WELCOME TO

TECHNOVATION

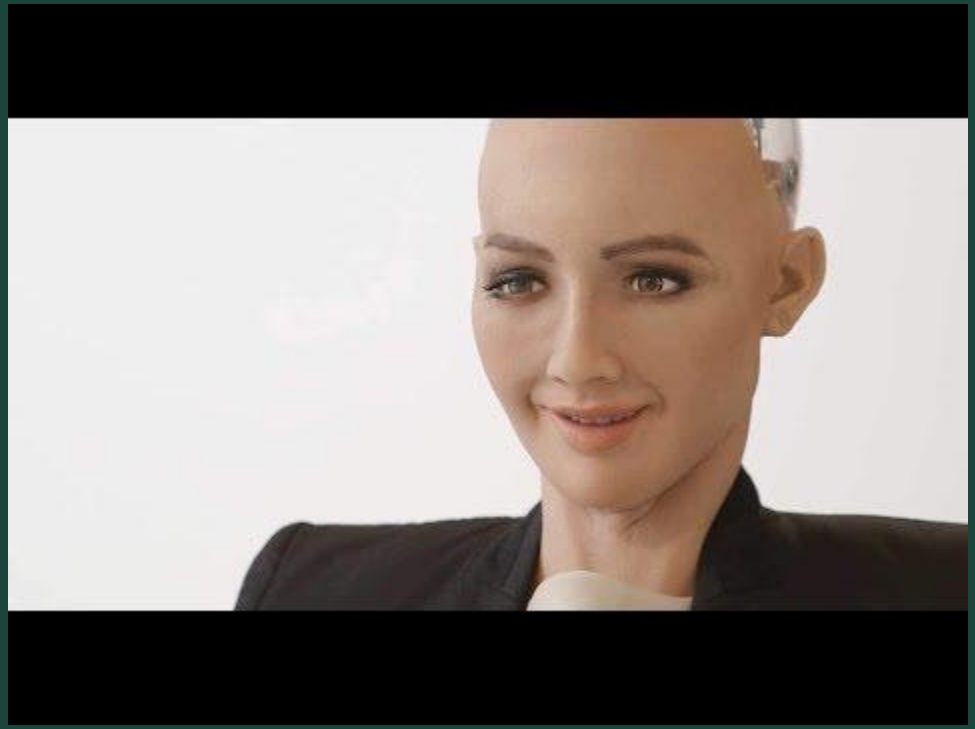
Week 5 - October 22

MICHIGAN STATE UNIVERSITY

Agenda

- Spotlight
- Lesson
  - Functions
- Examples
- Coding challenges
- Attendance and Temperature Check

Spotlight Video!



Artificial Intelligence

- In what ways do you think computer science was used to create Sophia?
- How do you think having a diverse workforce contributed to how Sophia turned out?

Artificial intelligence(AI): the ability for a computer to think and learn. With AI, computers can perform tasks that are typically done by people.

Reviewing Loops!

```
1  circle(20)
2  penup()
3  forward(40)
4  pendown()
5  circle(20)
6  penup()
7  forward(40)
8  pendown()
9  circle(20)
10 penup()
11 forward(40)
12 pendown()
13 circle(20)
14 penup()
15 forward(40)
16 pendown()
17 circle(20)
18 penup()
19 forward(40)
```

For loops help us by:

- shortening our code
- making it easy to alter our code

19 lines to 5 lines!

```
1  Tracy, repeat this code 5 times!
2      circle(20)
3      penup()
4      forward(40)
5      pendown()
```

Reviewing Loops!

```
1  circle(20)
2  penup()
3  forward(40)
4  pendown()
5  circle(20)
6  penup()
7  forward(40)
8  pendown()
9  circle(20)
10 penup()
11 forward(40)
12 pendown()
13 circle(20)
14 penup()
15 forward(40)
16 pendown()
17 circle(20)
18 penup()
19 forward(40)
```

For loops help us by:

