Upper School 2 - Coding

FruityLoops

Nasri Academy
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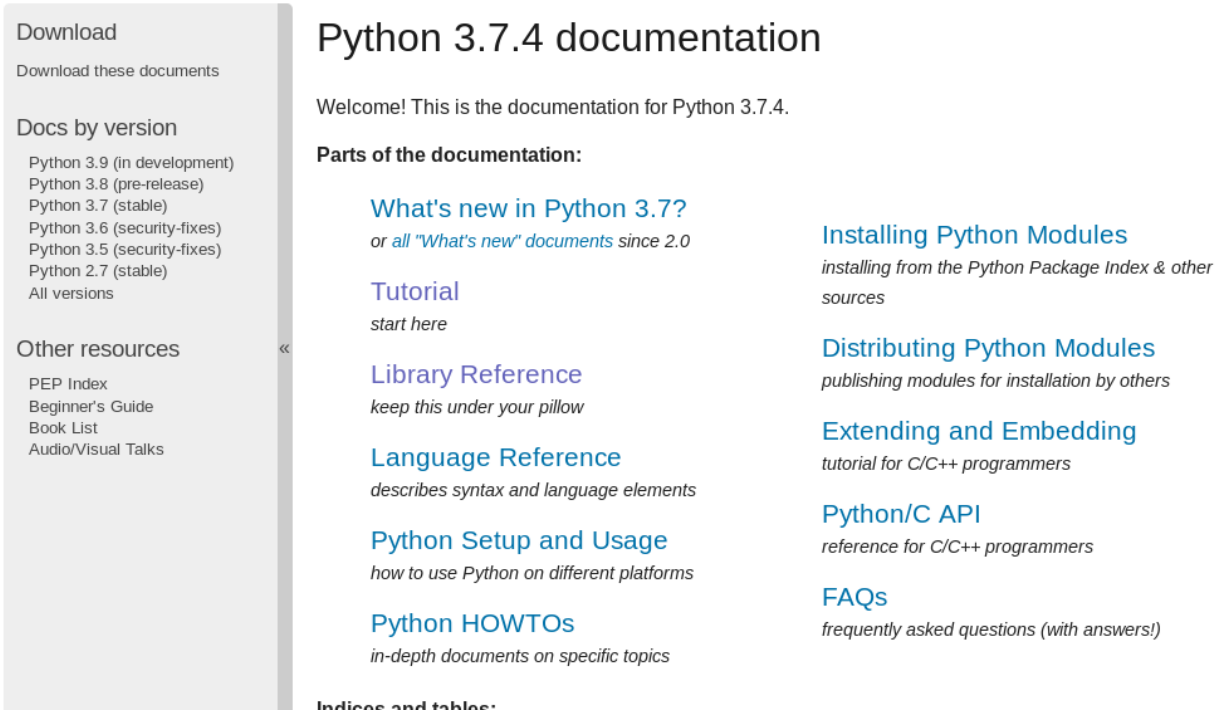
Overview

- **Review**
- **Loops**
  - For
  - While
- **Choice**
  - If/Else
  - switch
- **Def my_function():**
- **Assignment: function(myFunction)**
- **Introduction to matrices**

Review

- **https://docs.python.org/3/**
- **Click on tutorial to get started**



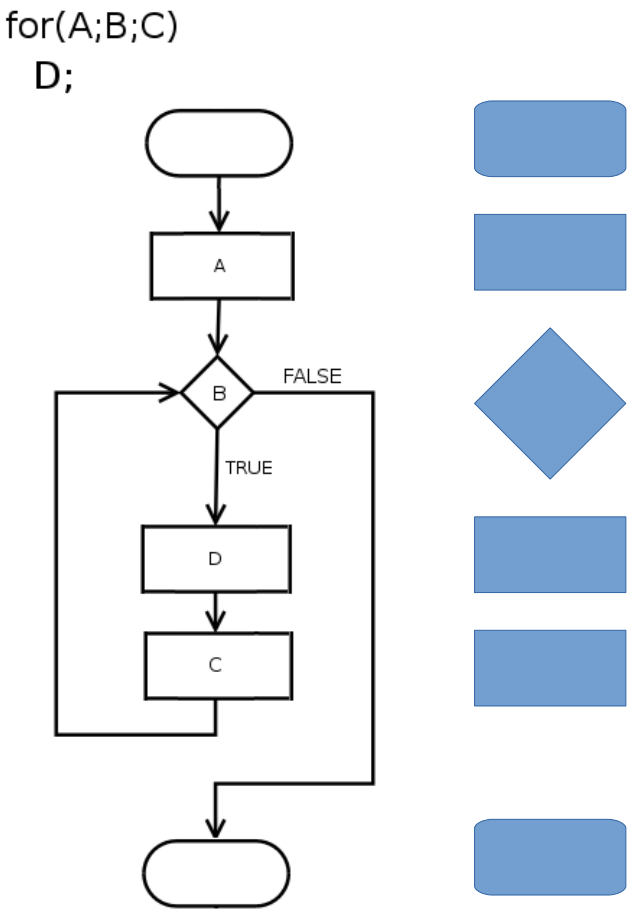
Loops

These structures control execution of a program.

