Welcome to Introduction to Python

What do you need?

1. Python: https://www.python.org/downloads/
2. PyCharm: http://www.jetbrains.com/pycharm/download/

This software has been downloaded for you on the computers in the lab.

Wi-Fi: OSCON
Password: need update

Who is helping you today?

Aimee Maree : Instructor
Cayci Gorlitsky: Assistant

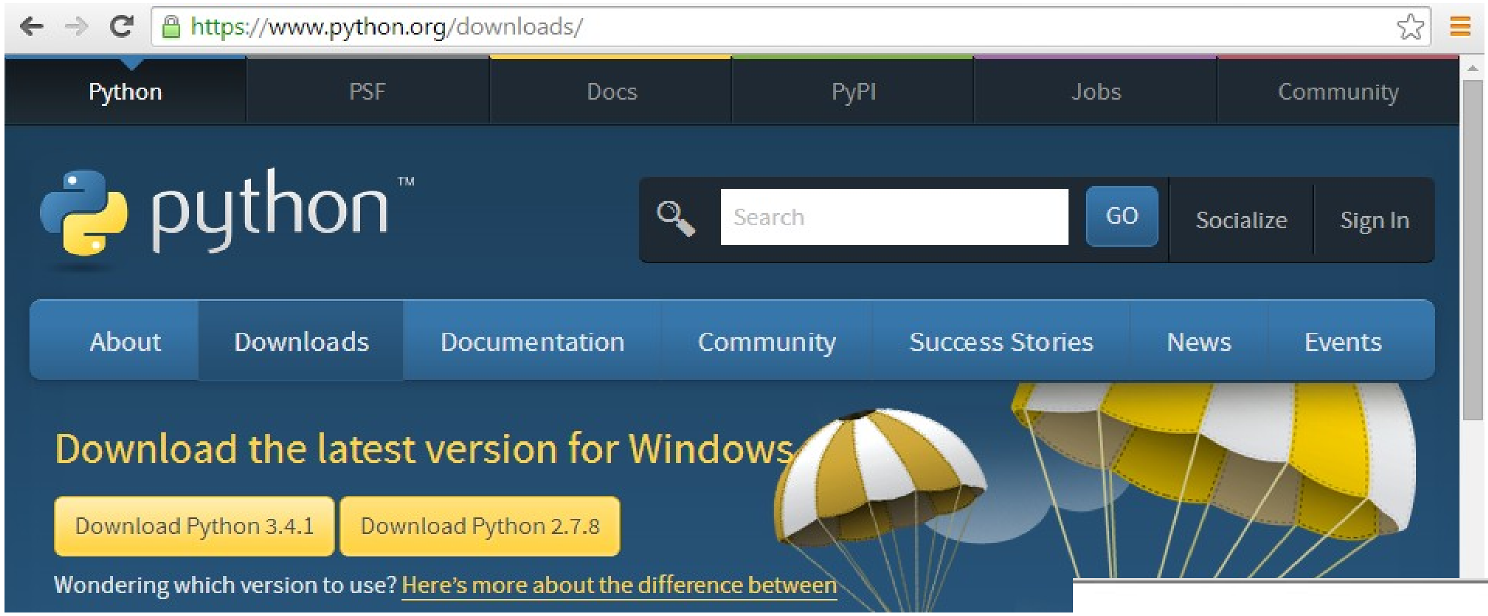
What are we going to do today ?

1. *Python and PyCharm*
2. *Basics of Python Programming*
3. *Input and output statements*
4. *Different data ‘types’*
5. *If and basic logic statements*
6. *Practice Examples!*
7. *Q&A / Showcase*

Python:

Python is a scripting language that can be run on Linux, OSX and Windows.
You can download the latest Python from the website.
Python3 is the latest version and it is always best to start new projects in the latest version.

For today the Computers have Python installed on them for you
If you want to install Python at home it is as easy as visiting
https://www.python.org/downloads/

