

CS21: INTRODUCTION TO COMPUTER SCIENCE

Prof. Mathieson

Fall 2017

Swarthmore College

Informal quiz (discuss with a partner)

- 1) `c` is an _____ of the `Circle` _____.
- 2) `GraphWin(..)`, `Point(..)`, and `Circle(..)` are all _____.
- 3) `width/2`, `height/2`, "white", "blue" are all _____.
- 4) `setFill(..)`, `setOutline(..)`, and `draw(..)` are all _____ not _____.

```
width = 600
height = 600
win = GraphWin("Random Circles", width, height)
win.setBackground("white")

p = Point(width/2, height/2)
c = Circle(p, 10)
c.setFill("blue")
c.setOutline("blue")
c.draw(win)
```

argument
parameter
constructor
function
instance
type
class
method
object

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- 4) `setFill(..)`, `setOutline(..)`, and `draw(..)` are all *methods* not *functions*.

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Outline Oct 4:

- Recap OOP vocabulary
- Continue graphics
- User clicks
- Getters and setters
- Moving box program (**box.py**)
- Falling snow program (**snow.py**)

Notes

- **Quiz 2** this **Friday** (let me know if you have conflicts)
- **Lab 4** due **Saturday** night
- **Office Hours 3-5pm on Friday (or by appointment)**

Continue Graphics

GraphWin class

- **GraphWin(title, width, height)** – constructs a new graphics window (default width and height are both 200)
- **setBackground(color)** – set the background color
- **close()** – closes the window
- **getMouse()** – waits for the user to click, returns the click position as a **Point**
- **checkMouse()** – does not wait for the user to click, returns the click position as a **Point**, or None if no position clicked

Methods for all Graphics Objects

- **setFill(color)** – sets the interior color of an object
- **setOutline(color)** – sets the outline color of an object
- **setWidth(pixels)** – sets the outline width (doesn't work for **Point**)
- **draw(window)** – draws the object on the given window
- **undraw()** – removes the object from a graphics window
- **move(dx,dy)** – moves the object dx in the x direction and dy in the y direction
- **clone()** – returns a duplicate (new copy) of the object

Rectangle class

- **Rectangle(point1, point2)** – constructs a rectangle with opposite corners at the given points (upper left, lower right)
- **getCenter()** – returns the center point
- **getP1(), getP2()** – returns a clone of the corner point

User clicks and getters

- **win.getMouse()** waits for the user to click
- It returns the user's click as a **Point**
- We can use that **Point** later on or extract the x and y coordinates using a *getter*

```
click = win.getMouse()
print(click)
x = click.getX() # getter for x coordinate
y = click.getY() # getter for y coordinate
print(x_click, y_click)

c = Circle(click, 10)
center = c.getCenter() # getter (what is the type of center?)
```

Programs for today

Work with a partner on one computer!

- *Pair programming* is frequently used in upper level CS classes and afterward in industry/academia
- One person is the *driver* at the keyboard (typing)
- The other person is the *navigator* who is providing advise, feedback, etc.
- Switch frequently between roles, email code at the end of class

- **cs21/inclass/week05/box.py** (first)
- **cs21/inclass/week05/snow.py** (second)