Some Graphics

CS303E: Elements of Computers and Programming

August 6, 2012

Announcements

Test FRIDAY

- Same time
- Same place

Sample Programs

- Python
- C
- Perl
- Java

Some Graphics

- Very Brief Taste
- Uses Zelle's graphics module
  - Download from his website
  - Put in same directory as your program

Graphics Objects

- Recall that in object-oriented programming objects consist of:
  - Data
  - Actions on that data
- To use the graphics packages you:
  - Create objects
  - Perform actions on those objects

Example: A Possible Circle Object

- Data
  - center = (20,20)
  - radius = 10
  - interior_color = "blue"
  - outline_color = "green"
- Operations
  - Draw myself
  - Move myself
  - Set interior color
  - Set outline color

Windows

- Graphics objects are drawn on *windows*
  - Windows are also objects
  - A single program can create multiple windows
- Created using the `GraphWin()` object

GraphWin() Objects

- `GraphWin(title, width, height)`
  - Constructs a new graphics window
  - All parameters are optional
  - Default size is 200x200
- `setBackground(color)`
  - Sets window's background to a color
  - Options: red, cyan, green, blue, purple, yellow
- `getMouse()`
  - Pause for a mouse click in the window, and return the Point at which it was clicked
- `close()`

Example: Creating a Window

```
from graphics import *

win = GraphWin()
win2 = GraphWin("Second",300,300)
```

Point Objects

- Often used to define the position of other objects
- Can also be drawn on the window

Points Objects: Operations

- `Point(x,y)`
  - Construct a point with the specified coordinates x and y
- `getX()`
  - Returns the x coordinate of the point
- `getY()`
  - Returns the y coordinate of the point
- AND all the operations for *drawable objects*

Drawable Objects

- A category of objects that are drawable
- All drawable objects implement all the drawable operations
- Includes: Point, Line, Circle, Oval, Rectangle, …

Drawable Objects: Operations

Method	Description
`setFill(color)`	Sets the interior color of the object to the specified color
`setOutline(color)`	Sets the outline of the object to the specified color
`setWidth(pixels)`	Sets the width of the object's outline to the specified number of pixels
`draw(graphicWindow)`	Draws the object on the specified graphics window
`undraw()`	Undraws the object
`move(dx,dy)`	Moves the object dx units in the horizontal direction and dy units in the vertical directions

Example: Point Objects

```
pt=Point(15,55) #construct a
                #point with
                #x=15, y=55
pt.setOutline("purple")
pt.draw(win) #draw point on
             #the window win
```

iClicker Question

Which is a Boolean value?

A. True
B. true
C. "True"
D. "true"

Circle Objects

- A `Circle` is defined by its center coordinates (given as a `Point`) and its radius
- Operations:
  - `Circle(centerPoint, radius)`
    - Constructs a circle with a specified center point and radius
  - `getRadius()`
    - Returns the radius of the circle

Example: Circle Objects

```
cir=Circle(Point(50,100), 25)
  #center=(50,100), radius=25
cir.setFill("yellow") #set
        #interior to yellow
cir.draw(win)  #draw circle on
               #window win
```

Line Objects

- Specified by two points
- Operations:
  - `Line(point1, point2)`
    - Construct a line from `point1` to `point2`
  - `setArrow(<string>)`
    - Set arrow status of the line.
    - Possible values for `<string>` are: first, last, both, or none.

Example: Line Objects

```
diag = Line(Point(0,0),Point(200,200))
  #line from top left to bottom right
diag.setWidth(15) #increase thickness
diag.setOutline("blue") #make it blue
diag.draw(win) #draw line on window win
```

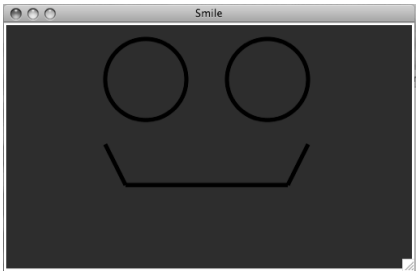
Rectangle Objects

- Draws a rectangle
- Operations
  - Rectangle(point1, point2)
    - Constructs a Rectangle with opposite corners point1 and point2

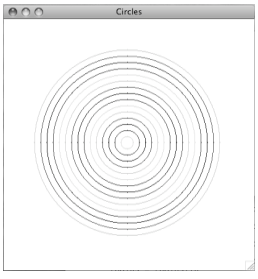
Example: Rectangle Objects

```
rec1 = Rectangle(Point(3,4),Point(8,10))
rec1.setFill("green")
rec1.draw(win)
```

Exercise



Exercise



iClicker Question

I'll come to class Wednesday prepared to:

A. Take an exam
B. Ask questions to review for the exam
C. Sleep