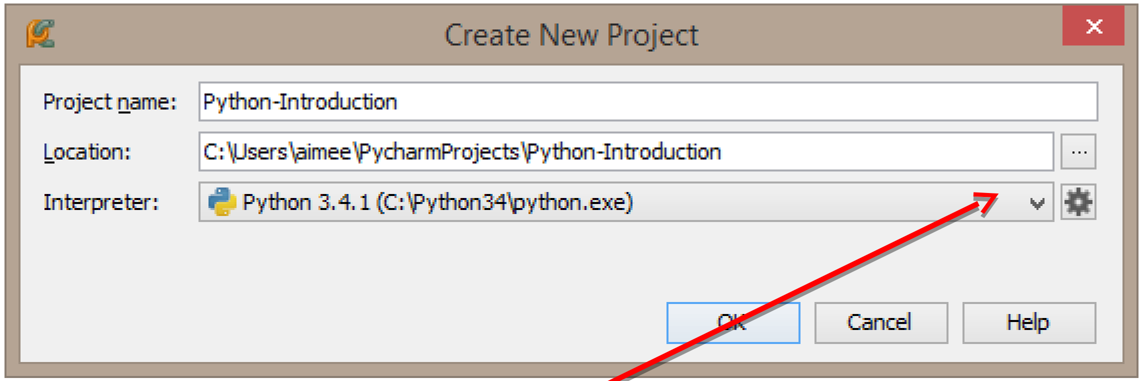


PyCharm:

PyCharm is an IDE (Integrated Development Environment)
We use an IDE because it helps us highlight our code and debug any problems

Because Python needs to be interpreted when we run PyCharm (or an IDE) it will integrate with the Interpreter when we "Debug" or "Run" the code

In an IDE we can create a "Project" this will be a collection of Scripts that we will create
For the purpose of the Tutorial lets create a new Project

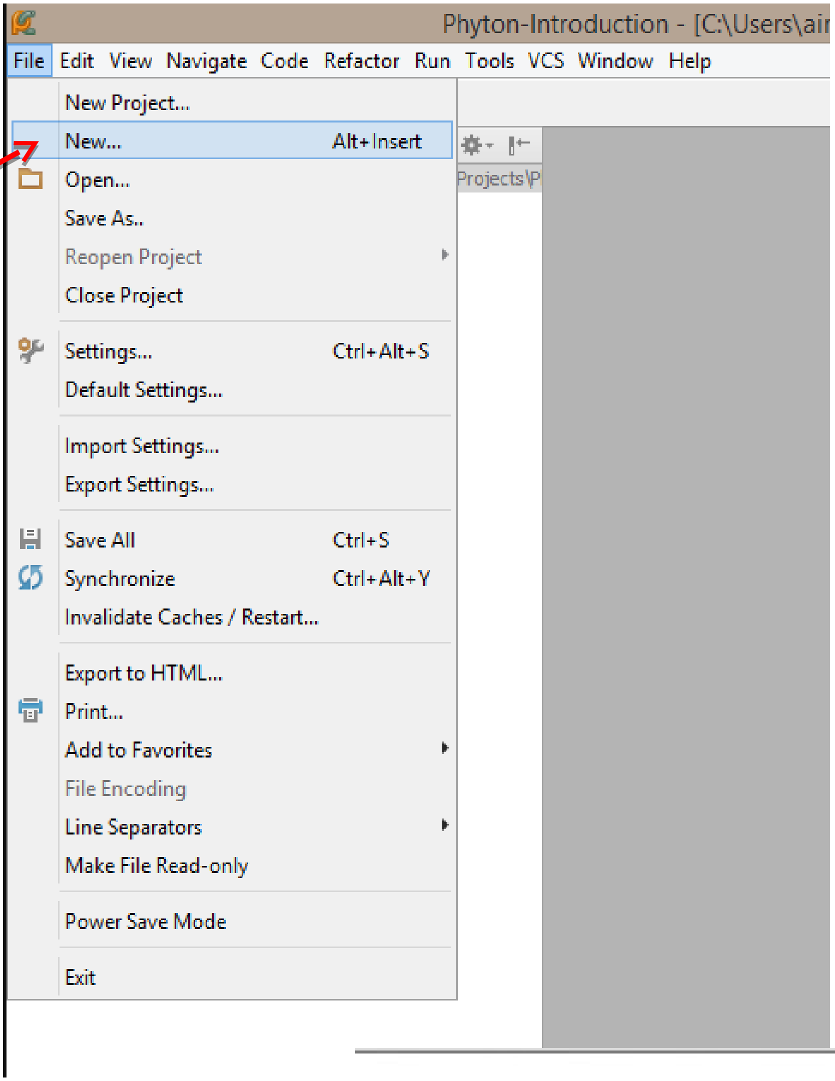


Create New Project

Project name: Python-Introduction
Location: C:\Users\aimee\PycharmProjects\Python-Introduction
Interpreter: Python 3.4.1 (C:\Python34\python.exe)

