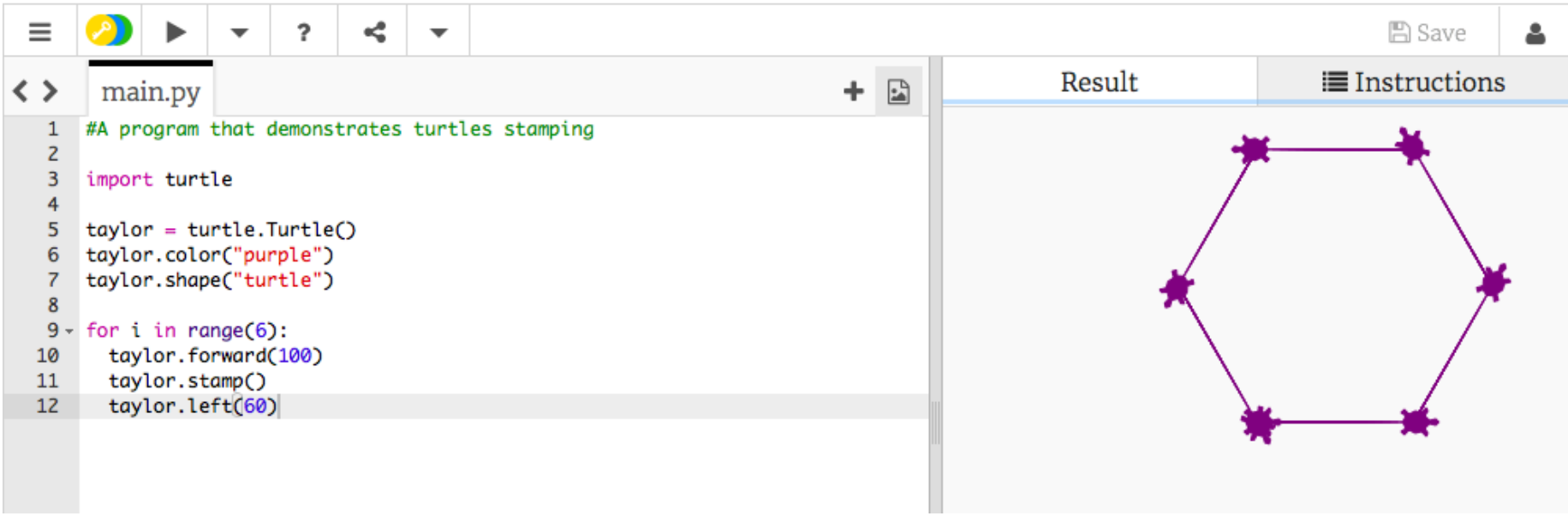
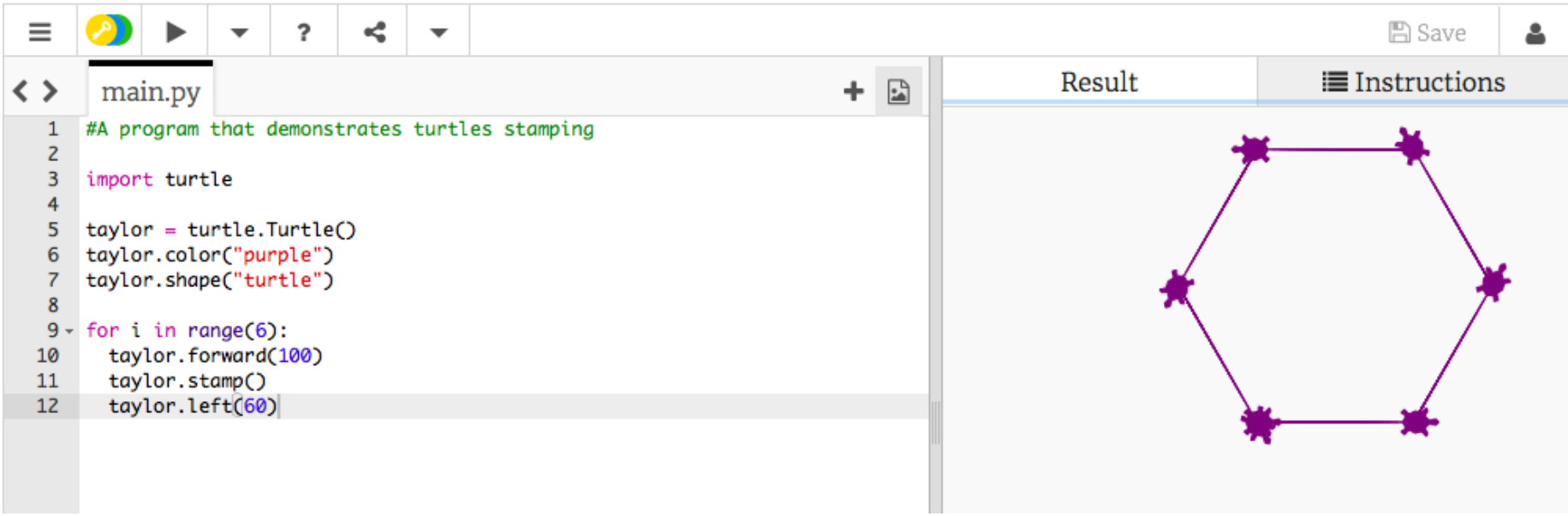
Turtles Introduction



- Creates a turtle **variable**, called `taylor`.

Turtles Introduction



- Creates a turtle **variable**, called `taylor`.
- Changes the color (to purple) and shape (to turtle-shaped).

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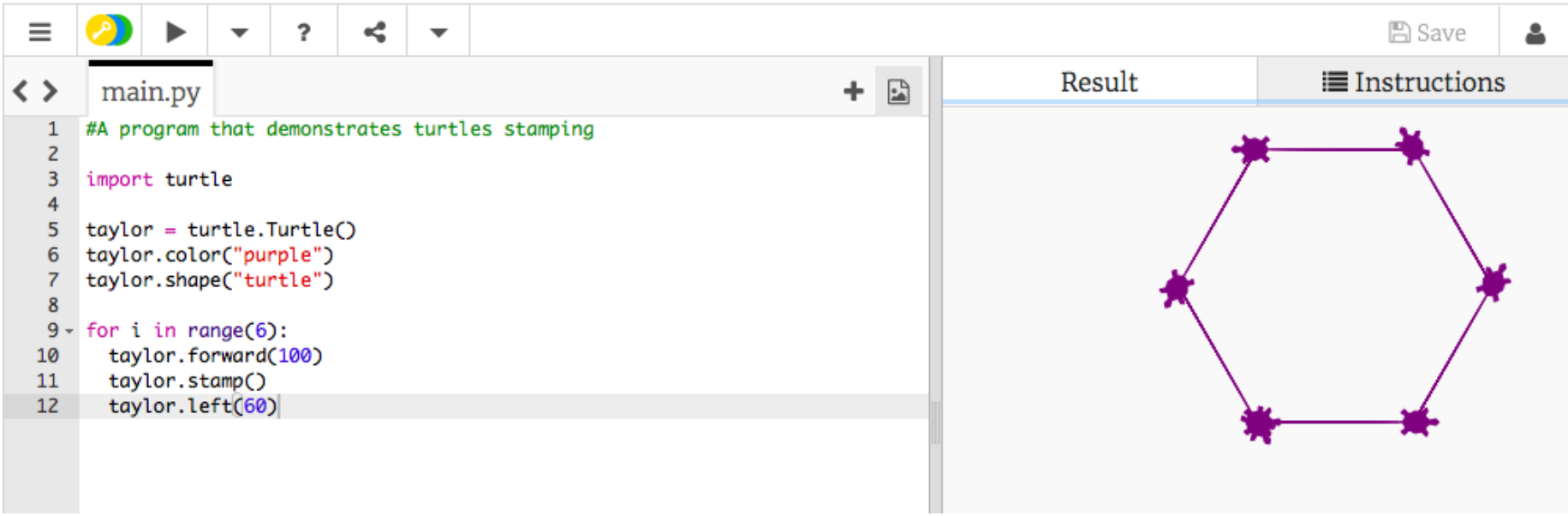

- Creates a turtle **variable**, called `taylor`.
- Changes the color (to purple) and shape (to turtle-shaped).
- Repeats 6 times:

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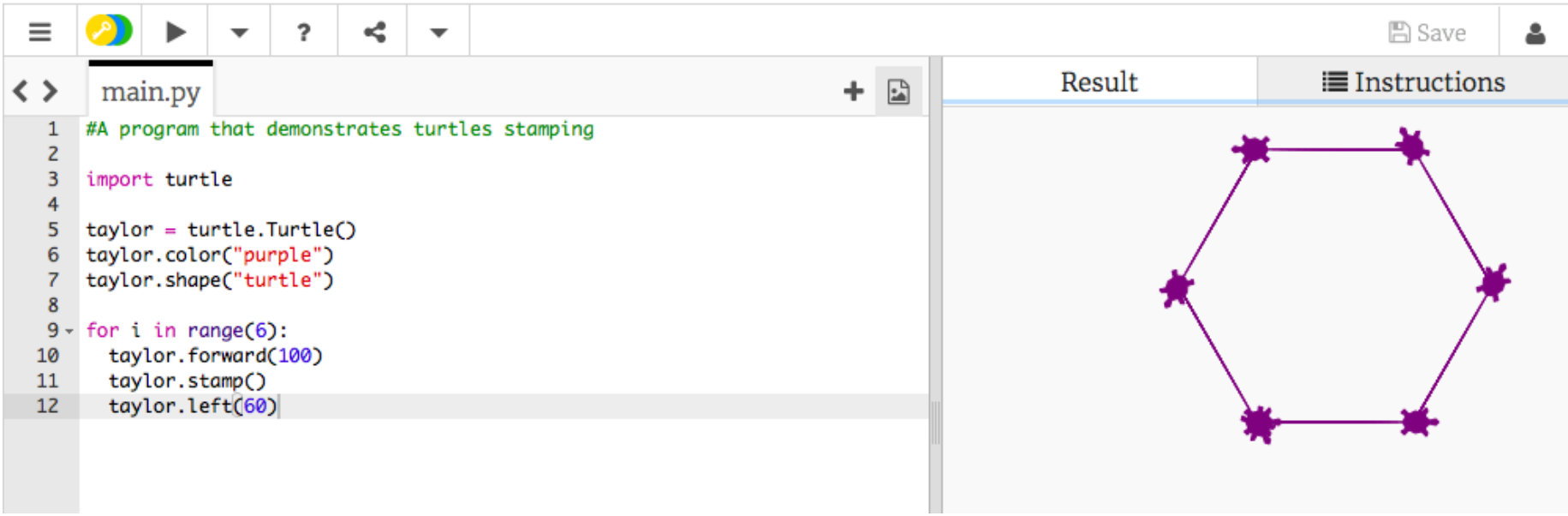

- Creates a turtle **variable**, called `taylor`.
- Changes the color (to purple) and shape (to turtle-shaped).
- Repeats 6 times:
  - Move forward; stamp; and turn left 60 degrees.