They run repeatedly until some condition(s) is/are met

We introduce two types of loops

- **For loops**
- **While loops**



For

These loops continue until a condition is met.

- **If that condition is not met, the execution jumps to the else portion**
- **For j < 1:**
  - Do something
- **Else j = 0:**
  - Do something else
- **Else j > 0:**
  - Do yet another thing

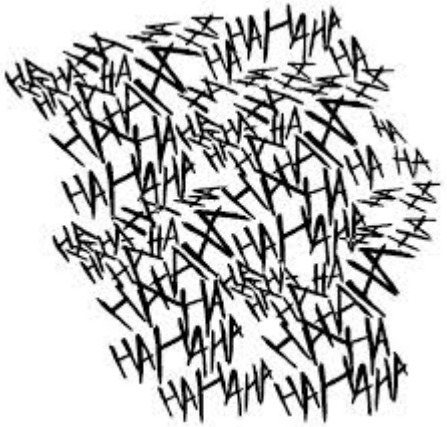
For (cont.)

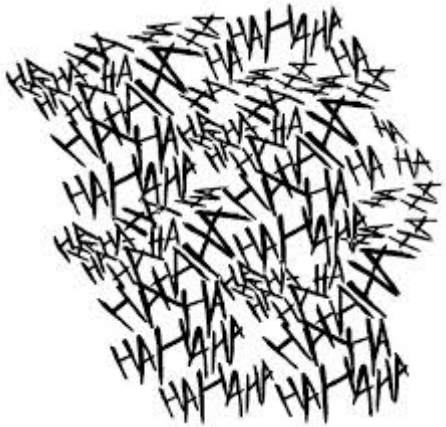
```
1     # for example (pun intended)
2     words = ['dog', 'funeral', 'flowers']
3     for i in words:
4         print(i, len(i))
5
6     # i is an index that ranges from 0 to 2
7     # word is a list with 3 values
8     # len() stands for length
9
10    for i in range(10):
11        i = i+i*2
12    print(i)
13    # PEMDAS rules apply
14
```

While

```
i = 1
while i < 6:
    print(i)
    i = i + 1

# save before running this next part
x = 1
while x >= 1:
    print("Ha Ha Ha")
    x = x + 1
```





While (cont.)

- **while a < 10:**
- **while A > 10:**
- **while the sky is blue && dogs > cats**

  An exit strategy is recommended

If/Else

```
1     # loop stuff
2     import random
3
4     a = random.randint(-10, 10)
5     if a > 0:
6         print("yes")
7     else:
8         print("no")
9
10    # run this (ctrl+shift+b) 10 times
11    # Do you see the two different outcomes?
```

Def my_function():

- **Sets are not mutable**
  - Or non-mutable
  - It means they can’t be modified like lists
- **Used to check for membership**
  - Sets use curls {}
- **Use sets to check for membership or to delete duplicate entries**
  - Ask if c is a set of B
    - B = {a, b, c, d, e, f}
  - You can’t have duplicate entries
    - B \= {a, b, a, d, e, f}

Assignment: function(myFunction)

- **To search through lists, tuples, and sets we use an index**
  - A = [1, 2, 3, 4]
- **An index is like a house address**
  - A[0] = 1
  - A[1] = 2
  - A[2] = 3
  - A[3] = 4
- **The index starts at 0, and runs through 3 in this example**
  - 0, 1, 2, 3
- **What if?**
  - B = [1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1028]
  - What is B[2] + A[3]
  - What is A[5] + B[0]

Introduction to matrices

- **Singular Matrix**
- **Plural Matrices**
  - Aka the rice of mathematics
- **The index address uses 2 values**
  - A[1,2] = A_{12}

$$\boldsymbol{A} = \begin{bmatrix} A_{11} & A_{12} & \cdots & A_{1n} \\ A_{21} & & & A_{2n} \\ \vdots & & & \vdots \\ A_{n1} & A_{n2} & \cdots & A_{nn} \end{bmatrix}$$

$$\boldsymbol{A} = \begin{bmatrix} A_{11} & A_{12} & A_{13} \\ A_{21} & A_{22} & A_{23} \\ A_{31} & A_{32} & A_{33} \end{bmatrix}$$