Calico Graphics

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Introduction to Computing
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Introducing "Objects"

- Objects are "things" (often nouns) in computing
- They know how to do things (verbs) and have attributes (properties)
- We can refer to properties and tell objects to do things by using the DOT (period):
    - garth.turnLeft(1, 2)
    - jane.turnLeft(1, 3)
    - robot1.name
- Verbs are just functions, but we call them "methods"

Objects

- Objects are defined by a "Class"
  - Similar to a recipe – it describes how to make one
  - Sometimes called a "type"
- When you make a object from a Class (by calling it), you create an "instance" of that Class/type
- You can make an instance do something by calling a function attached to the object
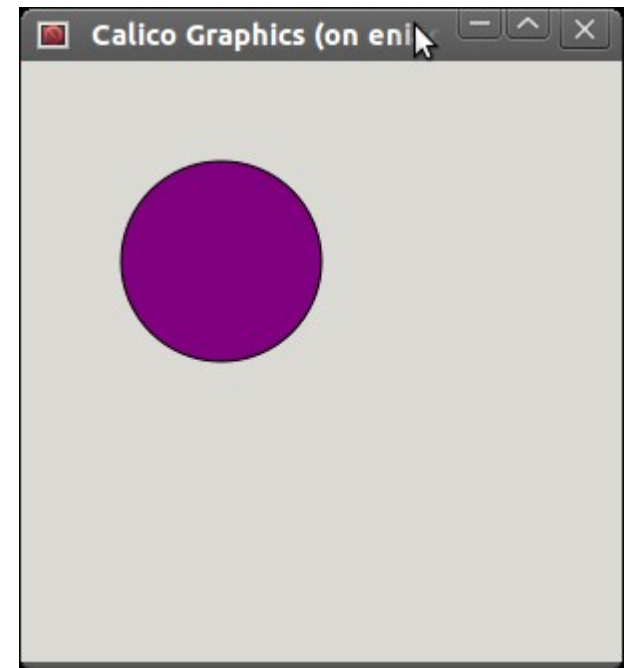- These functions are called "methods" and are attached to an instance via a dot

Creating Graphical Objects

from Graphics import *

win = Window()
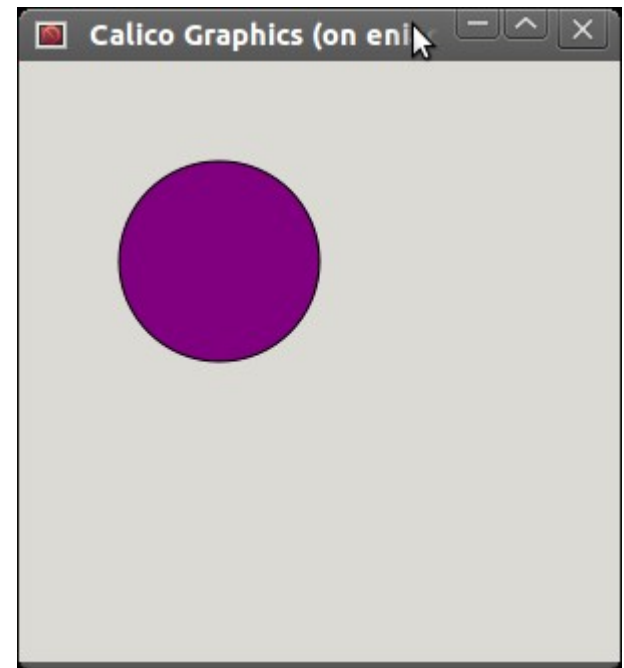circle = Circle((100, 100), 50)
circle.draw(win)

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Class

instance

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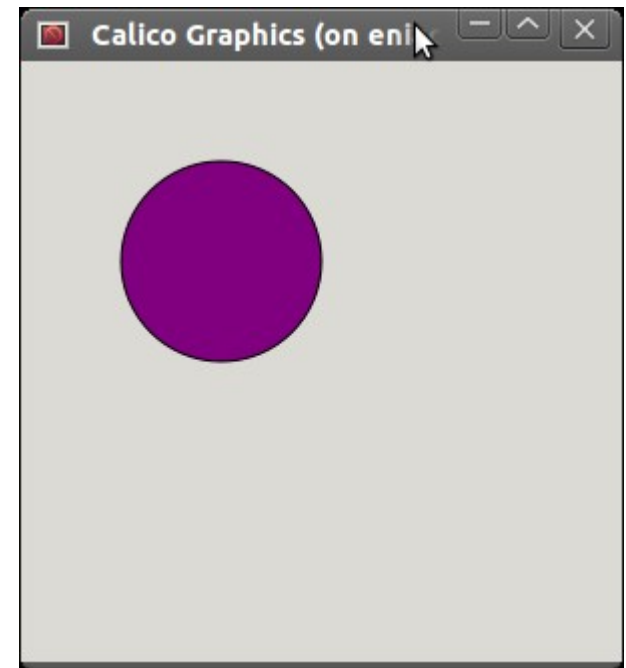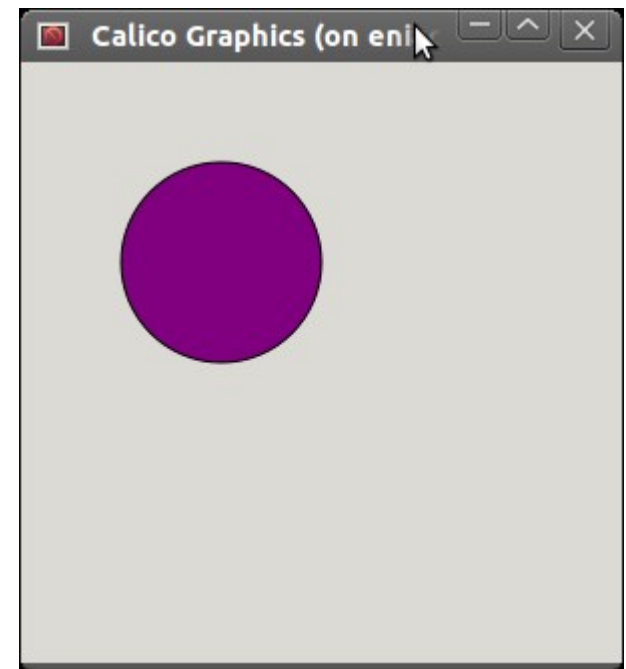circle = Circle((100, 100), 50)
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instances