- shortening our code
- making it easy to alter our code

Change radius to 50 pixels

```
1  Tracy, repeat this code 5 times!
2      circle(20)
3      penup()
4      forward(40)
5      pendown()
```

Writing For Loops

```
for i in range (amount of times to repeat):
    Commands to repeat go here (indented!)
```

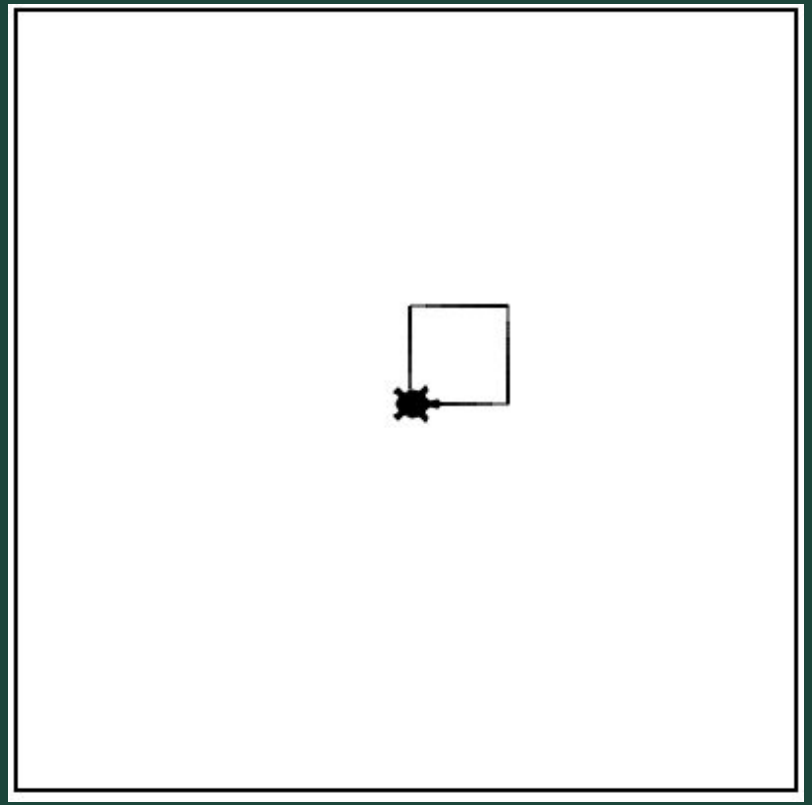
```
1  Tracy, repeat this code 5 times!
2      circle(20)
3      penup()
4      forward(40)
5      pendown()
```

Write loop

```
1  for i in range(5):
2      circle(20)
3      penup()
4      forward(40)
5      pendown()
```

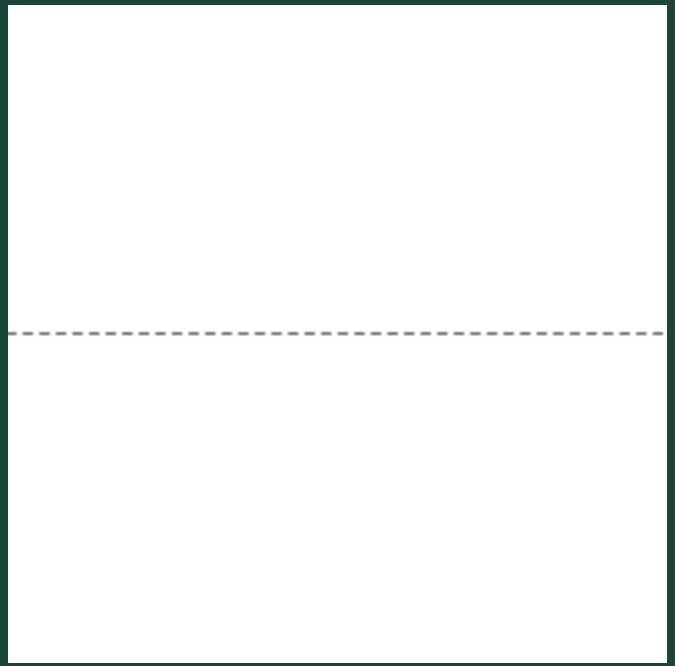
Example #1: Square using for loops

Write a program that has Tracy draw a square with sides of 50 pixels using a for loop.