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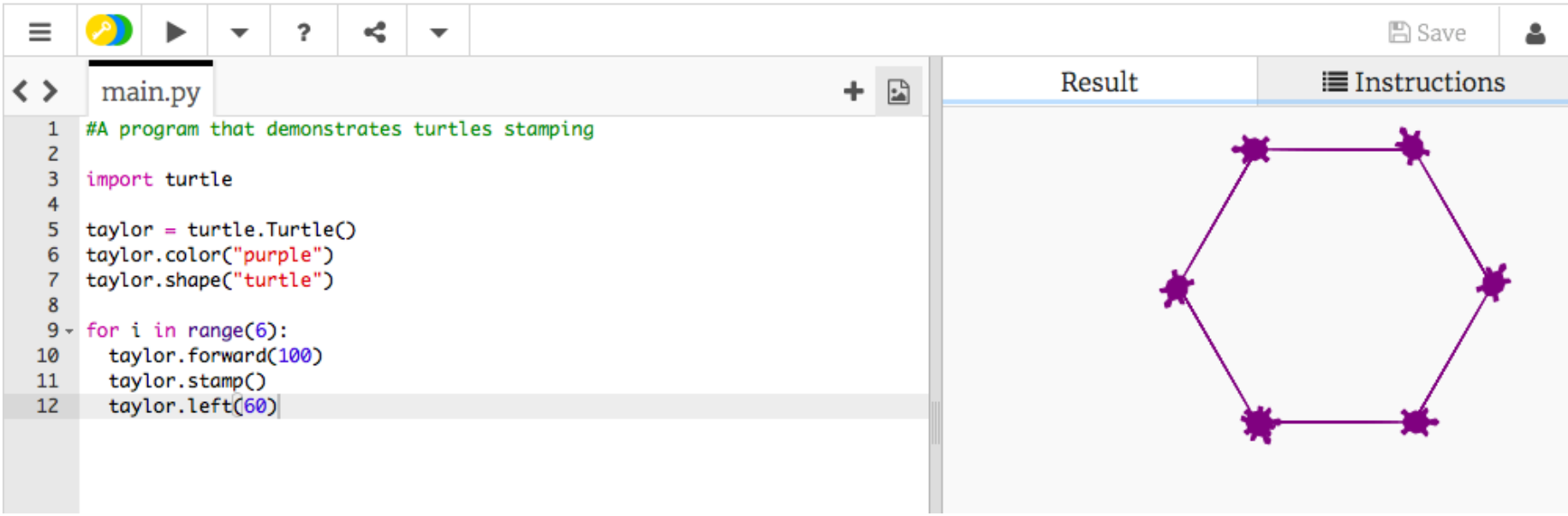

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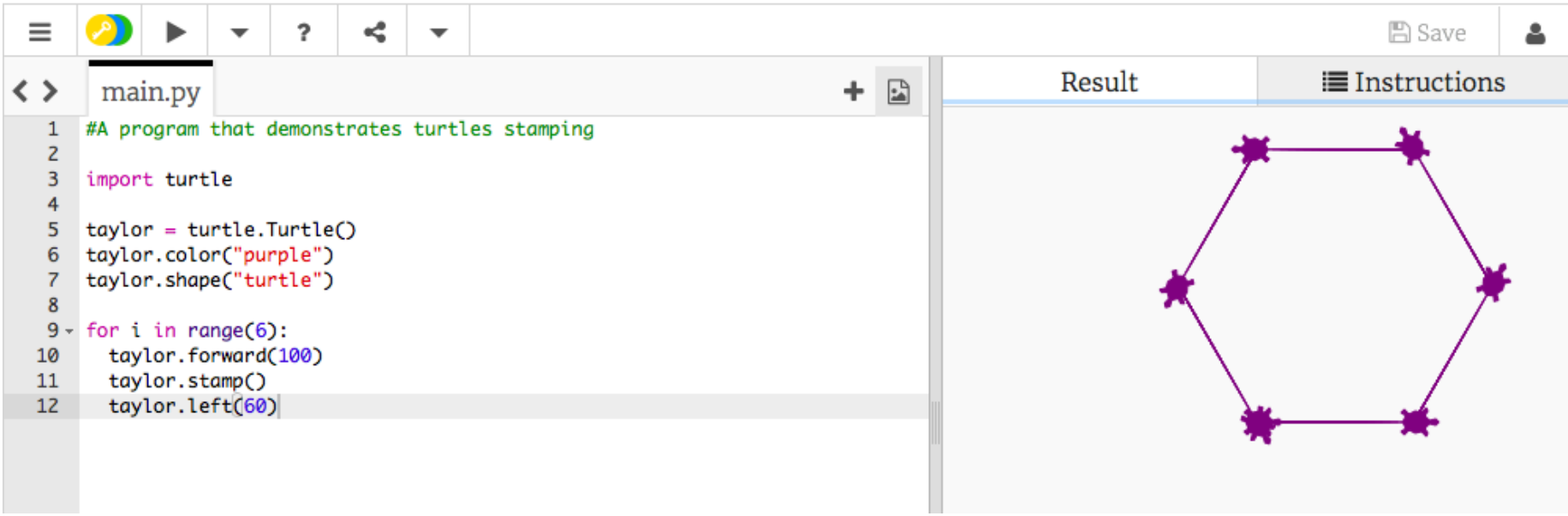

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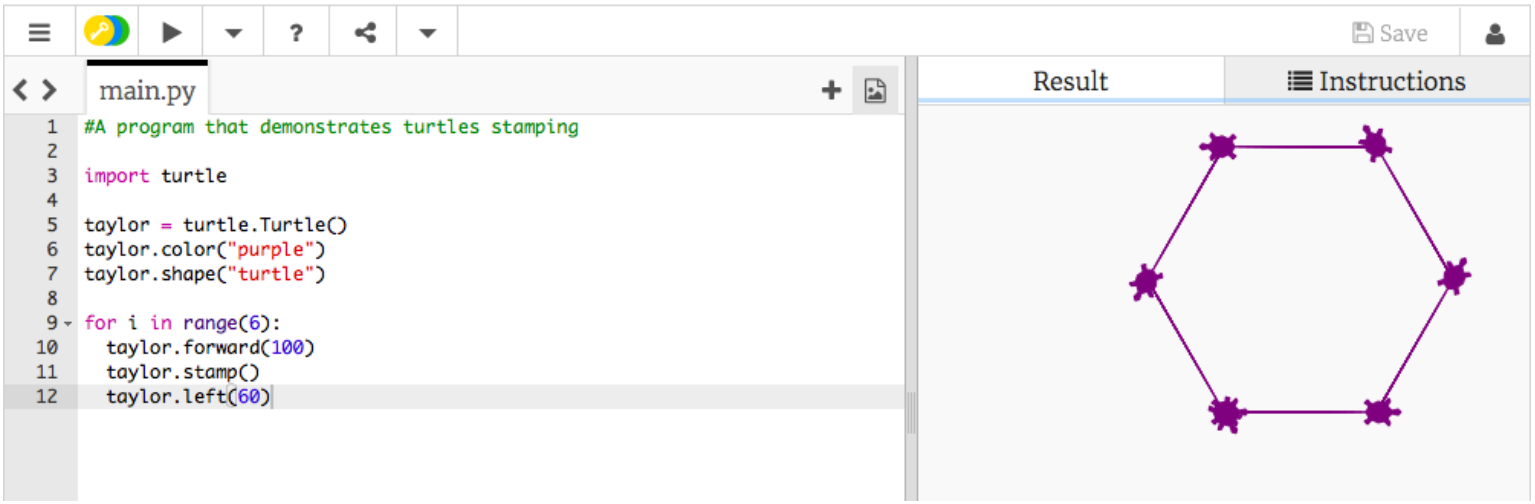
- Repeats 6 times:
  - Move forward; stamp; and turn left 60 degrees.
- Repeats any instructions **indented** in the "loop block"
- This is a **definite** loop because it repeats a fixed number of times

Your Turn!!!

Try to solve this challenge:

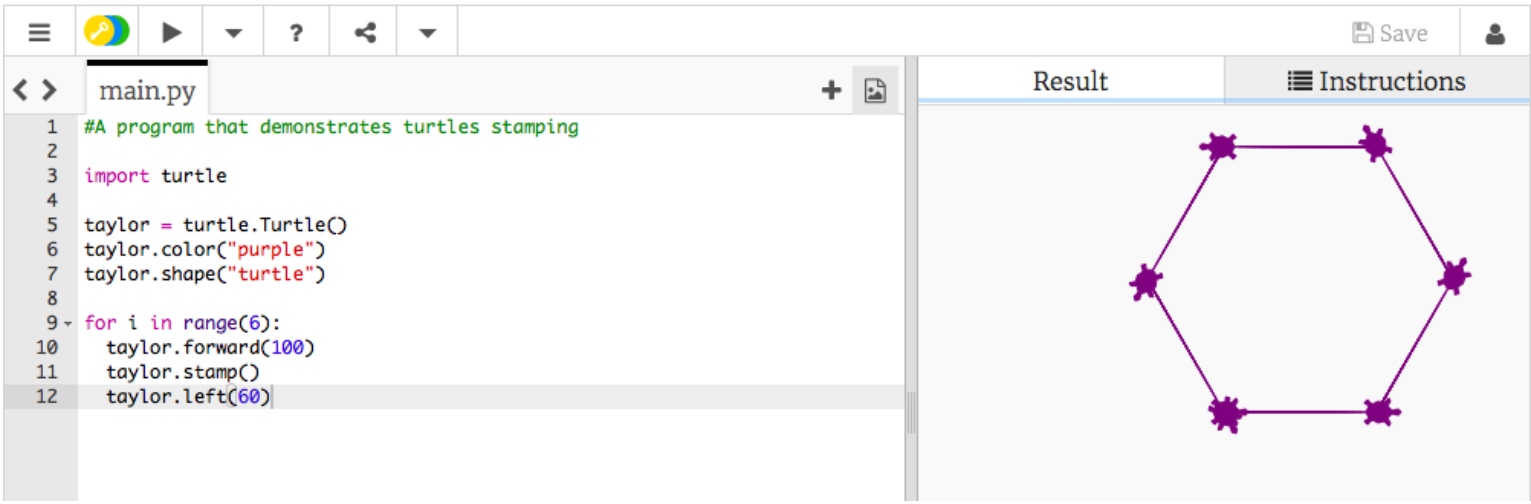
1. Write a program that will draw a 10-sided polygon.
2. Write a program that will repeat the line:
   `I'm lookin' for a mind at work!`
   three times.