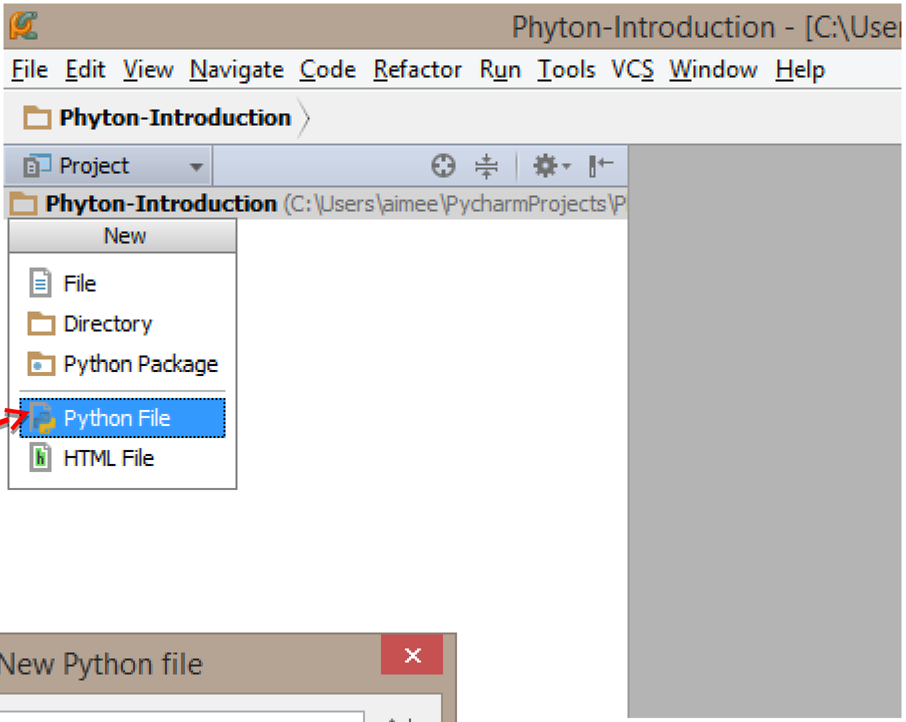
The interpreter should be chosen by default
If you need to change it you can modify it here

Creating your first Python Script:

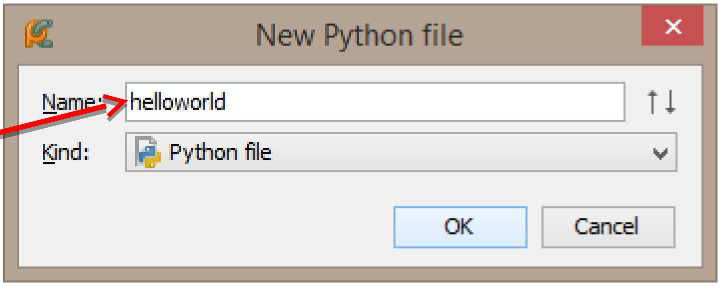


To create a new Python Script
Select "File" from the top menu
and select "New"

Creating your first Python Script:


Phyton-Introduction - [C:\Use
File Edit View Navigate Code Refactor Run Tools VCS Window Help
Phyton-Introduction
Project
Phyton-Introduction (C:\Users\aimee\PycharmProjects\P
New
File
Directory
Python Package
Python File
HTML File

A New box will drop down
Select the “Python File” option



Name: helloworld
Kind: Python file

A “New Python File” box
Will pop-up type in the name
It is always good to name files
Something that will remind you
What they contain.