Example #2: Create a Dashed Line

Using a food loop create a small dashed line across the page. Each dash should be five pixels long with a five pixel gap in between.



Questions?

Look Back at Four Circles

```
1  """
2  This program will draw four circles in a square formation at the center
3  of the canvas. Each circle will have a radius of 50.
4  """
5  speed(5)
6
7  # Move to bottom left of circle group at position (-50,-100)
8  penup()
9  setposition(-50,-100)
10
11 # Draw two circles next to each other
12 for i in range (2):
13     pendown()
14     circle(50)
15     penup()
16     forward(100)
17
18 # Move to top of circle row at position (-50, 0)
19 setposition(-50,0)
20
21 # Draw two circles next to each other
22 for i in range (2):
23     pendown()
24     circle(50)
25     penup()
26     forward(100)
```

Instead, write a function!

What is a Function

Functions are a way to group a set of commands so they can be called with one line of code.

Functions help us teach Tracy new commands using the ones she already knows!

Why Use Functions

Functions help us by:

- Shortening our code
- Making our code reusable
- Making our code more readable

Defining a Function

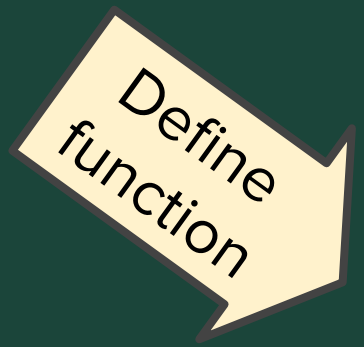
```
def function_name_here():
    function commands here (indented!)
```

Function Name: my_function

Defining a Function Cont.

```
11  # Draw two circles next to each other
12  for i in range (2):
13      pendown()
14      circle(50)
15      penup()
16      forward(100)
```

```
def function_name_here():
    function commands here
```




```
11  # Draw two circles next to each other
12  def draw_two_circles():
13      for i in range (2):
14          pendown()
15          circle(50)
16          penup()
17          forward(100)
```

Calling a Function

```
5  speed(5)
6
7  # This function draws two circles next to each other
8  def draw_two_circles():
9      for i in range (2):
10         pendown()
11         circle(50)
12         penup()
13         forward(100)
14
15 # Move to bottom left of circle group at position (-50,-100)
16 penup()
17 setposition(-50,-100)
18
19 draw_two_circles()
20
21 # Move to top of circle row at position (-50, 0)
22 setposition(-50,0)
23
24 draw_two_circles()
```

To call a function:

function_name()

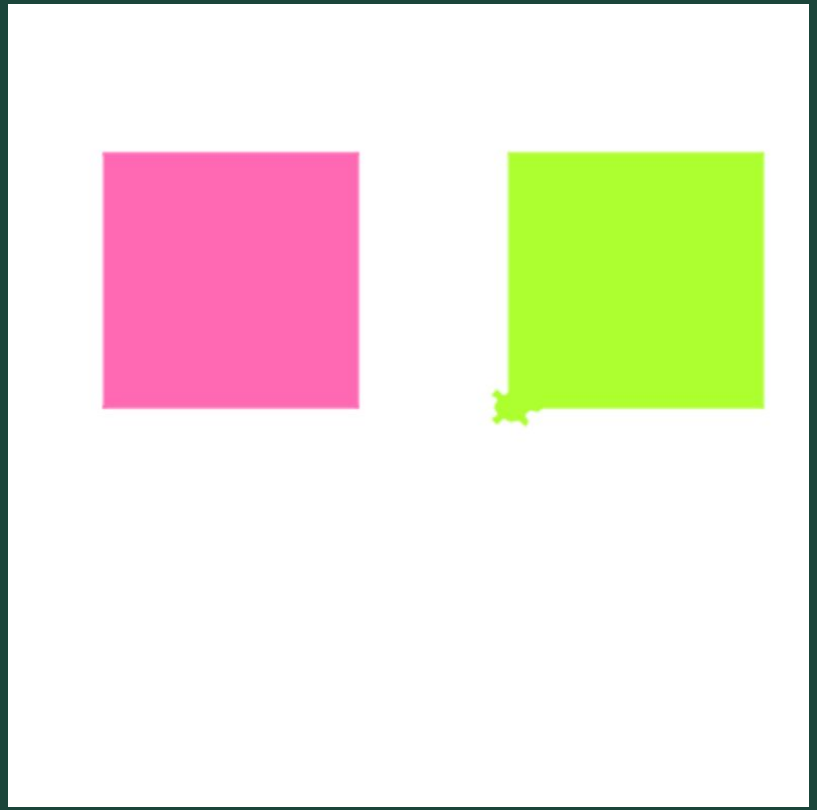
*Reminder! Functions must be defined **before** they are called.