Decagon Program



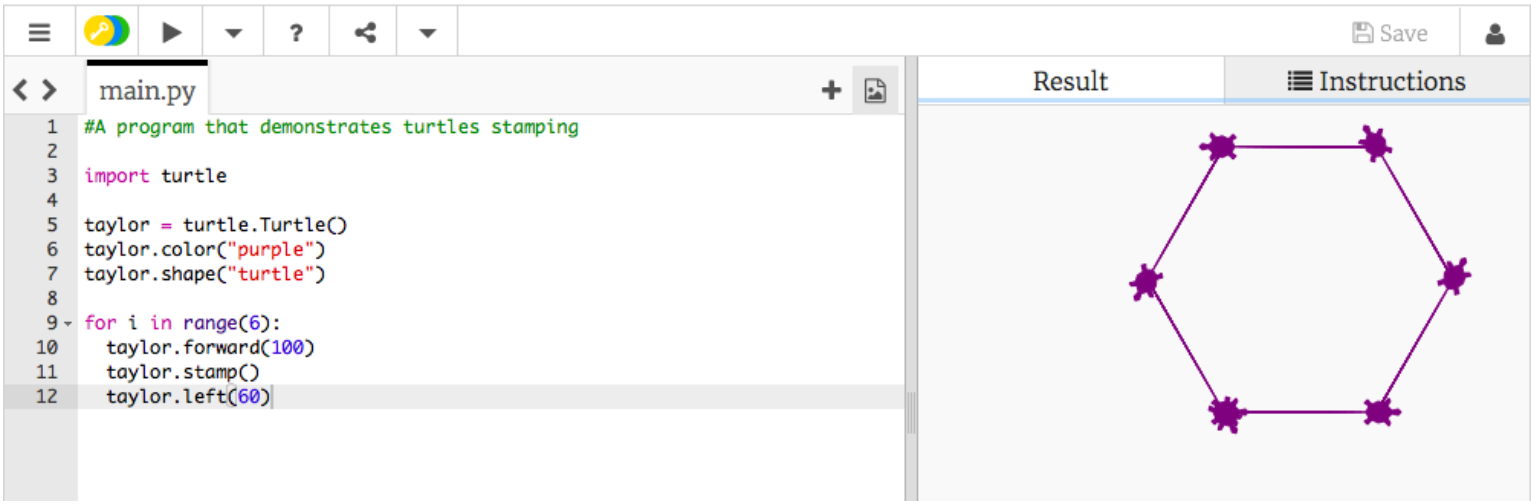
- Start with the hexagon program.

Decagon Program



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

Decagon Program



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

Work Program

2. Write a program that will repeat the line:
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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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Lecture Quiz

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What is an Algorithm?

From our textbook:

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

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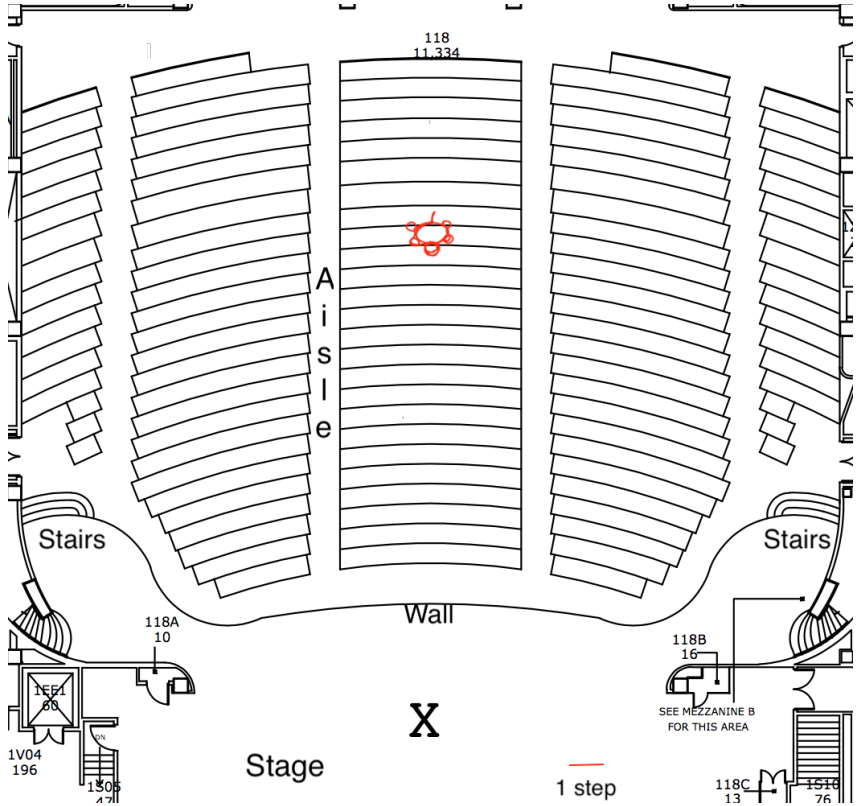
From our textbook:

- An algorithm is a process or set 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.

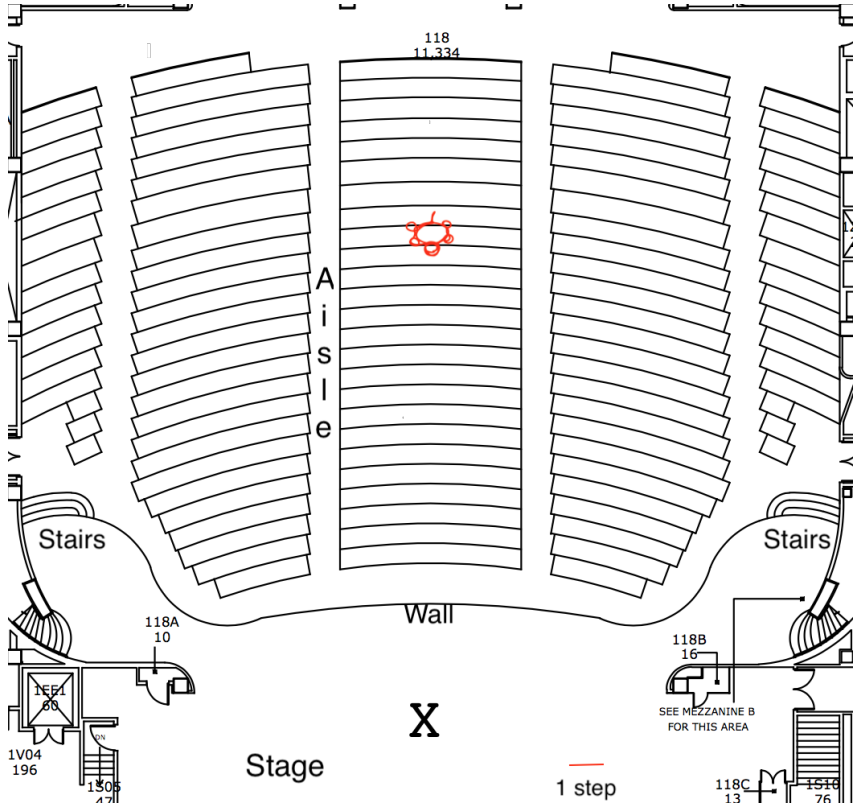
Your Turn!!!



Try to solve this challenge:

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

Your Turn!!!



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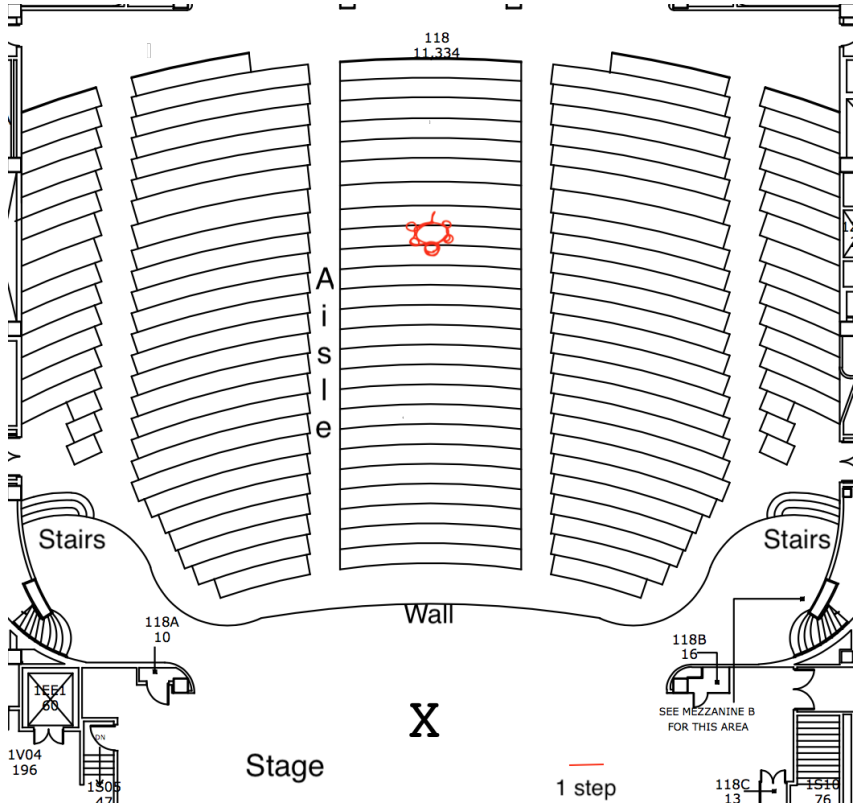

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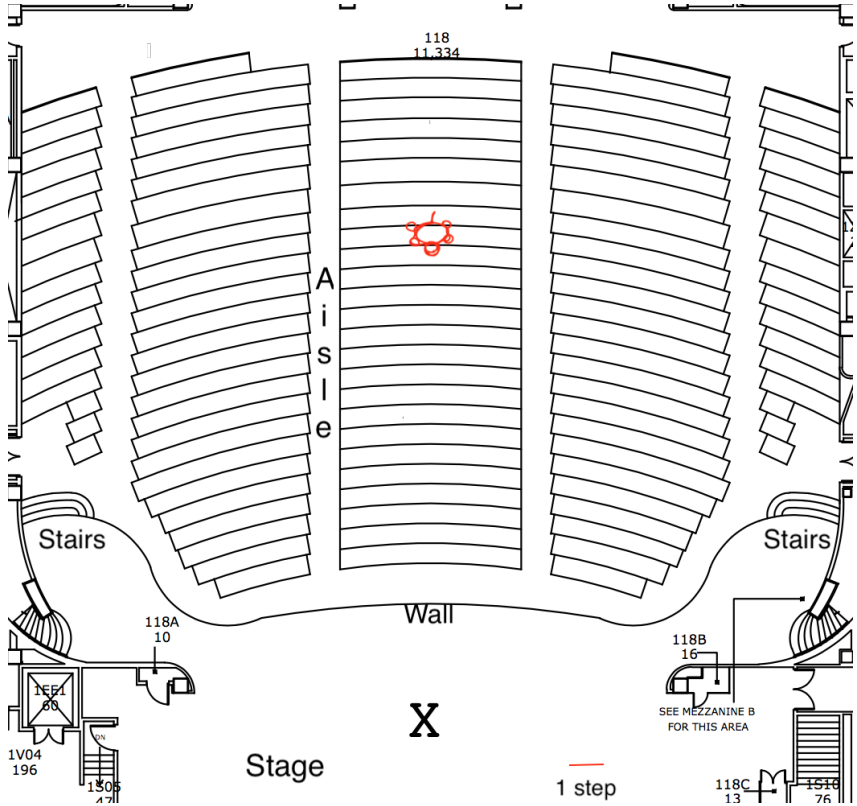

