Session 2 Python Examples

IDLE 1.2

Review:
Assigning to a variable (note case-sensitivity and no strong typing)

```
>>> xyz = 3
>>> xyz
3
>>> Xyz

Traceback (most recent call last):
  File "<pyshell#2>", line 1, in <module>
    Xyz
NameError: name 'Xyz' is not defined
>>> xyz = "My name is Delvin"
>>> xyz
'My name is Delvin

>>> # define a function to calculate area of a circle
>>> def circleArea(radius):
                  return math.pi*radius*radius

>>> circleArea
<function circleArea at 0x00C4DC70>
>>> circleArea(4)
50.26548245743669
>>> # Is a Papa John’s Extra Large a better deal than the Large?
>>> areaRatio = circleArea(16)/circleArea(14)
>>> priceRatio = 12.99/10.99
>>> areaRatio, priceRatio
(1.306122448979592, 1.1819836214740673)


# ------------ new stuff

# Explore the range() function
>>> list(range(12))
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
>>> list(range(2, 12))
[2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
>>> list(range(2, 12, 3))
[2, 5, 8, 11]
>>> list(range(2, 12, 2))
[2, 4, 6, 8, 10]
>>> list(range(12, 2))
[]
```

```
>>> list(range(12, 2, -1))
[12, 11, 10, 9, 8, 7, 6, 5, 4, 3]
>>> list(range(12, 2, -4))
[12, 8, 4]
```

```
>>> # Simple loops
>>> for i in range(6):
        print(i*i)

0
1
4
9
16
25
>>> [i*i for i in range (2, 20, 2)]
[4, 16, 36, 64, 100, 144, 196, 256, 324]

>>> [sin(i*pi/6) for i in range(12)]
[0.0, 0.49999999999999994, 0.8660254037844386, 1.0, 0.86602540378443871,
0.49999999999999994, 1.2246063538223773e-016, -0.49999999999999972, -
0.86602540378443837, -1.0, -0.8660254037844386, -0.50000000000000044]
>>> [round(sin(i*pi/6),2) for i in range(12)]
[0.0, 0.5, 0.87, 1.0, 0.87, 0.5, 0.0, -0.5, -0.87, -1.0, -0.87, -0.5]
```

Open up a new code window at this point. Save the File as <something>.py.
Place in the window:
5
Run it (F5)
Then do
print 5
run again.
Go back and do both of these things in the interactive window.

Erase the code from the script file.

Graphics:

Now do something like the following. After each new line of code (or enough to get new stuff in the graphics window) run it. Be sure to point out the use of zellegraphics vs. graphics, change p. 126 of text.

```
from zellegraphics import *
win = GraphWin('Our First Graphics Demo' , 700, 500)
line = Line(Point(20, 30), Point(300, 490))
line.draw(win)
thickLine = Line(Point(30, 490), Point(200, 30))
thickLine.setWidth(5)
thickLine.setOutline('red')
thickLine.draw(win)
cir = Circle(Point(500, 100), 70)
cir.draw(win)
```

Now encourage them to add to the program to draw something interesting (for example, a house or a face).

```
>>> for i in range (7):
      cir = Circle(Point(50,50), i*8)
      cir.draw(win)
```

```
# animate movement of a rectangle
rectangle = Rectangle(Point(350, 450), Point(400, 500))
rectangle.setFill('green')
rectangle.draw(win)
import time (You may want to put this at the beginning of the file)
for i in range(300):
       rectangle.move(-1, -1)
       time.sleep(0.01)
```

Draw an interesting picture (10 minutes) that includes at least one loop.
Show it off to people near you.
Get help from other students near you, instructor, and lab assistants as needed.

```
>>> # Work with character strings
>>> "Rose" + "-" + "Hulman"
'Rose-Hulman'
>>> 'Rose-' + 'Hulman'
'Rose-Hulman'
>>> '''I think,
therefore I am'''
'I think,\ntherefore I am'
>>> print 'I think,\ntherefore I am.'
I think,
therefore I am.
>>> print '''I think,
therefore I am'''
I think,
therefore I am
```

Beatles String function example:

```
>>> # Lists of strings
>>> beatles = ['John', 'Paul']
>>> beatles.append('George')
>>> beatles
['John', 'Paul', 'George']
>>> beatles + ['Ringo']
['John', 'Paul', 'George', 'Ringo']
>>> beatles
['John', 'Paul', 'George']
>>> beatles = beatles + ['Ringo']
>>> beatles
['John', 'Paul', 'George', 'Ringo']
>>> beatles[1]
'Paul'
>>> beatles[1][2]
'u'


>>> # More on Strings
>>> franklinQuote = ' Who is rich? He who is content.  Who is content?  Nobody.
'
>>> franklinQuote.strip()
'Who is rich? He who is content.  Who is content?  Nobody.'
>>> franklinQuote.count('Who')
2
>>> franklinQuote.lower().count('who')
3
>>> franklinQuote.title()
' Who Is Rich? He Who Is Content.  Who Is Content?  Nobody.  '
>>> franklinQuote.replace('He', 'She')
' Who is rich? She who is content.  Who is content?  Nobody.  '
>>> franklinQuote.split()
['Who', 'is', 'rich?', 'He', 'who', 'is', 'content.', 'Who', 'is', 'content?',
'Nobody.']
>>> quoteList = franklinQuote.split()
>>> quoteList.reverse()
>>> quoteList
['Nobody.', 'content?', 'is', 'Who', 'content.', 'is', 'who', 'He', 'rich?',
'is', 'Who']


>>> # Decisions, Decisions, Decisions
>>> a = 4
>>> if a < 5:
                  print a + 1

5
>>> if a + 1 < 5:
                  print a
```

```
>>> if a + 1 < 5:
                  print a
else:
                  print a * 2

8
>>> def myAbs(x):
                  if x < 0:
                      return -x
                  else:
                      return x

>>> myAbs(-4), myAbs(2), myAbs(0)
(4, 2, 0)
```