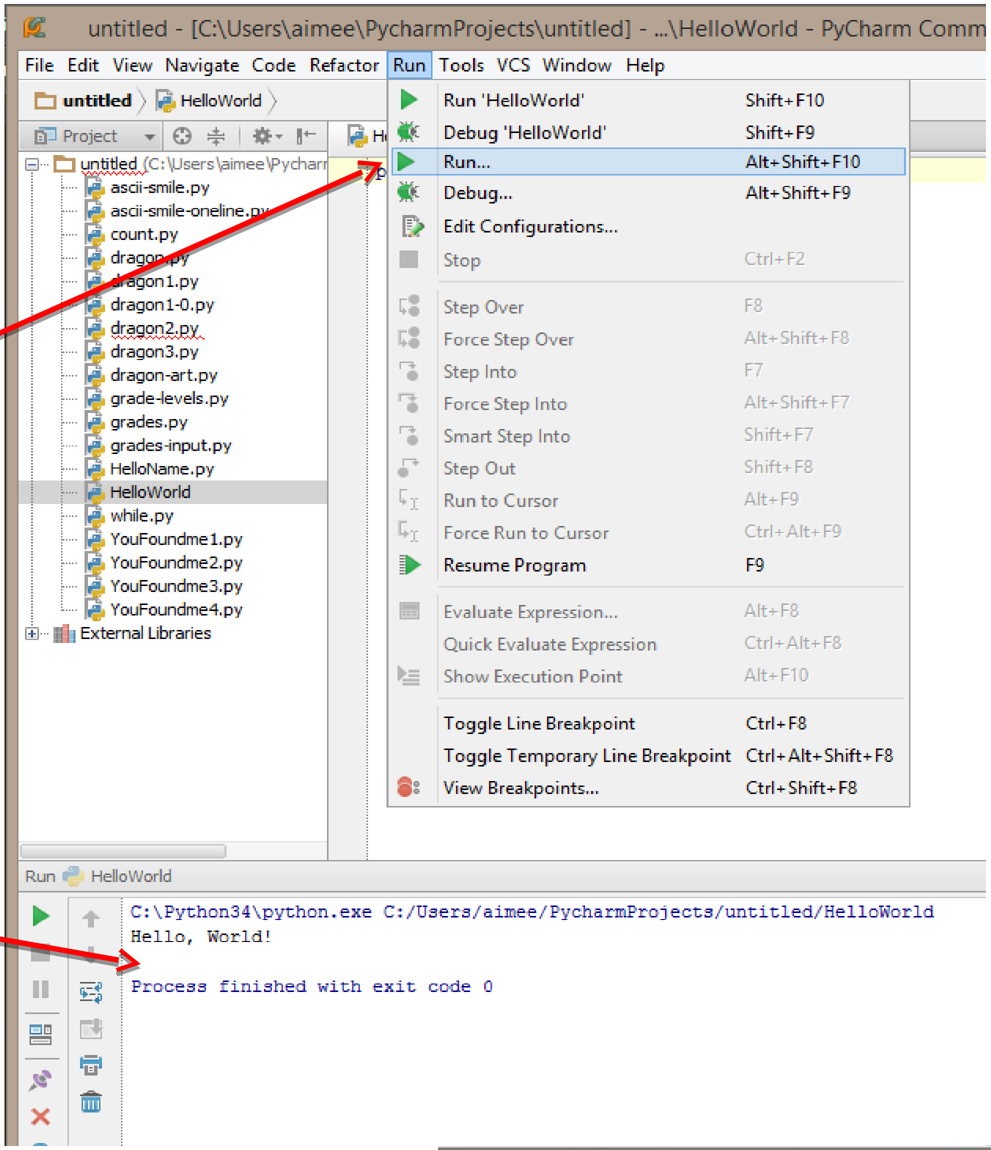
Hello World!

```
#This is our first script
#print tells the interpreter to print the text to the screen
print('Hello, World!')
```

Run Hello World!

Now that we have created our
First Python script we can go
To the menu and select "Run"
And then click on "Run" from
The drop down menu

This will execute the code
In our IDE interpreter console


untitled - [C:\Users\aimee\PycharmProjects\untitled] - ...\HelloWorld - PyCharm Comm
File Edit View Navigate Code Refactor Run Tools VCS Window Help
untitled HelloWorld
Project
untitled (C:\Users\aimee\Pycharm
ascii-smile.py
ascii-smile-oneline.py
count.py
dragon.py
dragon1.py
dragon1-0.py
dragon2.py
dragon3.py
dragon-art.py
grade-levels.py
grades.py
grades-input.py
HelloName.py
HelloWorld
while.py
YouFoundme1.py
YouFoundme2.py
YouFoundme3.py
YouFoundme4.py
External Libraries
Run 'HelloWorld' Shift+F10
Debug 'HelloWorld' Shift+F9
Run... Alt+Shift+F10
Debug... Alt+Shift+F9
Edit Configurations...
Stop Ctrl+F2
Step Over F8
Force Step Over Alt+Shift+F8
Step Into F7
Force Step Into Alt+Shift+F7
Smart Step Into Shift+F7
Step Out Shift+F8
Run to Cursor Alt+F9
Force Run to Cursor Ctrl+Alt+F9
Resume Program F9
Evaluate Expression... Alt+F8
Quick Evaluate Expression Ctrl+Alt+F8
Show Execution Point Alt+F10
Toggle Line Breakpoint Ctrl+F8
Toggle Temporary Line Breakpoint Ctrl+Alt+Shift+F8
View Breakpoints... Ctrl+Shift+F8
Run HelloWorld

```
C:\Python34\python.exe C:/Users/aimee/PycharmProjects/untitled/HelloWorld
Hello, World!

Process finished with exit code 0
```

What we just learned

We ran our first Script.
We printed out some text..

