Graphics!

```python
def f(p, q):
    print(2 * q + p)


def g(c, d):
    if c > d:
        print(c - d)
    else:
        print(d - c)
```

```python
def main():
    i = 10
    j = 3
    f(i, j)
    f(j, i)
    g(i * 2, j)
    g(i, i)



# What is the output
# of this program?
```

Using graphics in Python

- Many programming languages include a *library* for computer graphics.

  - A library is a pre-written collection of functions usually centered around a theme (graphics, networking, math, sound, etc)

  - Using libraries (rather than starting from scratch) enables you to write programs faster.

  - Libraries are centered around functions because we know functions are abstractions of algorithms.

The "canvas"

- All graphics in Python are drawn in a separate window called the *canvas*.

- The canvas is laid out similarly to the Cartesian plane, but with a flipped y-axis.
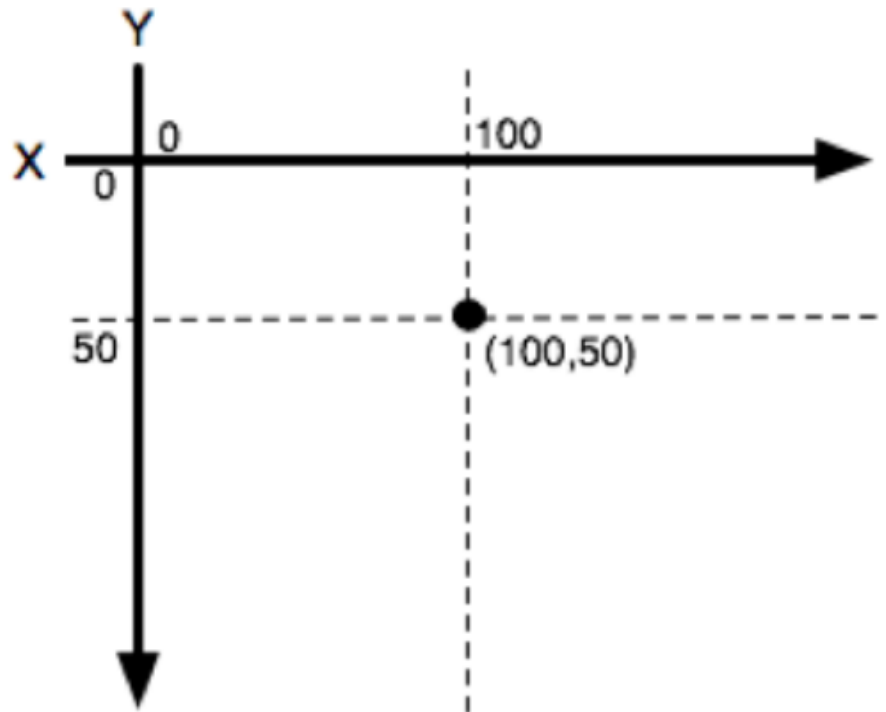
- On the desktop, look for a folder named Lastname_Firstname.
- Inside that folder, make a subfolder called cs141. (From now on, save everything in this cs141 folder!)
- Go to the class webpage (cs.rhodes.edu/141kirlin)
- Under "Resources," right click & save the files `cs1graphics.py` and `simplegraphics.py` *to your cs141 folder!*
- In Python, from now on, when you save a file, save it to this folder.

- Download the files **cs1graphics.py** and **simplegraphics.py**. Save each file into your cs141 folder. Put all your Python files here from now on. This is important!
  - Do this by right-clicking each file and choosing "Save Link As" or something similar.
- Make a new Python file and type in the following program:

```
from simplegraphics import *

def main():
    open_canvas(500, 500)
    draw_circle(250, 250, 50)
    close_canvas_after_click()

main()
```
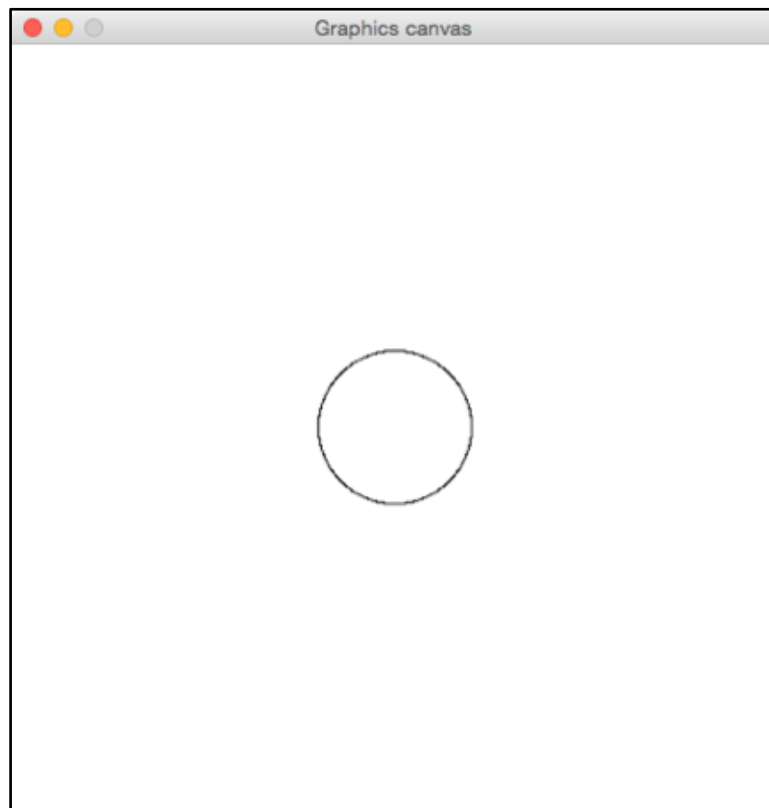
- If you see the picture to the right, you're all set! (Click the window to close it.)
- Experiment with the other functions on the handout.
- Try writing programs to draw the following pictures:
  - a bulls-eye (concentric circles of different colors). Use draw_filled_circle and layer them.
  - a landscape (mountains, trees, houses, a cityscape, or something like that)
  - a self-portrait
  - a depiction of the solar system
  - the Mona Lisa
  - something else of your choice