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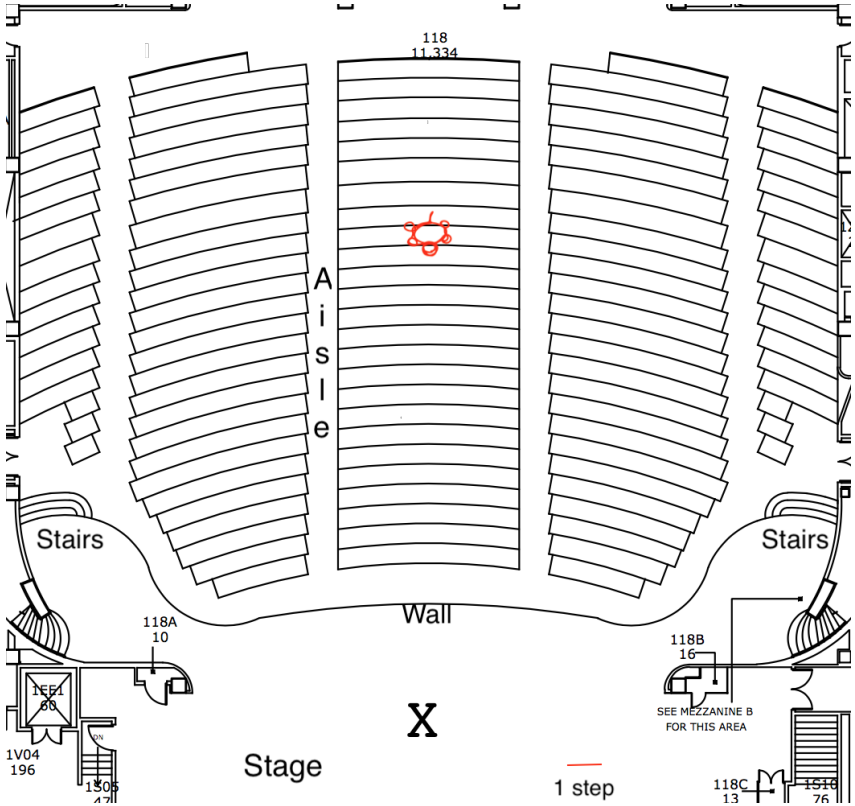

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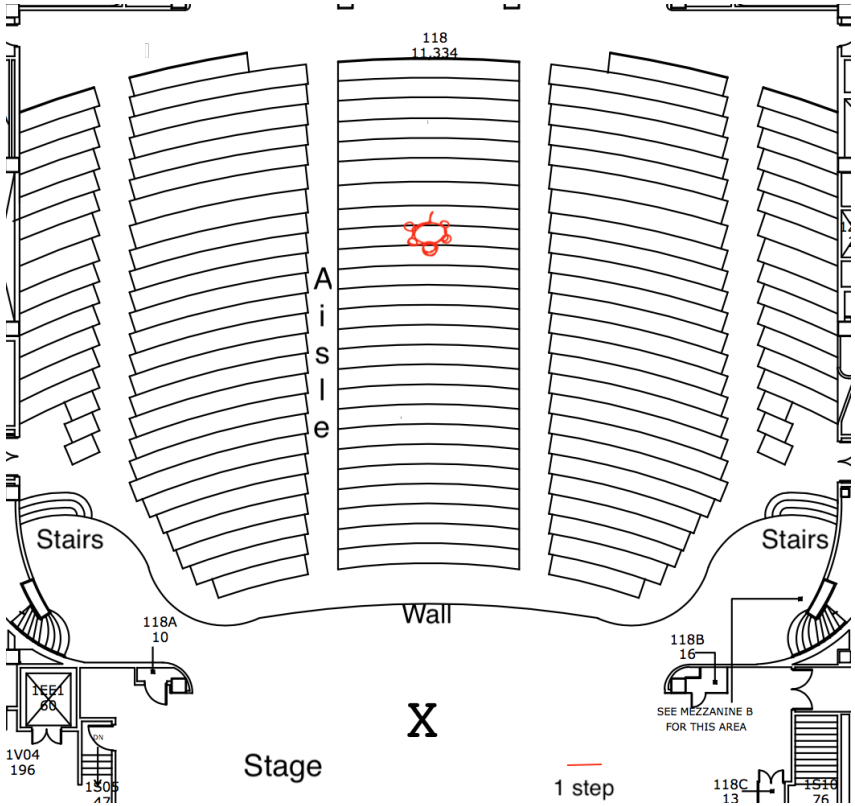

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   - Turtles cannot climb walls, must use stairs (walk forward on steps).

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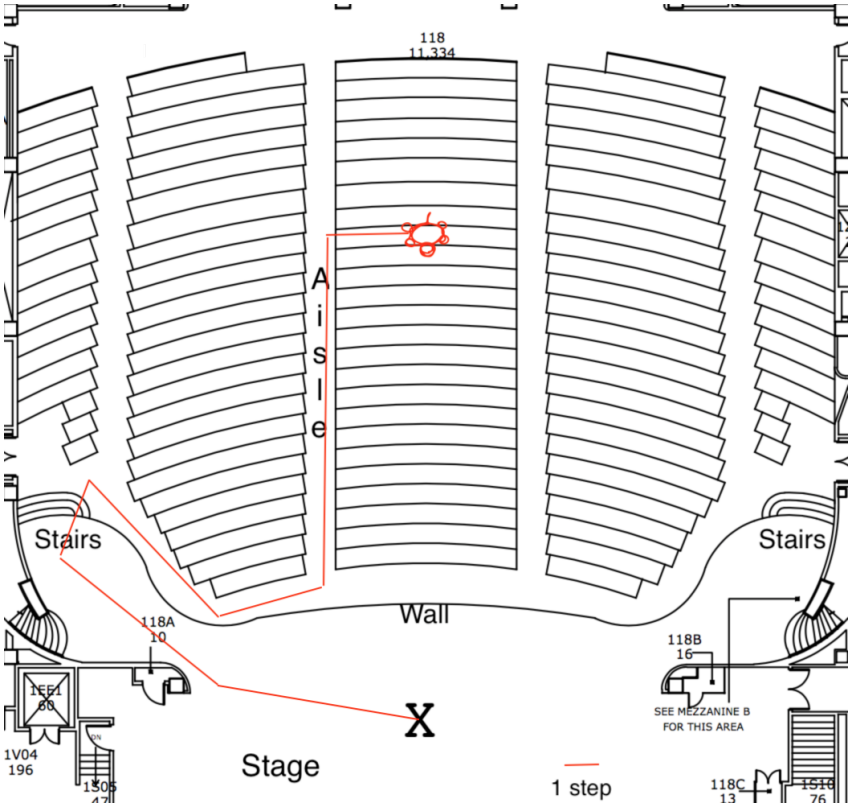
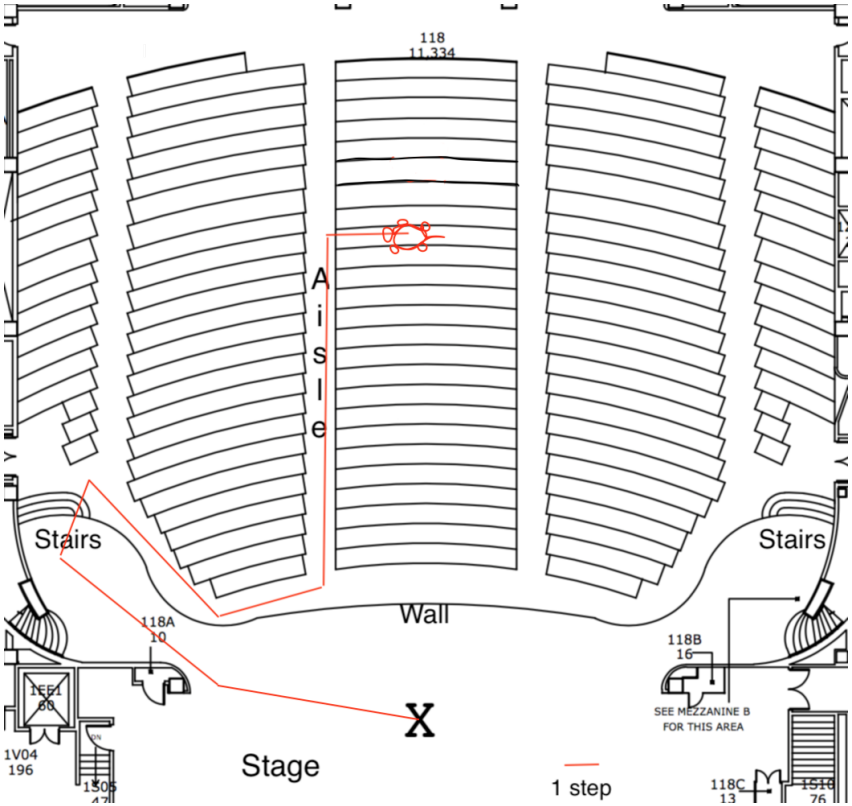


One possible solution:

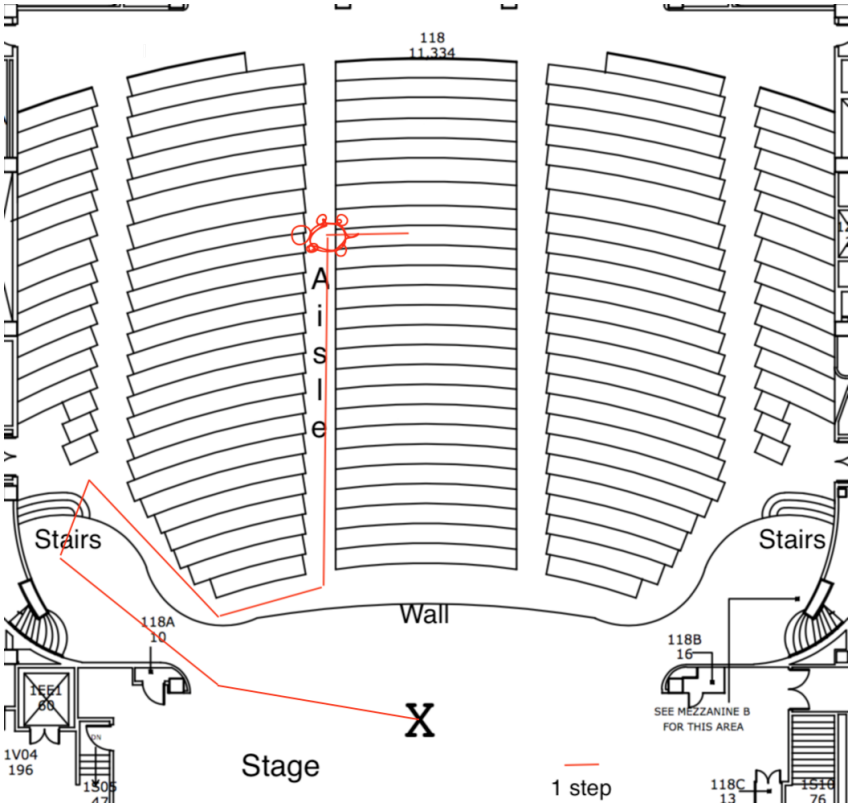
Your Turn!!!



