# Python!



When you click on it, it will bring up the "Python Shell" called IDLE that you see below.

If you don't see the icon, you can type **idle** into the search Windows box:
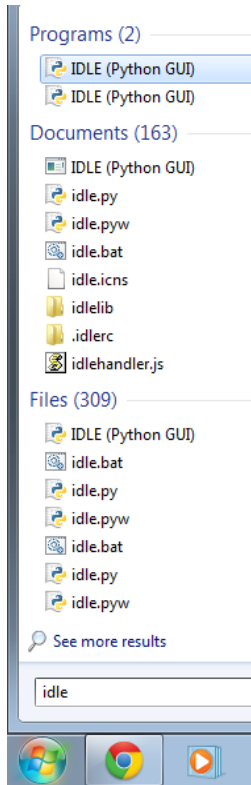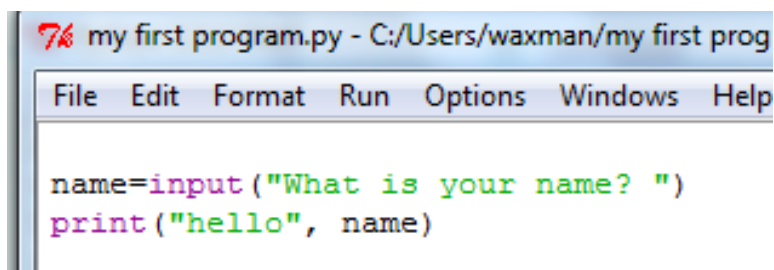


Now click on the IDLE shortcut and Python will start up in the IDLE shell:

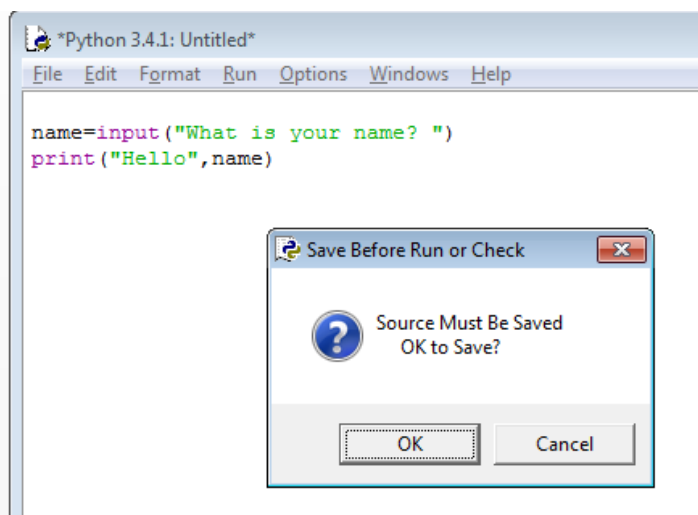**We are now ready to write some Python programs!**

