PRACTICE WITH FUNCTIONS – SOLUTIONS
CS 125

1. Write a function `areaOfRectangle(height, width)` that returns the area of a rectangle with dimensions `height` and `width`.

```
def areaOfRectangle(height, width):
    return height*width
```

2. Write a function that computes and returns the distance between two points on the earth given the longitude and latitude of both points. You function should be called `earthDist(t1, g1, t2, g2)`, where (`t1`, `g1`) is the latitude and longitude of the first point, and (`t2`, `g2`) is the latitude and longitude of the second point. Use the formula

$$\text{distance} = 6371.01 \times \arccos(\sin(t_1)\sin(t_2) + \cos(t_1)\cos(t_2)\cos(g_1 - g_2))$$

In the formula, 6371.01 is the average radius of the earth in kilometers, and kilometers are the units of the computed distance. Make sure you convert the input values from degrees to radians before using the trig functions in the math module.

```
import math

def earthDist(t1, g1, t2, g2):
    sines = math.sin(math.radians(t1)) * math.sin(math.radians(t2))
    cosines = (math.cos(math.radians(t1)) *
       math.cos(math.radians(t2)) * math.cos(math.radians(g1 - g2)))
    return 6371.01 * math.acos( sinces + cosines )
```

3. Write a function `drawPolygon(anyTurtle, numSides, sideLength)` that makes a turtle draw a regular polygon with the specified number of sides and side length. Use your function to draw four different polygons on the screen.

```
import turtle

def drawPolygon(anyTurtle, numSides, sideLength):
    for i in range(numSides):
        anyTurtle.forward(sideLength)
        anyTurtle.left(360/numSides)


wn = turtle.Screen()
ted = turtle.Turtle()
drawPolygon(ted, 4, 30)
ted.up()
ted.forward(50)
ted.down()
```

```
    drawPolygon(ted, 6, 20)
    #continue drawing polygons...
```

4. Write a function `drawHexagon(anyTurtle, sideLength)` that calls your `drawPolygon` function from the previous question to have a turtle draw a regular hexagon. Use your function to draw six nested hexagons on the screen, like the image at right.
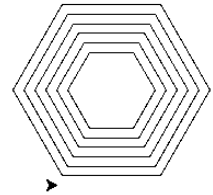
```
import turtle

def drawHexagon(anyTurtle, sideLength):
    drawPolygon(anyTurtle, 6, sideLength)

wn = turtle.Screen()
ted = turtle.Turtle()

for i in range(6):
    drawHexagon(ted, 40 + i*10)
    ted.right(120)
    ted.up()
    ted.forward(10)
    ted.down()
    ted.left(120)
```