One possible solution:

- Turn right 90 degrees.

Your Turn!!!



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

One possible solution:

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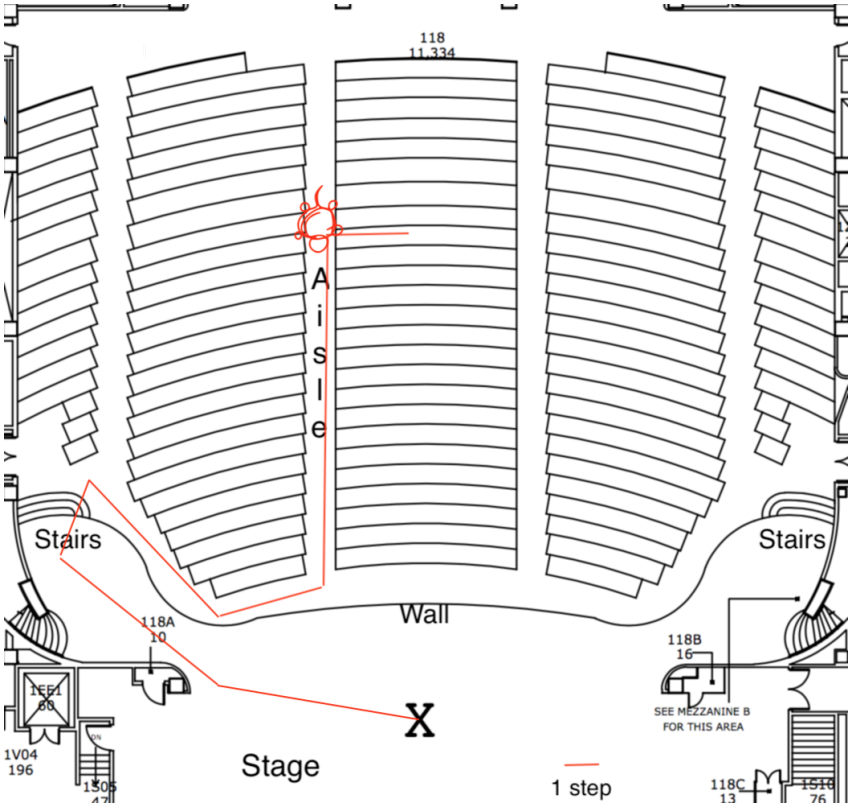

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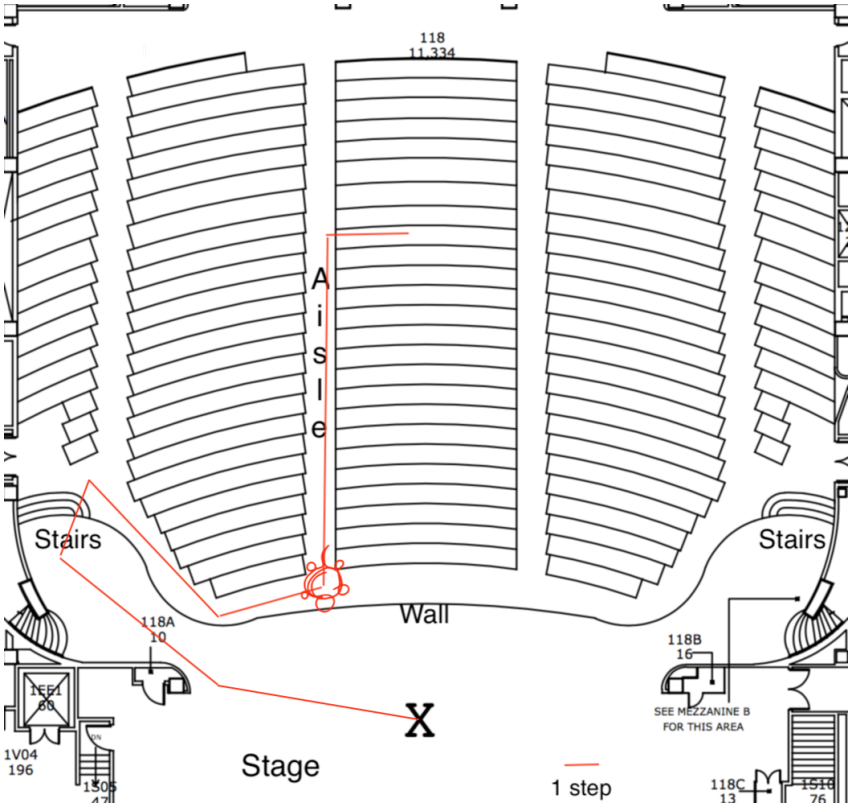

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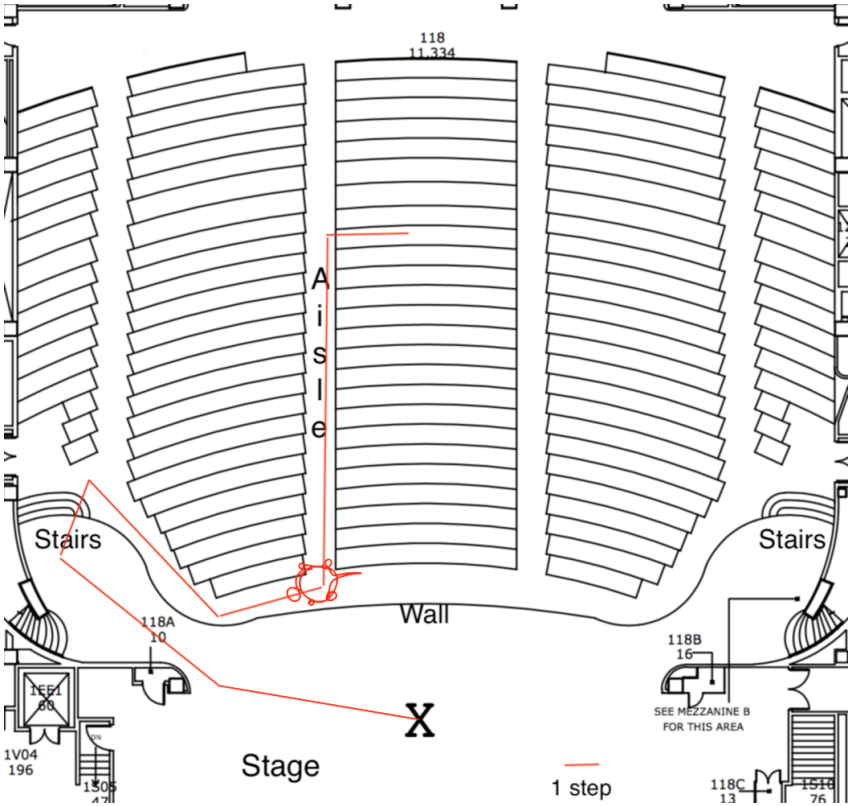
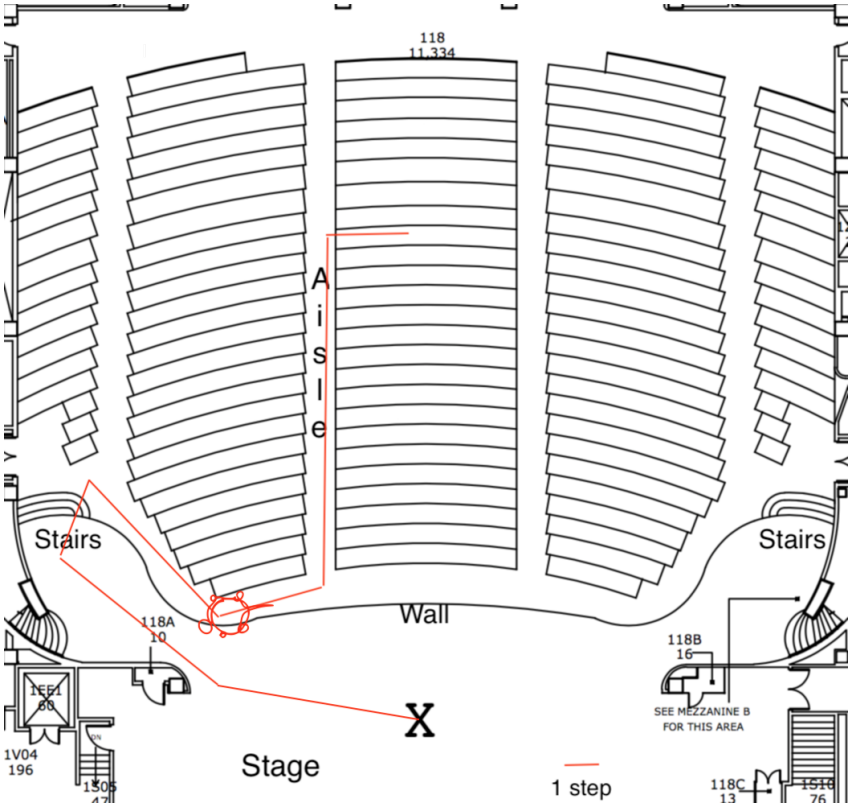


- Turn right 90 degrees.
- Walk forward 3 steps.
- Turn left 90 degrees.
- Walk forward 10 steps.
- Turn right 65 degrees

One possible solution:

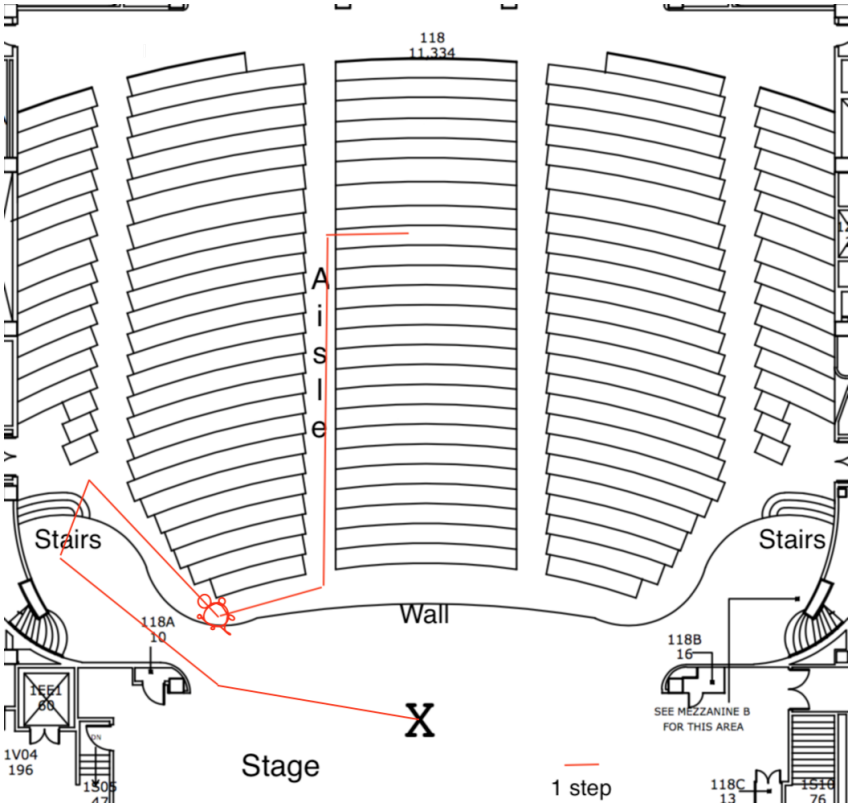
Your Turn!!!



