Lesson 2

- Data Types - In Detail
- First step towards interactive programs
  - write your first interactive program
- Conditional Operations
  - write your first conditional program
  - write your second conditional program
  - your first tracing example

Data Types & Operators - Revisiting

- Data types:
  - int
  - float
  - string
  - bool
  - list
  - dict
  - ...

```
i = 10
pi = 3.14
hello = "Hello"
hi = 'Hi'
b = True
elements_list = [1,2,3,4,5,10]
elements_dict = {'Ahmed':31, 'Malek':19, 'Nazly':29}
```

- *type* function can be used to know what is the type of variable

```
type(10)
>> <class 'int'>
```

- When to use each type?

Examples

- float:

```
2/3
2.0/3
5.0/3
7.0/3
```

- string:

```
"hello"
'hi'
 print("hello \n hi") # other escape characters \t \\ \' \"
 "my Name is " + " Kareem"
 "hello"*5
```

- bool

```
x = False
y = True
not x
x and y
x or y
5 ==7
5 !=7
7 > 5
```

- list

```
l = [1,2,3,4,10]
print(l[0])
m = [1,5] + [6,7]
```

- Taking string as input from user will that be a problem or not?
- why do we use int or float variables? => we can be able to apply mathematical operations
- try "10" / 2

Precedence - Revisiting

Operator	Description
**	Exponentiation (raise to the power)
~ + -	Complement, unary plus and minus (method names for the last two are +@ and -@)
* / % //	Multiply, divide, modulo and floor division
+ -	Addition and subtraction
>> <<	Right and left bitwise shift
&	Bitwise 'AND'
^ |	Bitwise exclusive `OR' and regular `OR'
<= < > >=	Comparison operators
<> == !=	Equality operators
= %= /= //= -= += *= **=	Assignment operators
is is not	Identity operators
in not in	Membership operators
not or and	Logical operators

Input & Output

- A lot of programs depend on input from the user, e.g. click of a button or text he types in a searchbar
- Output: for now we use *print* function
- Input: we can use *input* function
- Try it out:

```
print('Enter your name')
user_input = raw_input()
print("This is the user's name:")
print(user_input)

print('Enter your age')
user_age= input()
print("This is the user's age:")
print(user_age)
```

Excerise 1 - Your first interactive program

Part 1:

- Given the radius of a circle, we would like to print out both circumference and area.
- Hints:
  - circumference = $2\pi r$
  - area = πr^2
  - you can assume $\pi = 3.14$

Part 2:

- What if we want the user to tell us whether he wants to calculate area or circumference?
- What else do we need?

Conditional Operations

- Test a certain condition
- Depending on this condition, decide what are the next steps

In [ ]:

```
weather = input()
if(weather == 'Sunny'):
    print('Go out and enjoy the sun')
else:
    print('Stay Home')
```

How to write conditional operations? (Syntax)

```
if(condition):
    # perform operations when condition is true
else:
    # perform operations when condition is false
```

How to write conditions?

- Operators: ==, >= , <=, !=, >, <

```
num > 5
num >= 10
num != 10
num == 10
```

- What is type for these conditions ?
- What is difference between?

```
weather = 'Sunny'
weather == 'Sunny'
```

Exercise 2 - Your first conditional program

- Given two numbers, print out the bigger of the two numbers.
  - Examples:
    - n=10 m = 5, output = 10
    - n= -10 m = 5, output = 5

What if we are given three numbers?

What if we want to test for more than one condition?

```
if(condition1):
    # perform operations for condition1
elif(condition2):
    # perform operations for condition2 (and condition 1 is false)
elif(condition3):
    # perform operations for condition3 (and conditions 1,2 are false)
........

else:
    # perform operations when conditions 1, 2 and 3 are false
```

- You can have as many *elif* as you want and optional else part in the end

Exercise 3 - Your second conditional program

- Given three numbers, print out the biggest of the three numbers.

Exercise 4 - Your first tracing example

- if n=11, What will be printed for each of these two programs and why?
- Program 1

```
if(n > 5):
    print('Number is more than 5')
elif(n > 10):
    print('Number is more than 10')
else:
    print('Number is less than 5')
```

- Program 2

```
if(n > 5):
    print('Number is more than 5')
if(n > 10):
    print('Number is more than 10')
else:
    print('Number is less than 5')
```

- What about for n=7? which program should you use?

Homework

Exercise 5

- Given the width and height of rectangle, calculate either perimeter or area (ask the user!)
- Hints:
  - perimeter = 2 X (length + width)
  - area = length X width

Exercise 6

- You have 3 lists for different kinds of workshop events: Programming, Art, and Photography. Ask the user about his interest , and show him the corresponding list to his interest. Below are the lists:

```
  programming_list = ['Basic Python workshop', 'Basic Java worksho
p', 'Intermediate Java']
  art_list = ['Painting workshop', 'Sculpture workshop', 'Fashion d
esign workshop']
  photo_list = ['Photography 1.0', 'Photography 2.0']
```

In [ ]: