

THE ONLY SHIBBOLETH THE WEST HAS IS SCIENCE. IT IS THE PREMISE OF MODERNITY AND IT DEFINES ITSELF AS A RATIONALITY CAPABLE OF, INDEED REQUIRING SEPARATION FROM POLITICS, RELIGION AND REALLY, SOCIETY. MODERNISATION IS TO WORK TOWARDS THIS.

BRUNO LATOUR

THE BOUNDARY BETWEEN SCIENCE FICTION AND SOCIAL REALITY IS AN OPTICAL ILLUSION.

DONNA HARAWAY

CSEF

INTRODUCTION TO PYTHON

THE STUDENT ACADEMY

Contents

Libraries 17

Graphics Library 19

Array 1-D, 2-D, 3-D 23

List of Figures

1	Flow diagram about how the while loop works	27
---	---	----

List of Tables

*The longest snake ever held captive is Medusa,
a reticulated python (python reticulatus).*

*On 12 October 2011, she was measured at
7.67 m long.*

Note

This physics text is an OpenSource academic project developed in abstraction at The Academy. The manuscript is written in \LaTeX and makes use of the `tufte-book` and `tufte-handout` document classes.

<http://latex-project.org/ftp.html>

<https://git-scm.com/downloads>

«««< HEAD

Libraries

Introduction

Libraries in Python are extensions to the basic Python coding. Python comes with some libraries of its own. But it is also possible to write your own libraries. But before you can use libraries you have to import the libraries that you want to use in your script. There are several ways how you can import libraries. Libraries are always imported at the beginning of a script.

Importing Python Libraries

The easiest way to import libraries is to use the import function. For these examples we will use the random library.

With this you have to put the libraries name in front of the function of the library

```
1 import random
2 print random.uniform(1,10)
```

If you want to rename a library before you are using it you can do the following

```
1 import random as rndm
2 print rndm.uniform(1,10)
```

If you don't want to have to write a library name in front of it at all you can do

```
1 from random import *
2 print uniform(1,10)
```

There is one other option how you can import libraries. If you use all of what we learned before we can use the following.

With this you can import a single function of a library and you name the function.

```
1 from random import uniform as makeRandom
2 print makeRandom(1,10)
```

Importing custom libraries

If you want to use libraries you or someone else has written in python you can do that also. First you have to make sure that the script you want to import is in the same folder as the script you want to import it into. Lets assume we have the following script we want to use as a library.

```
1 def Bla():  
2     print "Bla"  
3  
4 def MyFunction(A)  
5     print A+A
```

Lets assume the script's name is lib. Now if we want to use this in our main script we can do either of our ways. Use the file name as the library's name.

```
1 import lib  
2 import lib as mylib  
3 from lib import Bla as Tell
```

Graphics Library

The graphics library is a library for making easy graphical objects in python. It was written by John Zelle for use with his book Python Programming: An Introduction to Computer Science. This chapter is going to discuss the topics we covered during class. To use the library you have to import it first. For an explanation on how to import libraries see the section of the book.

Creating a basic window

The graphics library works as a program of its own. A window gets updated as long as it gets changed or is waiting for a new command. To draw something on a window we first have to create a window. A creation follows this pattern:

```
1 Window = GraphWin(WindowName, Width, Height)
2 Window.setCoords(StartX,StartY,WidthPixel,HeightPixel)
```

Drawing on windows

Now that we know how to create a window we can start drawing on it. There are various objects we can draw on windows. Because the graphics library uses its own coordinates system we need to use it for creating objects.

```
1 Point(2,4) #Creates a point at 2,4
```

To actually draw in windows we have to use the draw command.

```
1 Window = GraphWin(WindowName, Width, Height)
2 Window.setCoords(StartX,StartY,WidthPixel,HeightPixel)
3 Obj = OurObject
4 Obj.draw(Window)
```

In this example we are drawing Obj to our window.

Rectangles

In python rectangles are drawn from the down left point to the top right point.

```
1 Rect = Rectangle(Point(X1,Y1),Point(X2,Y2))
```

This creates a rectangle calles Rect at the position X1 and Y1 with the width X2 and height Y2. After you have created your basic reactangle you can also color it.

```
1 Rect = Rectangle(Point(X1,Y1),Point(X2,Y2))
2 Rect.setFill(color_rgb(255,0,0)) #Set the color for the reactangle
```

Circles

Of course you can also add circles to your window. Circles are drawn from their middle point to the setting of the size of their diameter.

```
1 C = Circle(Point(X,Y),Point(RX,RY))
```

The Point(X,Y) is defining the position of the circle. The Point(RX,RY) is defining the radius of the circle.

Text labels

On a window it is very important to be able to use text. Because of that the graphics library also comes with a text object for windows.

```
1 T = Text(Point(X,Y),StringText)
```

The example is self explaining. But this text is nothing special. To make it cool we need to modify it a bit.

```
1 Text.setFace(Font)
2 #Available Fonts are 'helvetica','arial','courier','times roman'
3 Text.setSize(Size) #Size of the text
4 Text.setStyle(Style)
5 #Available styles 'bold','normal','italic', 'bold italic'
6 Text.setTextColor(Color) # Use color_rgb(r,g,b) as a color
```

Other usefull methods

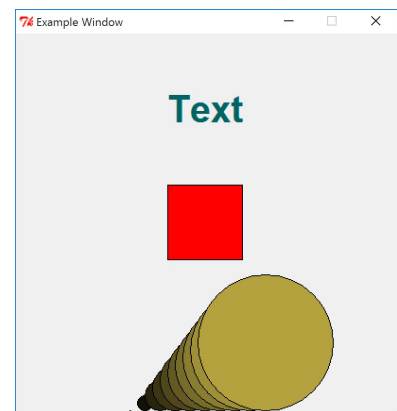
There are some other usefull methods for the graphics library. Obj can be any object of the graphics library.

```
1 Obj.setFill(Color) #Sets the color
2 Obj.clone() #Creates a new object with the same properties as Obj.
3 Obj.move(X,Y) #Moves the object
4 color_rgb(r,g,b) #Makes a color for use with this library
5 Window.getMouse() #Stops the programm until you press on the screen
```

Example code

This is an example code of the graphics library.

```
1 from graphics import *
2
3 Win = GraphWin("Example Window",400,400)
4 Win.setCoords(0,0,50,50)
5 T = Text(Point(25,40), "Text")
6 T.draw(Win)
7 T.setFill(color_rgb(0,100,100))
8 T.setStyle("bold")
9 T.setFace("arial")
10 T.setSize(30)
11
12 Rect = Rectangle(Point(20,20),Point(30,30))
13 Rect.draw(Win)
14 Rect.setFill(color_rgb(255,0,0))
15
16 for i in range(10):
17     C = Circle(Point(15+i*2,i),i)
18     C.draw(Win)
19     C.setFill(color_rgb(20*i,18*i,7*i))
```



```
=====
«««< HEAD »»»> refs/remotes/Trismeg/master
=====
«««< HEAD
```

Array 1-D, 2-D, 3-D

Intro

Array is like a storage, it can fill with string or integer. In 1-D, 2-D it can also represents the x-axis and y axis.

Creating arrays

Arrays is created buy blanket.

Example:

```
a=[ ]      *a is the array name that you want.
```

The things in the [] and be store and when you want to access it you will need its position in the array and type like a[o]

Example:

```
a=["apple","orange","banana"]
```

If you want to print banana form the array, you may want to type

```
print a[2]
```

Filling arrays

Everything can be store in the array, strings, integers, arrays. When you create an array you can fill things in it as the default things that the array have.

Example:

```
a=["Billy","Bud",90,60,50]
b=["Anne","Chow",90,95,100]
c=["Jen","Bo",60,80,90]
```

If you want to add things into the array that u create already, you can use

```
array_name=array_name+[Things you want to add]
```

Example:

```
a=[apple]
```

and now I want to add orange into it, so we add

```
a=a+[orange]
```

To create 2-D or more array we need to create array in the nested for-loop.