A program is a sequence of Python statements. We will first create a file to hold the program, then will will enter the Python statements. Finally we will instruct Python to run our program. To create the file, click on the "File" button in the IDLE shell:

```
7 Python 3.3.2 Shell
File  Edit  Shell  Debug  Options  Windows  Help
Python 3.3.2 (v3.3.2:d047928ae3f6, May 16 2013, 00:03:43) [MSC v.1600 32 bit (In
tel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> |
```
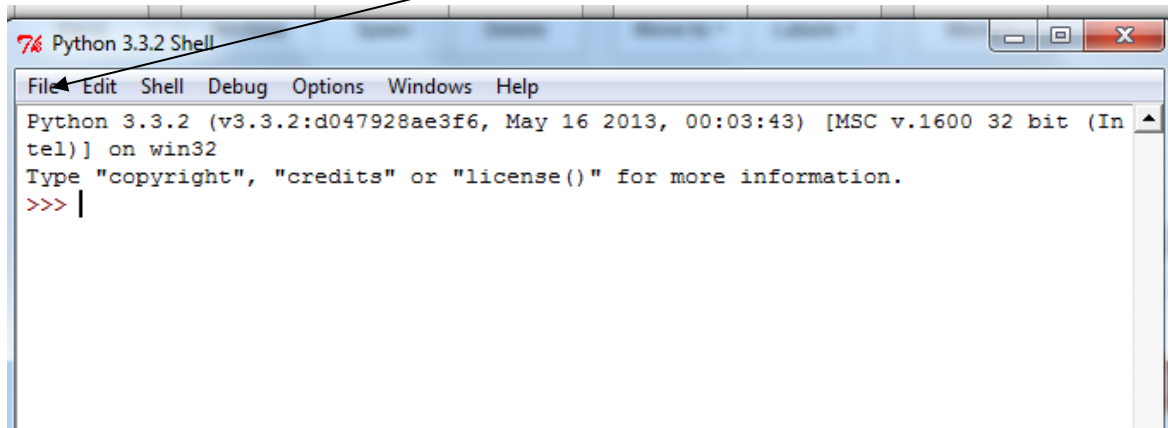
Now enter the program below in the file you just created.

```
7 my first program.py - C:/Users/waxman/my first prog
File  Edit  Format  Run  Options  Windows  Help

name=input("What is your name? ")
print("hello", name)
```

Before we run the proggram we need to save the file. Press F5:

```
*Python 3.4.1: Untitled*
File  Edit  Format  Run  Options  Windows  Help

name=input("What is your name? ")
print("Hello",name)
```

Save Before Run or Check

? Source Must Be Saved
OK to Save?

OK          Cancel

Press OK and give the file a name and press save. The program will run.

Here is a sample run.

```
>>>
What is your name? Jerry
hello Jerry
>>> |
```

Problem: Write a program to ask the user their age in years and have the program tell them their age in minutes. Don't worry about leap years.

Problem: write a program to ask the user for the temperature in Fahrenheit and print out the resulting temperature in centigrade. The formula is:

### How to convert Fahrenheit to Celsius

The temperature $T$ in degrees Celsius (°C) is equal to the temperature $T$ in degrees Fahrenheit (°F) minus 32, times 5/9:

$$T_{(°C)} = (T_{(°F)} - 32) \times 5/9$$

or

$$T_{(°C)} = (T_{(°F)} - 32) / (9/5)$$

or

$$T_{(°C)} = (T_{(°F)} - 32) / 1.8$$
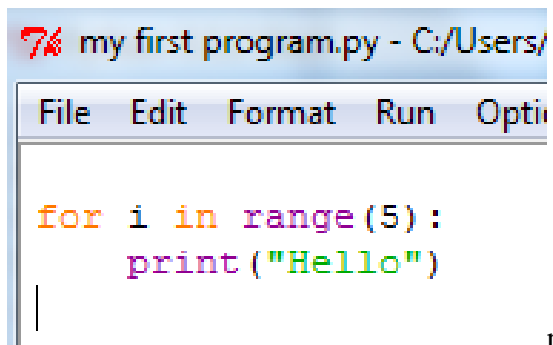
**Example**

Convert 68 degrees Fahrenheit to degrees Celsius:

$$T_{(°C)} = (68°F - 32) \times 5/9 = 20 °C$$

Answer:

