

Warm up discussion problem:

After years of diligent honing of your puzzle-solving skills, you are finally rewarded with a position at the prestigious Princeton Institute for Advanced Studies. Unfortunately, it is as a cook, but you have to start somewhere.

One December morning after a particularly heavy snow storm, the power fails. Fortunately, there is still an old wood stove with which you can prepare most of the professors' breakfasts. However one eccentric Mathematics professor with a great deal of power and influence at the institute has a peculiar breakfast item which now poses a problem. He likes a single egg boiled for exactly nine minutes.

You aren't wearing your watch, and all the clocks in the building are electric. You are able to find two exquisite hourglasses, able to precisely measure time for seven and four minutes, respectively.

Using only these two hourglasses can you accurately cook the professor's 9-minute egg?

Workshop:

Objects and Graphics

1. Pick an example of an interesting real-world object and describe it as a programming object by listing its data attributes (what it "knows"), and its methods (what it can "do").
2. Describe in your own words the objects produced by each of the following objects from the `graphics` module. Be sure to mention such things as the size, position and appearance. Draw a sketch of each one (including the bounding window).

```
(a) win = GraphWin()
    p1 = Point(130,130)
    p2 = win.getMouse()
    l = Line(p1, p2)
    l.draw(win)
    l.move(p2.getX()-p1.getX(), p2.getY()-p1.getY())
```

```
(b) c = Circle(Point(30,40),25)
    c.setFill('blue')
    c.setOutline('red')
```

```
(c) r = Rectangle(Point(20,20), Point(40,40))
    r.setFill(color_rgb(0,255,150))
    r.setWidth(3)

(d) o = Oval(Point(50,50), Point(60,100))

(e) shape = Polygon(Point(5,5), Point(10,10), Point(5,10), Point(10,5))
    shape.setFill('orange')

(f) t = Text(Point(100,100), "Hello World!")
    t.setTextColor("blue")
    t.setFace("courier")
    t.setSize(16)
    t.setStyle("italic")

(g) e_p = Point(100, 100)
    e = Entry(e_p, 20)
    e.setText("Enter something")
    e.draw(win)
print(e.getText())
```

3. Write a program that draws some sort of face.
4. Write a program that displays information about a rectangle drawn by the user.
Input: two mouse clicks for the opposite corners of the rectangle.
Output: draw the rectangle. Print the perimeter and area of the rectangle.
5. Write a program that displays information about a triangle.
Input: three mouse clicks for the vertices of a triangle.
Output: draw the triangle. Print the perimeter of the triangle (search for the distance formula of two points in the Cartesian plane if you don't remember it).