Example:

```
a=[]
for i in range(N): *N how long you want the array to be
    b=[]          *This is a temporary array to generate every array inside the main array.
    for j in range(N):
        *Things you want to put in the array by b=b+[ ]
    a=a+[b]       *Here put the temporary array back to the main array.
```

Traversing array

Traversing array is visiting each element in the array and do something. In 1-D we can do it with for loop to identify things in array.

Example:

```
a=[1,2,3]
for i in range(len(a))    *len(a) = Numbers of elements in the array
    *Things put here can edit the specific element a[i]
```

In 2-D we start using nested for-loop to identify the x-axis and y-axis. So we use nested for-loop to traversing it too.

Example:

```
a=[[0,1],[0,0],[0,1]]
for i in range(len(a)):
    for j in range(len(a)):
        *Things put here can edit the specific element a[i][j]
```


In 3-D we use more for-loop to identify the more dimension.

Example:

```
a=[[[0,0],[0,0]],[[0,0],[0,0]]]
for x in range(len(a)):
    for y in range(len(a)):
        for z in range(len(a)):
            *Things put here can edit the specific element a[x][y][z]
```

```
===== >>>>> upstream/master >>>>> upstream/master
```

While Loops

A **while loop** statement in Python programming language repeatedly executes a target statement as long as a given condition is true.

The condition may be any expression, and true is any non-zero value. The loop iterates while the condition is true. When the condition becomes false, program control passes to the line immediately following the loop. In Python, all the statements indented by the same number of character spaces after a programming construct are considered to be part of a single block of code. Python uses indentation as its method of grouping statements.

PYTHON CODE EXAMPLE

```
count = 0
while (count < 9):
    print 'The count is:', count
    count = count + 1

print "Good bye!"
```

OUTPUT

```
>>>
The count is: 0
The count is: 1
The count is: 2
The count is: 3
The count is: 4
The count is: 5
The count is: 6
The count is: 7
The count is: 8
Good bye!
>>>
```

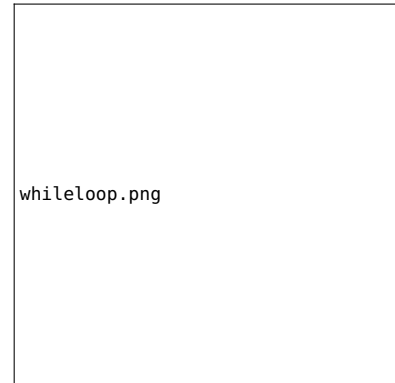


Figure 1: Flow diagram about how the while loop works

The code will produce the following output.

INFINITE LOOP

A loop becomes **infinite loop** if a condition never becomes **FALSE**. You must use caution when using while loops because of the possibility that this condition never resolves to a FALSE value. This results in a loop that never ends. Such a loop is called an infinite loop.

An infinite loop might be useful in client/server programming where the server needs to run continuously so that client programs can communicate with it as and when required.

```
var = 1
while var == 1:
    num = raw_input("Enter a number :")
    print "You entered: ", num

print "Good bye!"
```

This python code is an example of how infinite loop can be created.

```
Enter a number :X
You entered: x
Enter a number :Y
You entered: Y
Enter a number :Z
You entered: Z
Enter a number between :
```

This code creates an infinite loop where it will need your input of any number. Once you input any number, it will output it like if you input "X" it will show back "X".

To break the loop you will either need to add the **"break"** command in your code OR press **CTRL+C** to exit the program.

USING ELSE STATEMENTS WITH WHILE LOOPS

Python supports to have an else statement associated with a loop statement.

If the **else statement** is used with a while loop, the else statement is executed when the condition becomes false.

```
count = 0
while count < 5:
    print count, " is less than 5"
    count = count + 1
else:
    print count, " is not less than 5"
```

The following code illustrates the combination of an else statement with a while statement that prints a number as long as it is less than 5, otherwise else statement gets executed.

```
>>>
0 is less than 5
1 is less than 5
2 is less than 5
3 is less than 5
4 is less than 5
5 is not less than 5
>>>
```

This is the output in python when the code above is executed.

http://www.tutorialspoint.com/python/python_nested_loops.htm