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.

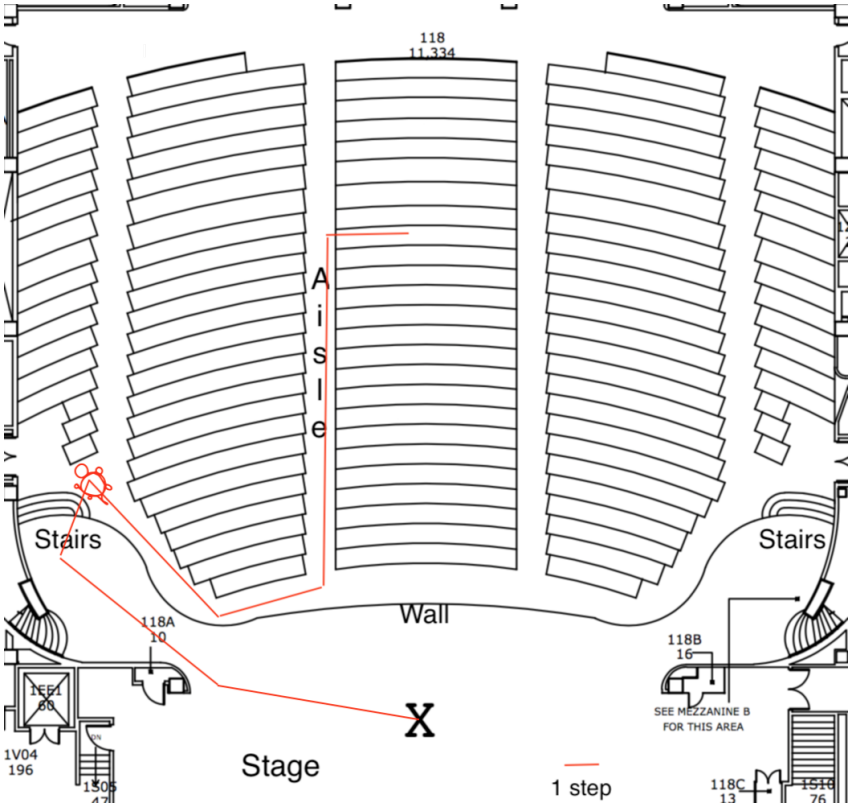
Your Turn!!!



- 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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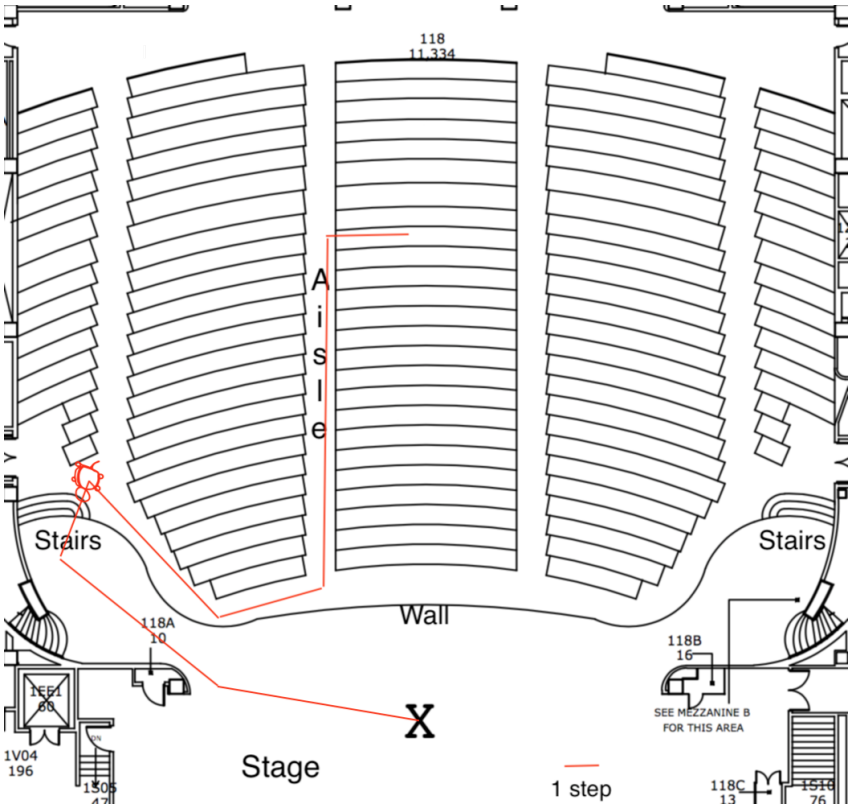

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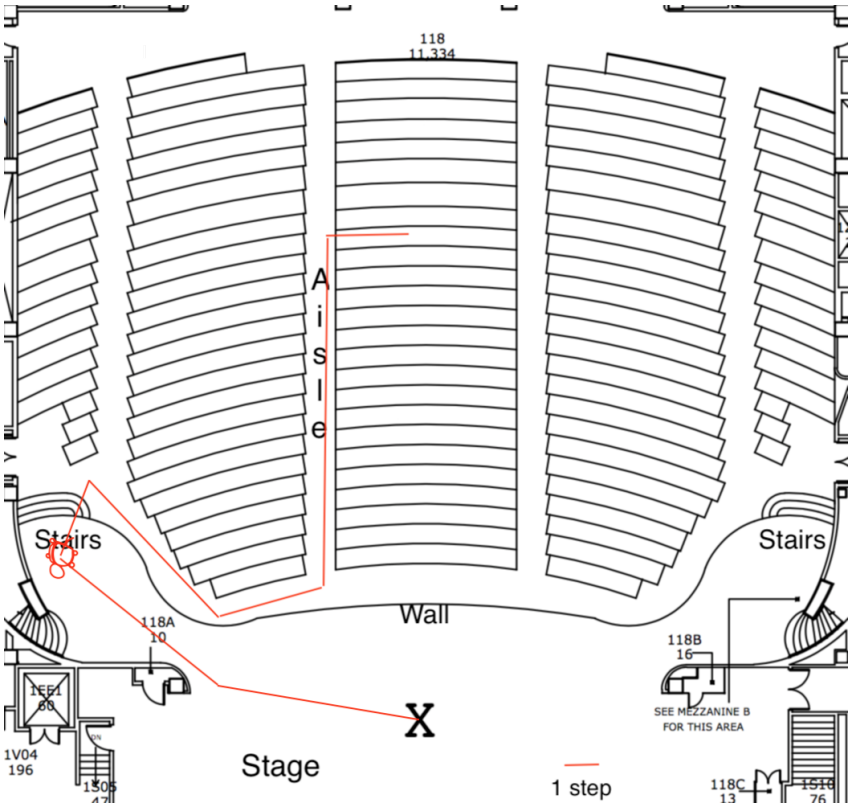
- Walk forward 4 steps.
- Turn right 45 degrees.
- Walk forward 6 steps.
- Turn left 110 degrees.

Your Turn!!!



One possible solution:

- Turn right 90 degrees.
- Walk forward 3 steps.
- Turn left 90 degrees.
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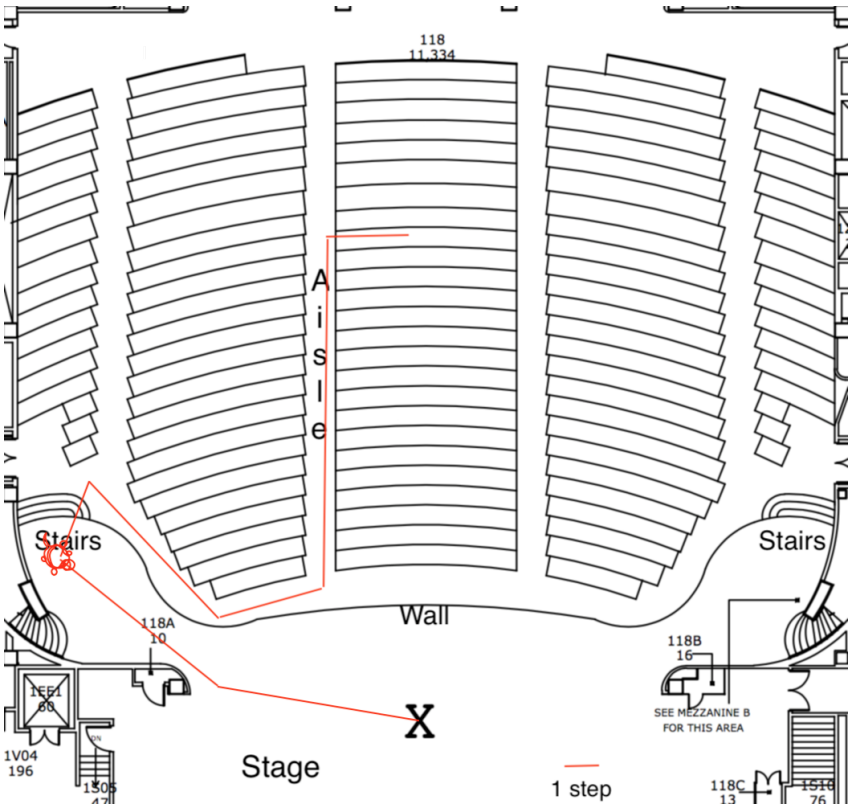
- Turn right 65 degrees.
- Walk forward 4 steps.
- Turn right 45 degrees.
- Walk forward 6 steps.
- Turn left 110 degrees.
- Walk forward 3 steps.

Your Turn!!!



