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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Point

- Point – Point\((x, y)\), \((x, y)\), \([x, y]\), Point(Point)
  - \(p1 = \text{Point}(100, 100)\)
  - \(p2 = (100, 100)\)
  - \(p3 = [100, 100]\)
  - \(p4 = \text{Point}(p1)\)
- 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
# Graphics Shapes

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<th>Shape</th>
<th>Constructor</th>
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<tr>
<td>Circle</td>
<td>Circle(Point, radius)</td>
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<tr>
<td>Line</td>
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<tr>
<td>Pie</td>
<td>Pie(Point, radius, start, stop)</td>
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<td>Arc</td>
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<tr>
<td>Frame</td>
<td>Frame(Point), Frame(x, y)</td>
</tr>
<tr>
<td>Text</td>
<td>Text(Point, string)</td>
</tr>
</tbody>
</table>
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`
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)