Fourth Industrial Summer School

Day 1

Python programming I

Session Objectives

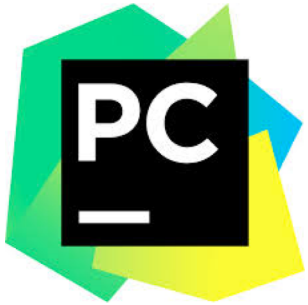
- ✓ Introduction to Python programming
  - History
  - IDE
- ✓ First Python Program
- ✓ Numbers
  - Integer
  - Float
  - Complex
- ✓ Operators
  - Arithmetic
  - Logical
  - Bitwise

Python History

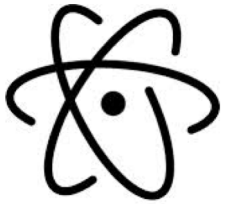
- Guido Van Rossum
  - First version of Python code (version 0.9.0) in 1991
  - Python version 1.0 was released in January 1994
  - …..
  - Recent major release version **3**

- Python? A snake?

Python Programming - IDEs



PyCharm



Atom

Python Programming - IDE

- Google Colab
  - Jupyter notebook environment that requires no setup to use and runs entirely in the cloud.

colab.research.google.com

- Benefits
  - Free GPU ☺
  - Pre-installed libraries
  - Jupyter Notebook
  - Collaboration feature
  - Stored on the cloud (e.g. Google Drive)

First Python Program in Colab

- The famous "Hello World" example

1. Start Colab notebook

2. Output the String "Hello World from Colab"
   - using the print function

```
print ("Hello World from Colab")
```

```
Hello World from Colab
```

Must do before proceeding

Comments

- The symbol # is used to indicates comments in a python program

```
# My first comment in Python
print ("Hello World from Colab") #Inline comment
```

```
Hello World from Colab
```

Python Variables

- Creating Variables
  - A variable is created when you assign a value to it.
  - No variable declaration

```python
num = 5
str = "KFUPM"
print(num)
print(str)
```

```
5
KFUPM
```

- Change type – Simple !!

```python
num = 5
num = "KFUPM"
print(num)
```

```
KFUPM
```

Python Variables

- Naming Variables

- Similar to other programming languages. Python has rules for naming variables
  - Must start with a letter or the underscore character
  - Can't start with a number
  - Name can only contain alpha-numeric characters and underscores
  - Names are case-sensitive

Python Variables

- Numbers
  - Integer
  - Float
  - Complex
- Collections (Arrays)
  - List
  - Tuple
  - Dictionary
- Strings

Python Numbers

- Numeric types in Python
  - int
  - float
  - complex

```
age = 30
weight = 70
complex = 3+5j
```

Input

- Read from user using the input function

```
name = input("What's your name? ")
print("Nice to meet you " + name)
```

```
What's your name? Ahmed Alahmed
Nice to meet you Ahmed Alahmed
```

Operators

- Arithmetic operators

Operator	Name
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Modulus
**	Power
//	Floor division

```python
x = 10
y = 3
print (x + y)
print (x / y)
print (x % y)
print (x ** y)
print (x // y)
```

```
13
3.3333333333333335
1
1000
3
```

Operators

- Assignment operators
  - x -= 10 means x = x - 10

Operator	Name
=	Assignment
+=	Addition then Assignment
-=	Subtraction then Assignment
*=	Multiplication then Assignment
/=	Division then Assignment
%=	Modulus then Assignment
**=	Power then Assignment
//=	Floor division then Assignment

Operators

- Comparison operators
  - Widely used in **conditional** statements and **loops**

Operator	Name
==	Equal
!=	Not equal
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to
==	Equal

```python
x = 10
y = 2
print (x > y)
print (x < y)
```

```
True
False
```

Operators

- Logical operators
  - **Compound** statements

Operator	Usage
and	True if both True
or	True if either True
not	Reverse

```python
x = 10
y = 2
print (x > 5 and y > 10)
print (x > 5 or y > 10)
print (not (x > 5))
```

```
False
True
False
```

Operators

- Bitwise operators
  - used to compare **binary** numbers

Operator	Name	Description
&	AND	Sets each bit to 1 if both bits are 1
|	OR	Sets each bit to 1 if one of two bits is 1
^	XOR	Sets each bit to 1 if only one of two bits is 1
~	NOT	Inverts all the bits

Hands on session

Problem Solving