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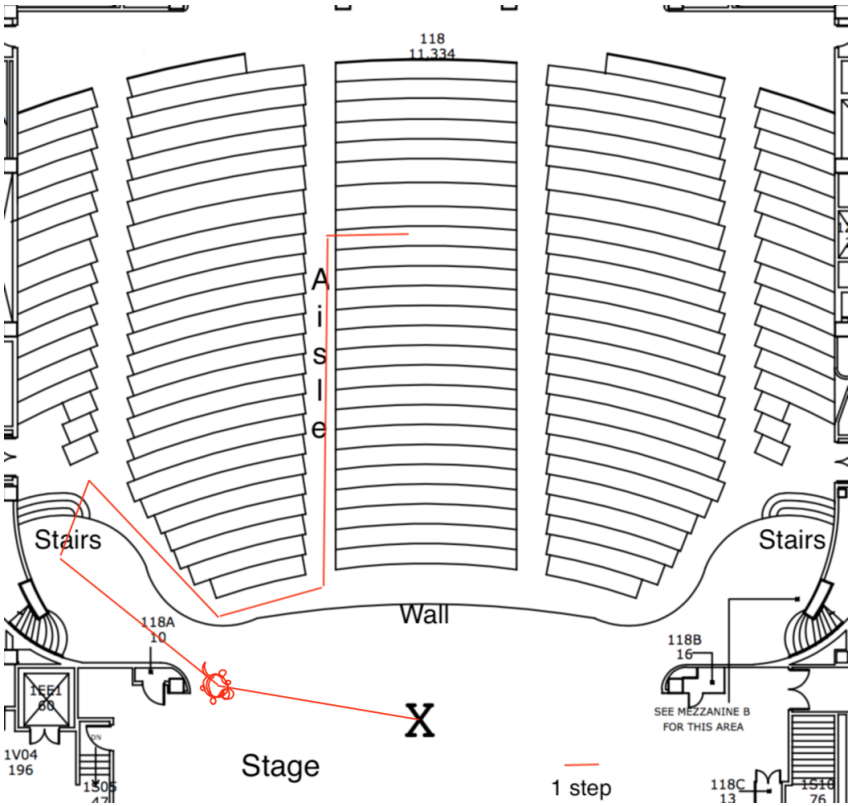

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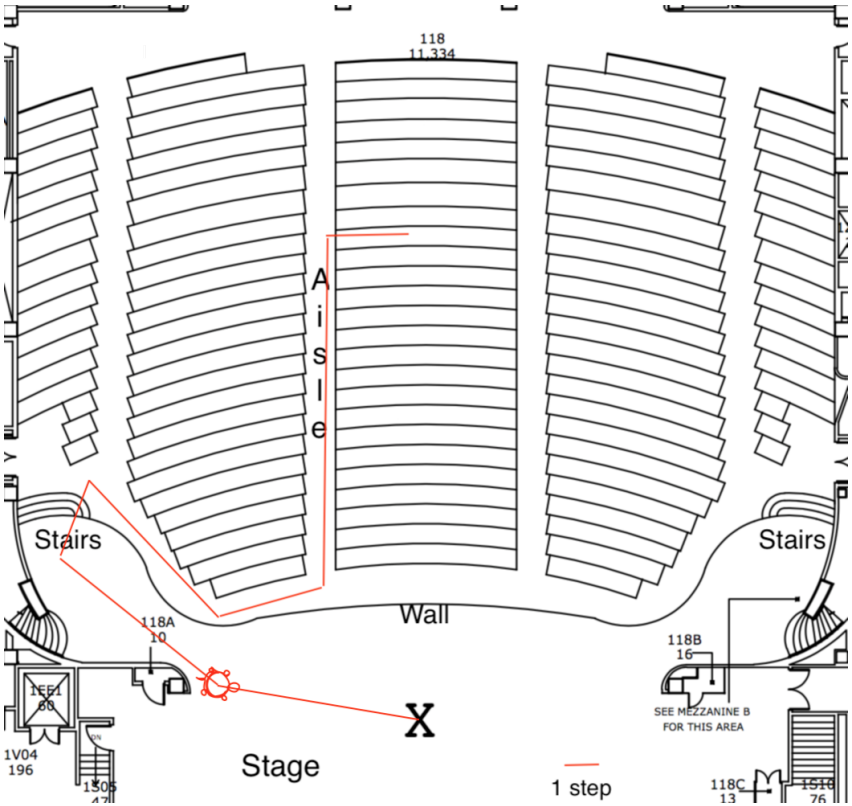

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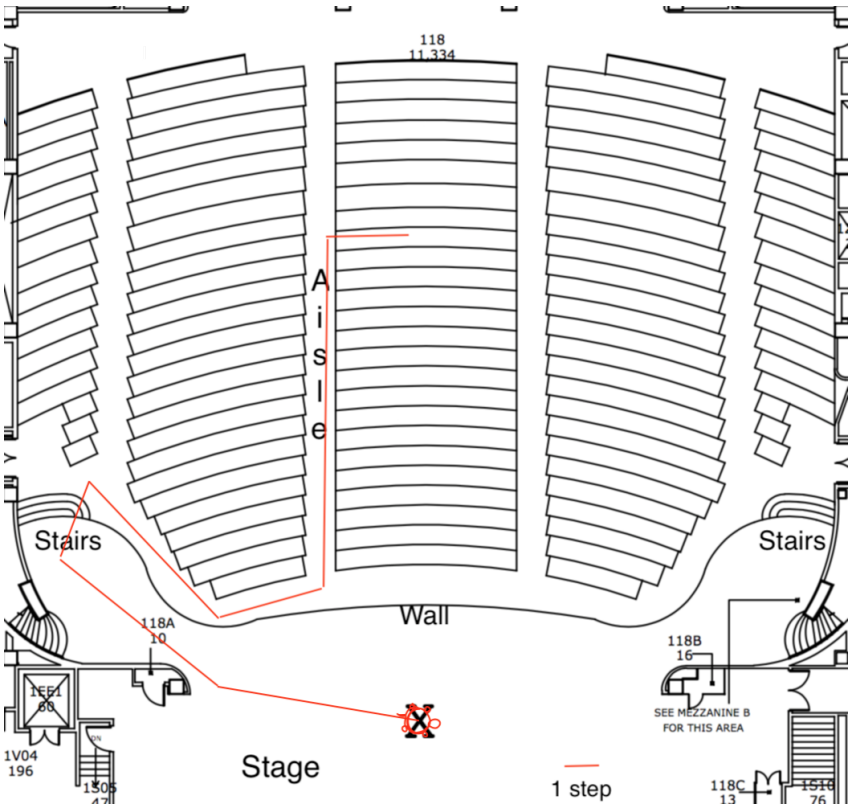

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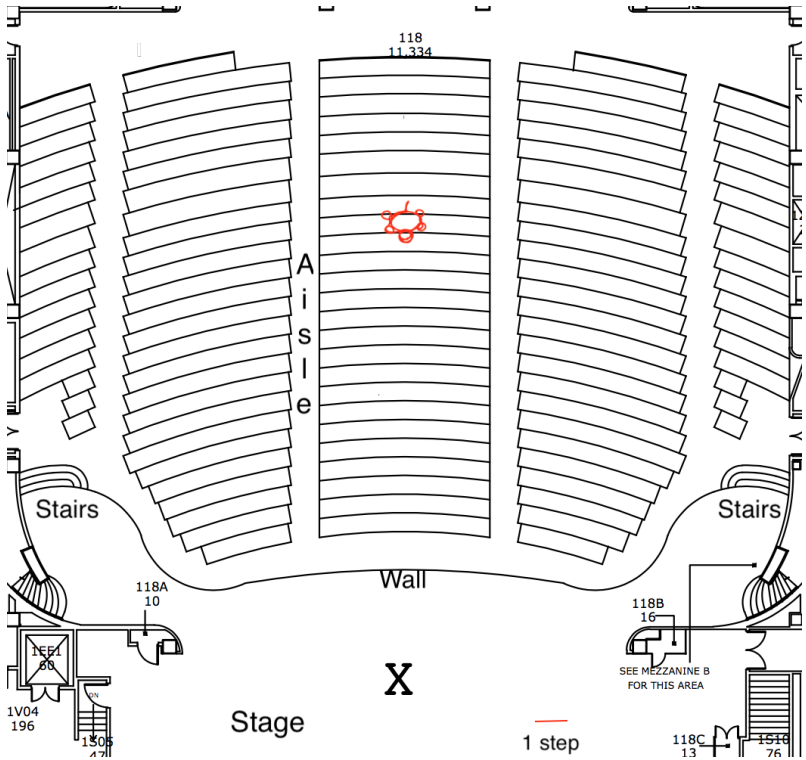
Your Turn!!!



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

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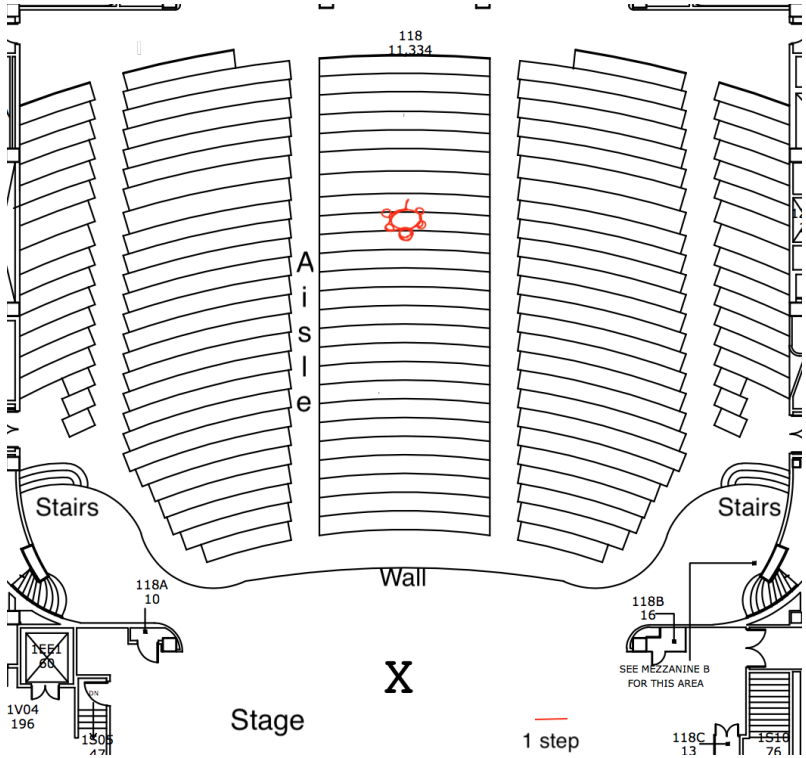