method

Point

- Point – Point(x, y), (x, y), [x, y], Point(Point)
  - p1 = Point(100, 100)
  - p2 = (100, 100)
  - p3 = [100, 100]
  - p4 = Point(p1)
- You don't draw points... they are used internally for creating Graphics Shapes

Color

- Color – Color(r, g, b), Color(colorname), Color(webcolor)
  - c1 = Color(128, 128, 128)
  - c2 = Color("red")
  - c3 = Color("#00FF00")
- Use getColorNames() to see all 147 named colors
- Use one of these wherever you need a color on a Shape (such as color, fill, or outline)

Graphics Shapes

Shape

- Circle
- Line
- Curve
- Arrow
- Picture
- Rectangle
- RoundedRectangle
- Polygon
- Dot
- Oval
- Pie
- Arc
- Frame
- Text

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Constructor

- Circle(Point, radius)
- Line(Point1, Point2)
- Curve(Point1, Point2, Point3, Point4)
- Arrow(Point), Arrow(Point, direction)
- Picture(width, height), Picture(filename), Picture(url)
- Rectangle(Point, Point)
- Rectangle(Point, Point, radius)
- Polygon(Point1, Point2, ...)
- Dot(Point), Dot(x, y), Dot(Dot)
- Oval(Point, xradius, yradius)
- Pie(Point, radius, start, stop)
- Arc(Point, radius, start, stop)
- Frame(Point), Frame(x, y)
- Text(Point, string)

Shape Methods
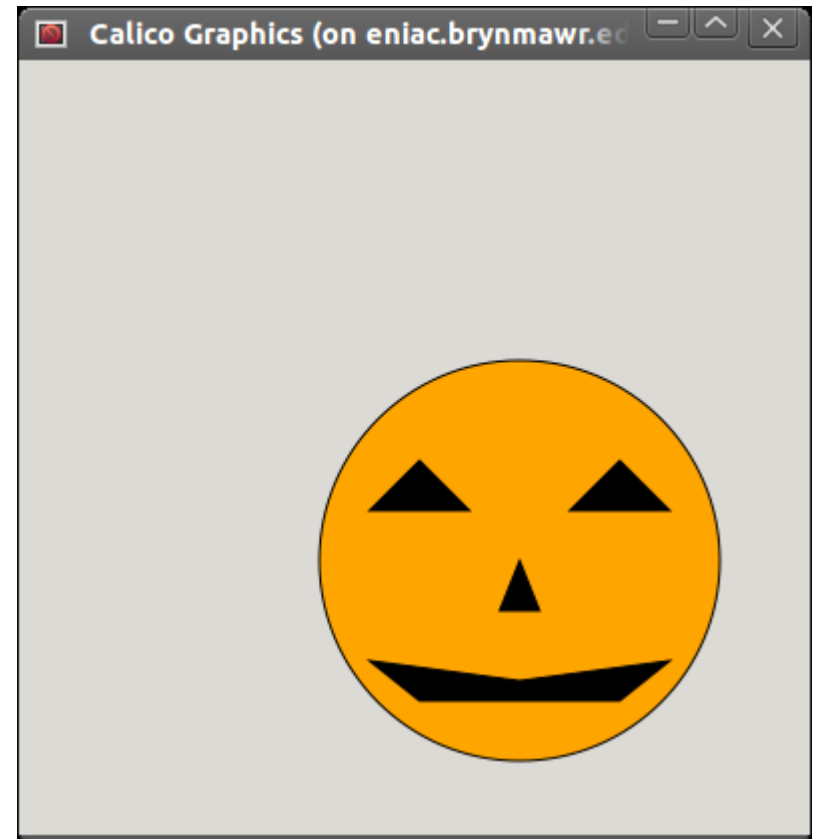
- shape = Shape(...)
- shape.draw(Window)

- shape.moveTo(x, y), shape.move(dx, dy)
- shape.scaleTo(s), shape.scale(ds)
- shape.rotateTo(d), shape.rotate(dd)

Shape Properties

- shape.color= Color("green")

- shape.fill = Color("silver")

- shape.outline = Color("blue")

- shape.x = 100

- shape.y = 80

Example

```
from Graphics import *
win = Window(600,600)
pumpkin = Circle((250,250), 100)
pumpkin.fill = Color("orange")
pumpkin.draw(win)
eye1 = Polygon((175, 225), (225,225),(200,200))
eye1.fill = Color("black")
eye1.draw(win)
eye2 = Polygon((275, 225), (325,225), (300,200))
eye2.fill = Color("black")
eye2.draw(win)
nose = Polygon((250, 250), (240, 275), (260, 275))
nose.fill = Color("black")
nose.draw(win)
mouth = Polygon((175, 300), (200,320), (300, 320),
                (325,300), (250,310))
mouth.fill = Color("black")
mouth.draw(win)
```

Example