But the main use of programs is to take “inputs” and then turn them into “outputs”

We are going to look at the ways that Python takes in Words and Numbers

And how we can interact with programs

Lets create a script with a variable that holds your name

Then we will get the program to ask you for your name

Hello World!

```
#This is our second script
#First we declare a Variable name
name = ('Aimee')

#here we print the word 'hello' plus the variable name
print('Hello, ' + name)
```

Hello World!

```
#This is our third script
#Lets are the user to input their name
#input tells to computer to take something in
#We also need to tell the user what we need them to enter
name = input('What is your name?')

#here we print the word 'hello' plus the variable name
print('Hello, ' + name)
```

We can create some art with Print

Print is a basic function but we can have some fun with it
Lets see if we can create some ASCII art

ASCII art can be created by printing out the whole
Picture

Or we can be tricky and reduce the lines of Print we use

Print a Smiley face

```
#The \n symbol means print a new line
print ('\n')

#Here we print each line including the spaces of a smiley face
print('**   **')
print('**   **')
print('**   **')
print ('\n')
print('*      *')
print(' *    * ')
print('  ***  ')
```

Print a Smiley face on one line

```
#If we combine the symbols above and print the \n character
#where we need to have a new line we can print the picture
#using one print command
print('**   **\n**   **\n**   **\n\n*     *\n *   * \n  ***  \n')
```

What we learned

The easiest way to replicate a picture is to print the ASCII art line-by-line

However, this is not the most efficient way

Because the interpreter needs to interpret each line separately,
by placing all the code on one line, we reduce the size of our file,
and also the time it takes to execute the code

You will not see much difference with a small program like printing a smiley face.
However, for a professional programmer, saving time on a large application
is very important

In industry, there are people whose specific role is to analyze the performance
of code and help developers make their code run/load faster

Strings and Numbers

In programming languages we declare strings and numbers differently

The reason we do this is because we want to do different things with them

An example of this is comparing strings (letters/words) with upper case and lower case

For numbers we need to calculations on them

Because we want to do calculations we declare whole numbers such as 10 or 100
Different to how we call numbers with decimals places 20.5 and 4.88

input() (Python 3) and raw_input() (Python 2) always return strings.
Convert the result to integer explicitly with int().

Numbers and Operands

When we want to do calculations in Python we need to use operands that the Language understands some basic operands are

+ Addition - Adds values on either side of the operator

2 + 2 will give us 4

- Subtraction - Subtracts right hand operand from left hand operand

5 - 2 will give 3

* Multiplication - Multiplies values on either side of the operator

2 * 2 will give 4

/ Division - Divides left hand operand by right hand operand

4 / 2 will give 2

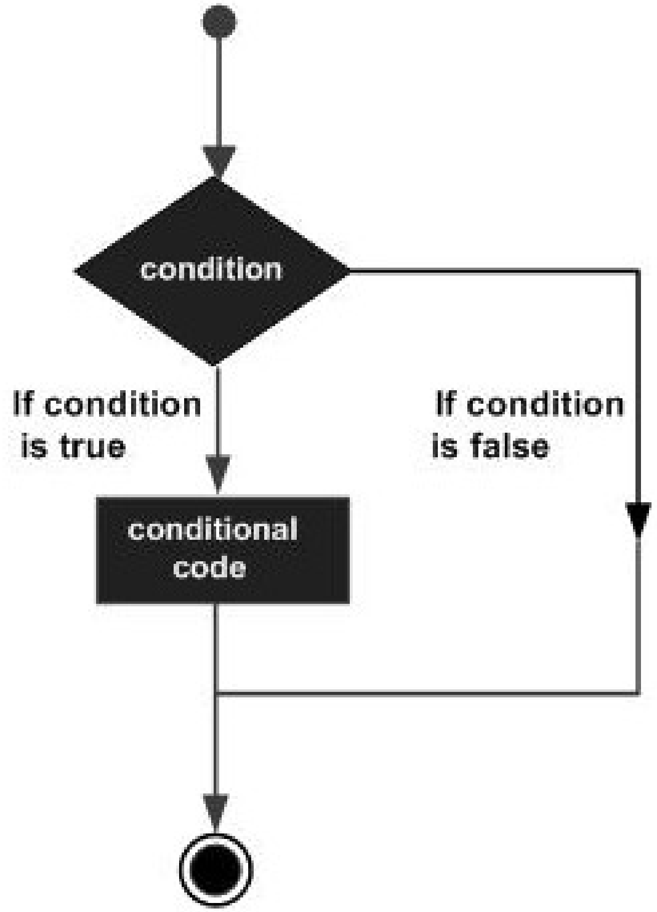
Numbers and Operands

```
#Lets do some calculations on numbers
a = 4 / 2
b = 10 + 5
c = 2 * 2
d = 50 - 10
E = (2 + 2) – 1

# We can print out the variables on one line
print(a, b, c, d, e)

#Or we can do further math with them
print(a + b)
print(c - e)
print(d * b)
```

Conditional Statements



A conditional statement is a set of rules performed when certain condition/s are meet.