Here is an example of looping in Python: (This is an example of "control")
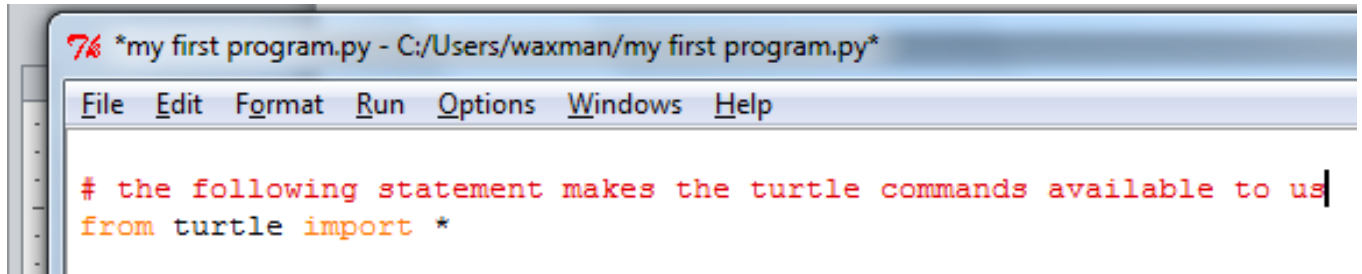
```
76 my first program.py - C:/Users/

File   Edit   Format   Run   Opti

for i in range(5):
    print("Hello")
|
```

prints:

```
>>>
Hello
Hello
Hello
Hello
Hello
>>> |
```

How does the "for loop" work? What does range(5) do? What about "i"?

Let's do some simple graphics with Python! It's called "Turtle Graphics" because we will issue commands to a "turtle".

```
7% *my first program.py - C:/Users/waxman/my first program.py*

File  Edit  Format  Run  Options  Windows  Help

# the following statement makes the turtle commands available to us
from turtle import *
```

**Here are some turtle commands:**

penup()

pendown()

forward(n)  - move n positions in the direction the turtle is pointing

back(n)  - move n positions in the direction opposite the one that the turtle is pointing

right(n) – rotate the turtle n degrees in a clockwise direction

left(n) – rotate the turtle n degrees in a counter-clockwise direction

**Example:**

What will this do?

```
for i in range(10):
    pendown()
    forward(15)
    penup()
    forward(15)
```

Think first, write your answer below then run the program to check your answer.
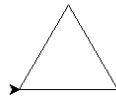
Let's write the following programs:

Write a Python program to draw a square with each side of length 100. Use a loop to do this
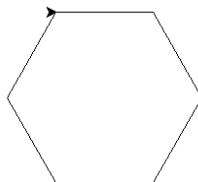
Write a Python program to draw a triangle with each side of length 100. It should look like this:
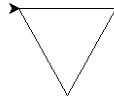
Write a Python program to draw a triangle with each side of length 100. It should look like this:
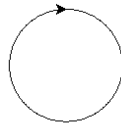
Write a Python program to draw a hexagon with each side of length 100. It should look like this:
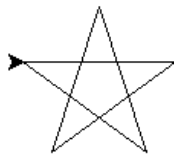
Write a Python program to draw a circle. It should look like this:

Write a Python program to draw a 5 pointed star. It should look like this:

What do you think that this one does? How/why?

```
for i in range(100):
    forward(10+5*i)
    right(120)
```

**Remember, a computer can:**

**Some Python equivalents …**

| input | x=eval(input("Please enter a number")) |
|---|---|
| output | print("You entered", x) |
| memory | y= … something …. |
| process | x=y+1, y=5*x, y=x/15+9 … |
| control | for , if, while .. these statement alter the program flow |

Write a program to ask the "user" how old they are in years. The program should print out how many days they have lived. Assume there are no leap years.

9. Write a program to ask the user for two numbers. Your program should print the following:

```
>>>
Please enter the first number: 3
Please enter the second number: 5
The sum of 3 and 5 is 8
>>>
```

**Here is a more general version. It keeps looping until the user inputs 'done'.**

```
# The Python "sum" program

print("Welcome to the addition program.")

print("You can enter values for x and y and I will calculate ")

print("and display the sum.")
print()  # prints a blank line

x=input("Please enter a value for x (entering 'done' terminates the program): ")

while x !='done':  # this a 'while loop'. It's an example of "control".
    x=int(x)
    y=int(input("Please enter a value for y: "))
    sum=x+y
    print("The sum of ",x," and ",y," is: ",sum)
    print()
    x=input("Please enter a value for x (entering 'done' terminates the program): ")

print()
print("Thanks for trying our program!")
```