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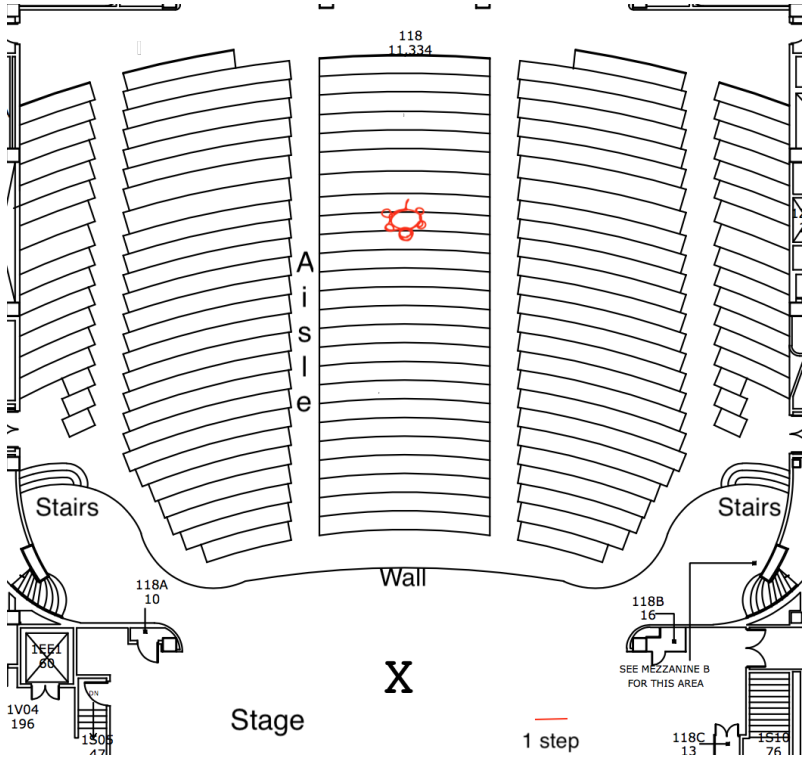

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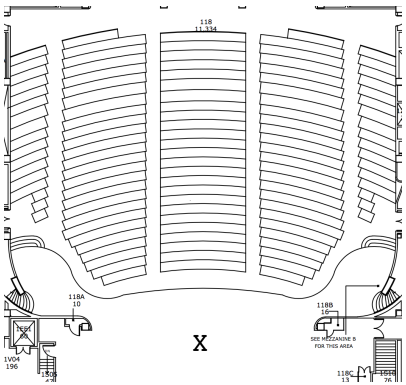
- "Test and Debug" other students' posted solutions and reply to their posts if you find a bug!
- Degrees the turtle turns are approximate, any good approximation is considered correct.

Recap



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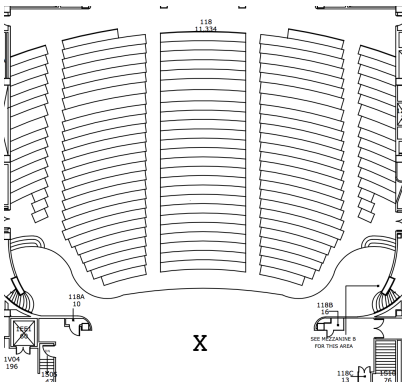

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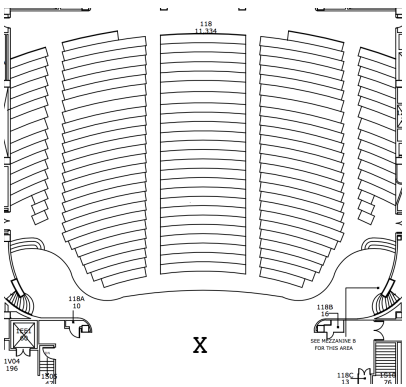

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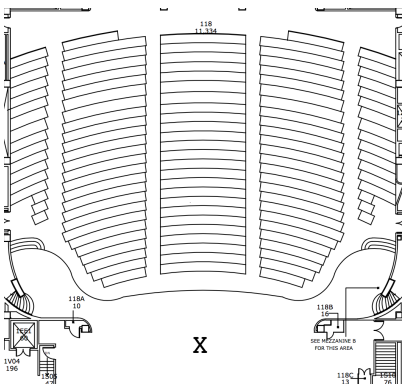

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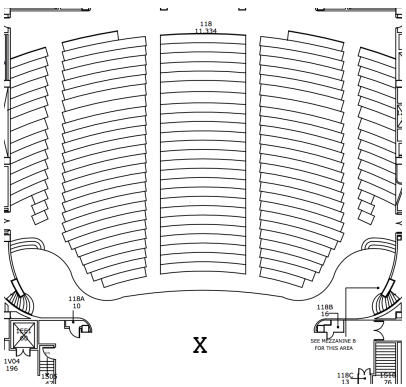

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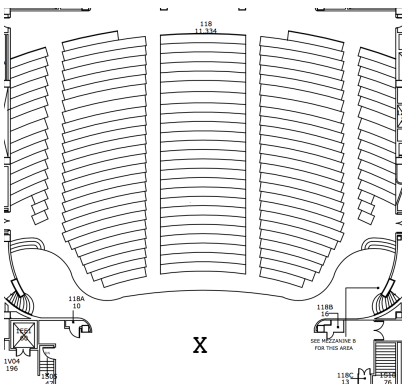

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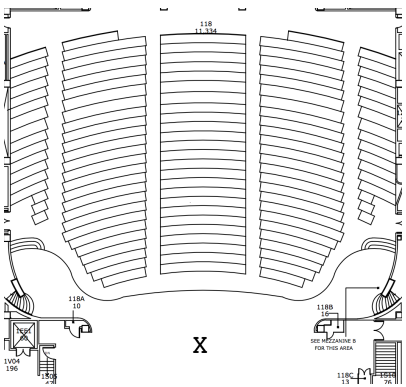

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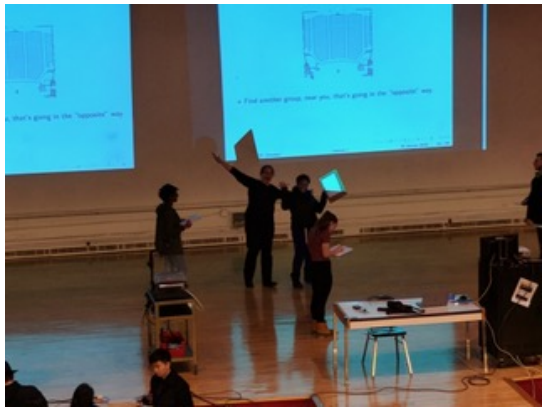
Practice Quiz & Final Questions



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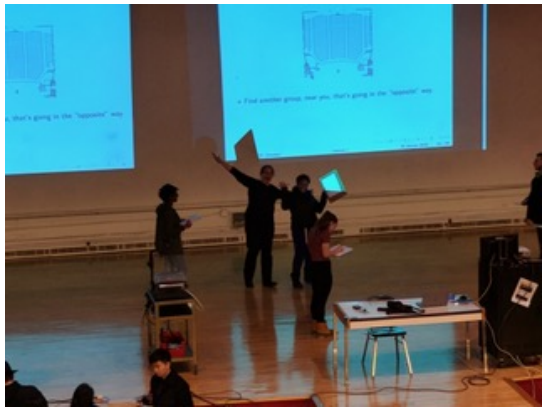

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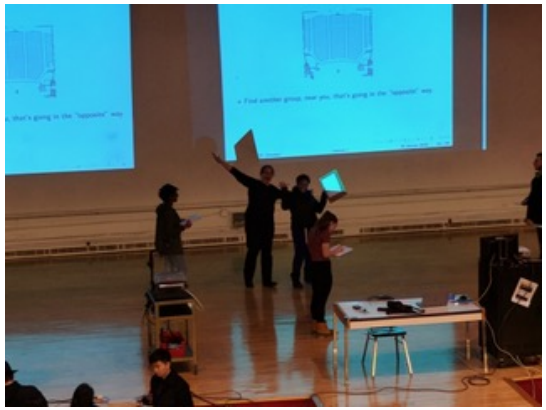

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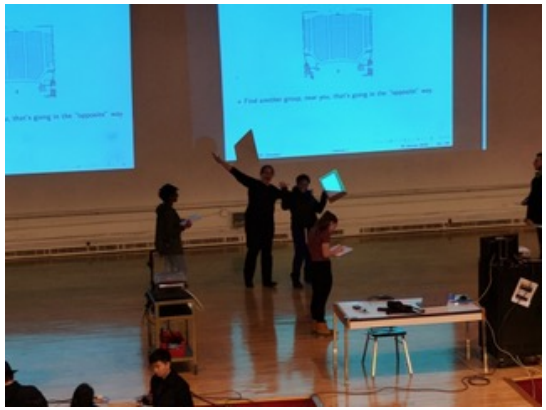

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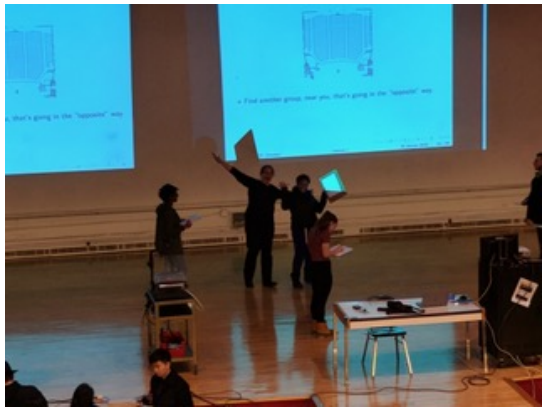

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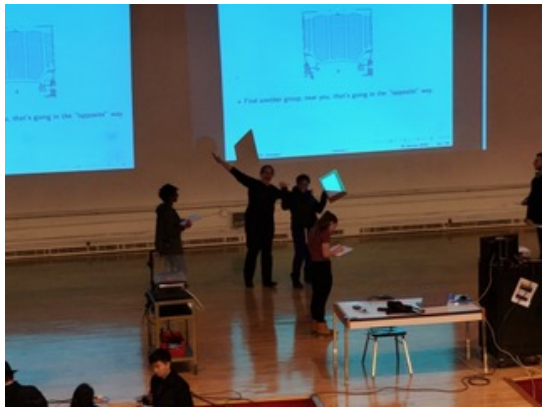

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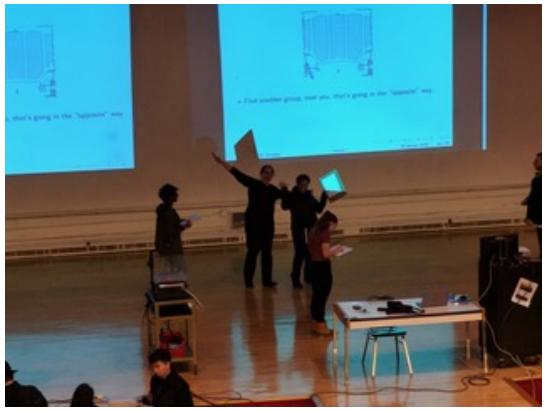

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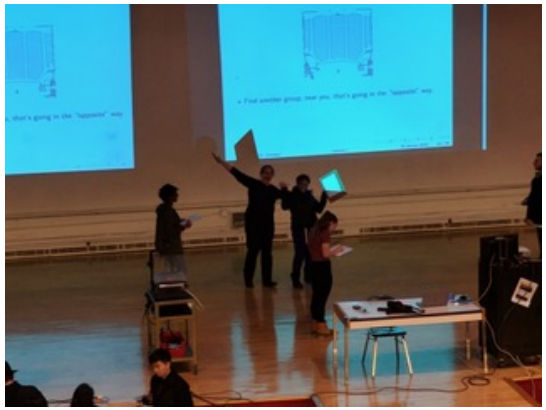

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- We're starting with Fall 2017, Version 1.

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