Here we are looking at an if else statement

If a certain condition is true
Perform an action
If the condition is false
Perform a different action
Then Stop

Comparison Operations

== Checks if the values are equal or not, if yes then condition becomes true. (a == b) is not true.

!= Checks if the value of two operands are equal or not, if values are not equal then condition becomes true. (a != b) is true.

> Checks if the value of left operand is greater than the value of right operand, if yes then condition becomes true. (a > b) is not true.

< Checks if the value of left operand is less than the value of right operand, if yes then condition becomes true. (a < b) is true.

>= Checks if the value of left operand is greater than or equal to the value of right operand, if yes then condition becomes true. (a >= b) is not true.

<= Checks if the value of left operand is less than or equal to the value of right operand, if yes then condition becomes true. (a <= b) is true.

Conditional Statements

```
#declare the variable name
name = 'Aimee'

#if the variable name == to 'Aimee'
#note we must include : at the end of the if statement
if (name == 'Aimee'):
#then print this text to the screen
    print ('You Found me!')

#if the variable name equals anything else print this text
#This is also an example of error catching
else:
    print('Try again')
```

Conditional Statements

```
#declare the variable name
name = 'Aimee'

#if the variable name == to 'Aimee'
#note we must include : at the end of the if statement
if (name == 'Ben'):
#then print this text to the screen
    print ('You Found me!')

#if the variable name equals anything else print this text
#This is also an example of error catching
else:
    print('Try again')
```

Conditional Statements

```
#Here we define a grade from 1 to 100
grade = 10

#Now we start our Conditional Statement
#if the Grade is greater then 90 print the below statement
if (grade > 90):
    print ('Congratulations, You achieved A Grade')

#for all other grades less then 90 print the below statement
else:
    print ('Better try again')
```

Conditional Statements

```
#Here we define a grade from 1 to 100
grade = 70

#Lets add in some more choices
if (grade >= 90):
    print ('Congratulations, You achieved A Grade')
#elif means if the grade is not >=90 but is >=70 do this
elif (grade >= 70):
    print ('You achieved a B Grade')
elif (grade >= 50):
    print ('You achieved a Pass')
#Last we put in a final else to catch all other grades <50
else:
    print ('Better Luck next time')
```

DEVOXX™ 4KIDS

Conditional Statements with input

```
#Here we ask the user for our name which is a string
name = input('What is your name?')
#Here we ask the user for an integer and use int(input()))
grade = int(input('Enter your grade: '))

print('Hello, ' + name)
#The grade entered runs through our conditional statement
if (grade >= 90):
    print ('Congratulations, You achieved A Grade')
elif (grade >= 70):
    print ('You achieved a B Grade')
elif (grade >= 50):
    print ('You achieved a Pass')
else:
    print ('Better Luck next time')
```

What we just learned

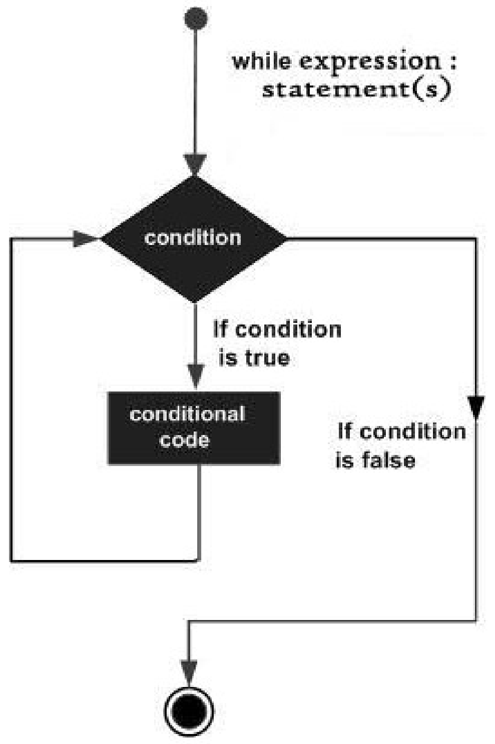
So we ran some conditional statements
That took some numbers and gave us an output
Based on the grade number we had assigned to the **grade variable**

Now lets combine our input with some **conditional Statements**

First we took input as Words in programming we calls these **Strings**

Now lets look at taking input as Numbers and specifically **Integers**
Integers are whole digit numbers example 1,2,3,4,5,6,7,8,9,10....

Conditional Statements



A conditional statement is a set of rules performed when certain condition/s are meet.

