

Objectives

- Continuing with OOP
- User Interaction
- Animation

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Review: Object-Oriented Programming

- How do we create a new object?
- How do we give commands to/do operations on objects?
- What is the syntax for calling a method on an object?
- What are two types of methods we talked about?
 - How do they work differently?
- What is a benefit of OO programming?

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Using the Graphics Library

- How do we create an instance of a Rectangle?
- Draw the rectangle?
- Shift the instance of the Rectangle class to the **right** 10 pixels
- What are the x- and y- coordinates of the upper-left corner of the Rectangle now?

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`rectangle.py`

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Problem: Draw a Full-Canvas Tic-Tac-Toe Board

- Using the Graphics API
- Make lines purple with line width 3
- The width and height of the canvas is 200

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`tictactoe.py`

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Modification to Tic-Tac-Toe

- **clone** a vertical line and horizontal line and shift appropriately
- Why clone?
 - Maintain the same properties (color, line-width, length)
 - Simplifies code

tictactoe_clone.py

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Getting Input from the User

- `<GraphWinObj>.getMouse()`
 - Returns the user's mouse click as a **Point** object
- Entry objects
 - Get text from user

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Problem

- Create a program where the user tells you where to draw a line
 - What do you need from the user?
 - What do you need to create a line?

userDraw.py

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Problem: Circle Shift

- Move a circle to the position clicked by the user
 - Repeat five times

circleShift.py

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Animation

- Use combinations of the method **move** and the function **sleep**
 - Need to **sleep** so that humans can see the graphics moving
 - Computer would process the **moves** too fast!
- **sleep** is part of the **time** module
 - takes a float representing *seconds* and pauses for that amount of time

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`animate.py`
`fenway.py`

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Examples of Animation

- From Previous Classes

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Problem: Animate Moving to User Click

- Use combinations of the method **move** and the function **sleep**
 - Need to **sleep** so that humans can see the graphics moving
 - Computer would process the **moves** too fast!
- **sleep** is part of the **time** module
 - Takes a `float` parameter representing *seconds* and pauses for that amount of time

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Problem: Animate Moving to User Click

- In X steps, move from the circle's current location to the location clicked by user

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Looking Ahead

- Lab 3 tomorrow
- Broader Issue: Self-Driving Cars