Commands Learned this Lesson

Command	What does it do?
`def function_name():`	Declares a function
`function_name()`	Calls a function

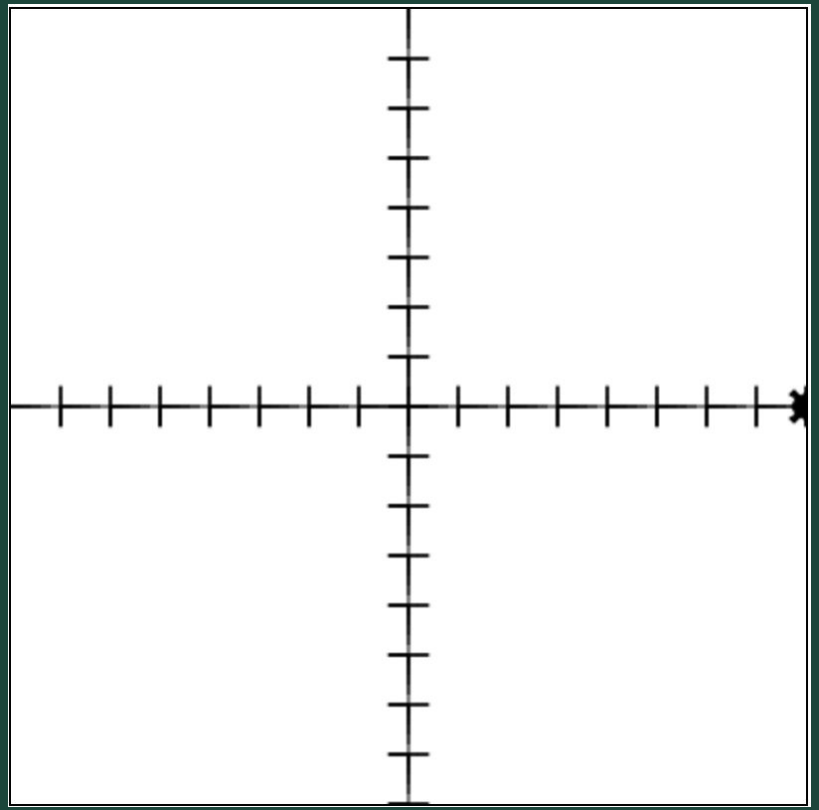
Example #1: Colored Boxes

Using functions, create two squares where each side is 125 pixels. Get creative and fill them in with your favorite colors!



Example #2: Coordinate Plane

Using functions, create a coordinate plane. There should be 25 pixels between each dash. There should be a total of 16 dashes along each axis (1 includes the origin).



Questions?

Coding Time!

- Let’s use today to work on the exercises we haven’t been able to finish!
- Break into our smaller Coding Rooms
- Work at your own pace! Ask questions!
- If you are all caught up, explore the weekly challenges or the Sandbox in CodeHS

Standup

- Do you want to have short personal sessions to ask questions?
- What was an exercise you worked on today?
- What is something you were successful at?
- What was a challenge you had while coding?

Attendance and Temperature Check

Attendance

Temperature Check