Here we are looking at a while loop

While a certain condition is true
Perform an action
When this condition is false
Perform another action or Stop

Conditional Statements and Input

```
#Here we declare a while loop and assign a condition
#While the count is less then 5
while(count < 5):

#Print what the count is and add one to the count
    print('The count is: ', count)
    count = count + 1

print ('This program is done!')
```

Conditional Statements and Input

```
#While the below condition is (True)
while(True):
#Capture the input from the user
    count = int(input('Please enter a number:'))
#If the number entered is greater then or equal to 5
    if (count >= 5):
        print(count, 'is more than or equal to 5')

#capture other numbers by checking the variable is less then 5
    else:
#Print the below statement
        print(count, 'is less than 5')
#Then exit the program
    exit()
```

What we just learned

A way to make programs make decisions is to use
Conditional statements

The conditional statement tells the program that
It has some options it can take

Conditional statements that we leart where

If, else

And

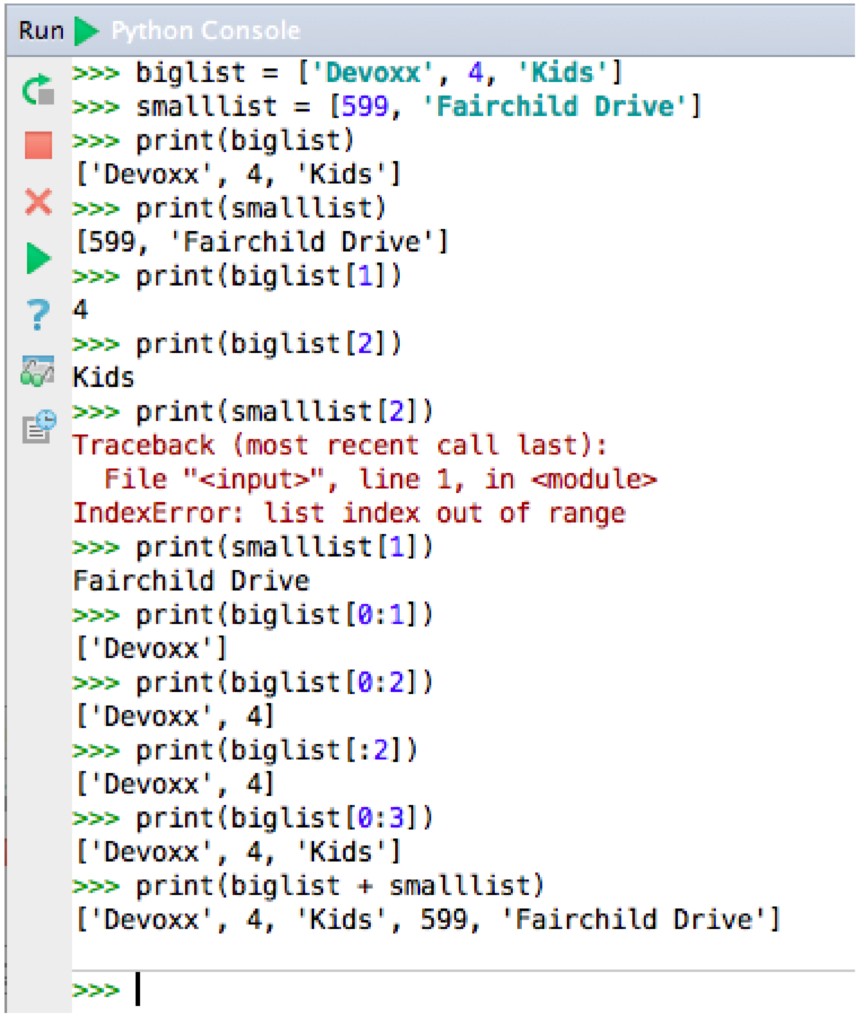
While

List

"A list contains items separated by commas and enclosed within square brackets ([])"

We using a list we can have a
Groups of items that
We can call

We call each item by referring to
Its position in the list



```
>>> biglist = ['Devoxx', 4, 'Kids']
>>> smalllist = [599, 'Fairchild Drive']
>>> print(biglist)
['Devoxx', 4, 'Kids']
>>> print(smalllist)
[599, 'Fairchild Drive']
>>> print(biglist[1])
4
>>> print(biglist[2])
Kids
>>> print(smalllist[2])
Traceback (most recent call last):
  File "<input>", line 1, in <module>
IndexError: list index out of range
>>> print(smalllist[1])
Fairchild Drive
>>> print(biglist[0:1])
['Devoxx']
>>> print(biglist[0:2])
['Devoxx', 4]
>>> print(biglist[:2])
['Devoxx', 4]
>>> print(biglist[0:3])
['Devoxx', 4, 'Kids']
>>> print(biglist + smalllist)
['Devoxx', 4, 'Kids', 599, 'Fairchild Drive']

>>> |
```

Lists

```
# First we create a list of options for fighting the Dragon
choicelist = ['1:wait', '2:fight', '3:run away']

#We can print the whole list by calling it
print(choicelist)
```

Lists

```
# First we create a list of options for fighting the Dragon
choicelist = ['1:wait', '2:fight', '3:run away']

#We can print each option by calling it by its key remember we
#always start with 0
print (choicelist[0])

#Print the second option in the list by calling 1
print (choicelist[1])

#Print the third option in the list by calling 2
print (choicelist[2])
```

Lets put it all together in a Game

Now that we have learnt some of the basics of Python
We can put all this together in a command line adventure game

Before computer graphics had advanced games used to be
Text based

This would mean that there would be some text on the screen
That would inform the user of the task at hand and then
It would ask the user to pick a choice or type in what to do next

Lets create a text adventure game by using some of
The techniques we have learnt

We can also include some ASCII art in our game

Dragon Game

```
# First we create a list of options for fighting the Dragon
choicelist = ['1:wait', '2:fight', '3:run away']
print('Dragon Slayer \n Let the Games Begin ')

name = input('Name your character: ')
print ('You are ' + name + ', the young warrior. You have been sent to save the Towns people from an angry dragon.')
print (choicelist[0])
print (choicelist[1])
print (choicelist[2])

myanswer = input("press the corresponding number and ENTER:")
print("You choose the answer number {0}".format(myanswer))
```

Dragon Game ...continued...

```
while myanswer == 1:
    print ("nothing happens, the dragon also waits")
    myanswer = input("chose your next turn ENTER:")

if  myanswer == "2":
    print ("you fight with the dragon.")
    print ("the dragon has been slayed and the towns people rejoice.
Game Over.")

elif myanswer == "3":
    print ("You run away, but the dragon is faster than you. The
dragon chased you and ate you for lunch. Game Over")
else:
    print ("wrong key pressed")
```

Further Work

Now that we have a basic game we can make it longer and
Include more options or even some ASCII art.

We can also import a Python module to include a dice
This way instead of having the user enter there choice
They can roll a dice to make a random selection.

Extra Work in ASCII Art

```
#Below we are creating a Dragon, can you include some art in your game?
print('  <>========()')
print(' (/\___   /|\\          ()==========<>_ ')
print('       \_/ | \\        //|\   ______/ \)')
print('         \_|  \\      // | \_/')
print('           \|\/|\_   //  /\/')
print('            (oo)\ \_//  / ')
print('           //_/\_\/ /  | ')
print('          @@/  |=\  \  |')
print('               \_=\_ \ | ')
print('                 \==\ \|\ ')
print('              __(\===\(  )\ ')
print('             (((~) __(_/   | ')
print('                  (((~) \  / ')
print('                  ______/ / ')
print('                  \______/ ')
```

Rolling a dice

```
#here we import a Python module called random this creates a random
#number like when a person rolls a dice
import random


#here we declare the variable called dice
#random.randrange is a way we set the possible number set for the dice

dice = random.randrange(6)

print ('Press enter to Roll the Dice: ', dice)

#to learn more about options we can use for random check the
#documentation https://docs.python.org/3.0/library/random.html
```

Rolling a dice with options

```
#here we import a Python module called random this creates a random
#number
import random

#here we declare out list options
choicelist = ['1:wait', '2:fight', '3:run away']

#random.randrange set the dice range between 1 and 3
dice = random.randrange(1,4)

print ('Press enter to Roll the Dice: ', dice)

print('You are faced with three options...')
print(choicelist[0])
print(choicelist[1])
print(choicelist[2])
```

Rolling a dice with options continued

```
#here we assign the myanswer variable the dice outcome
myanswer = dice

#Then we print the option out the the user
print("You choose to do number {0}".format(myanswer))
```

Further Work

Can you add the Dragon art into the dragon Game?

Can you create 6 options in the list for the Rolling dice code?

Can you include the Rolling dice code into the dragon Game?

Further Learning

Games are a great way to learn the fundamentals of Programming
https://github.com/amaree/Python-KidsDay

Today we learnt some of the very basics of Python But there is a lot more to learn

Learning programming works best when we are doing something
We enjoy this makes us want to learn more

Most people from my generation learnt how to program
By writing simple games

A great place to start learning games and python is

http://thepythongamebook.com/

Code examples for the book
https://github.com/horstjens/ThePythonGameBook/