IMSAL coding events: Learning Python (session 2)

- **Python:** is a (interpreted) high level programming language
- **PyCharm:** is an IDE (Integrated Development Environment) for the Python language. So PyCharm is only a coding assistance, not a language. It provides features like code-completion, quick fixes, error highlighting etc. (PyCharm itself is written in Java & python).

Content of this session

1. **Lists (mutable)**
    1. Initializing a list
    2. Indexing a list (access a single element)
    3. Slice (make a new list containing a slice/part of a given list)
    4. Special slices
    5. Changing slice steps
    6. Changing elements from a list
2. **Strings (immutable)**
    1. A string is an array of characters
    2. Indexing and slicing
    3. String concatenation
3. **Tuples (immutable)**
    1. Initializing
    2. Indexing and slicing
    3. Tuple concatenation
4. **While loops 1**
    1. Infinite loops
    2. Finite loops
5. **Program for printing all integers from zero till 5**
6. **Program for printing all elements of a list**

1) Lists (mutable)

Initializing	`my_list = [3, 5, 7, 2, 9, 21, 2, 3]`

Indexing	`# We start counting indexes from 0 to nb of elements-1`
	`>>>my_list[0]` `>>>my_list[2]` `>>>my_list[-1]`
	`3` `7` `3`

Slicing	`# Slicing means give me a new list that contains all`
	`# the elements of a given list from a 1st index till 2nd`
	`# CAUTION: the 2nd index is excluded`
	`>>>my_list[0:2]` `>>>my_list[1:4]` `>>>my_list[-4:-1]`
	`[3, 5]` `[5, 7, 2]` `[9, 21, 2, 3]`

Special slice	`>>>my_list[:2]` `>>>my_list[1:]` `>>>my_list[:]`
	`[3, 5]` `[7, 5]`
	`→ same as [0:2]` `→ 2nd till last` `→ whole list`

Changing steps	`>>>my_list[0:6:2]` `>>>my_list[1:4:3]` `>>>my_list[::2]` `[3, 7, 9]` `[5]` `[3, 7, 9, 2]`
Change elements	`>>>my_list[0] = 9  # Now the first elem is changed`
Add element	`my_list.append(9)  # Add 9 to end of the list` `my_list.insert(1, 17)  # Insert 17 in position 1`
Remove element	`my_list.remove(7)  # Remove the first 7 if exists` `# (throws error if 7 not in list)`

https://www.youtube.com/watch?v=nefopNkZmB4&list=PL6gx4Cwl9DGAcbMi1sH6oAMk4JHw91mC_&index=3
https://www.youtube.com/watch?v=YbipxqSKx-E&list=PL6gx4Cwl9DGAcbMi1sH6oAMk4JHw91mC_&index=4

2) Strings (immutable)

Initializing	`>>>my_name = "Adam"` `>>>my_sentence = "Adam should improve his handwriting"`

Indexing and slicing	`# Same as for lists`
	`>>>my_name[1]` `>>>my_sentence[4:8]` `>>>my_sentence[:8:2]`
	`'d'` `' sho'` `'Aa h'`

String concatenation	`>>>two_names = "Adam" + " Issam"`

2) Tuples (immutable)

Initializing	`>>>my_tuple = (3, 5, 7, 2, 9, 21, 2, 3)`
Indexing and slicing	`# Same as for lists`
Tuple concatenation	`>>>my_tuple =  my_tuple + (3, 5) + (7,)`

3) While loops

Infinite loops	`while True:` `  print("IMSAL")`

Finite loops	`i = 0`
	`while i < 5:`
	`  print("IMSAL")`
	`  i += 1  # Same as i = i + 1`
	
	`print("Finished")`
	`# 'IMSAL' will be printed 5 times and then: 'Finished'`

4) Program for printing all integers from zero till 5

```
i = 0
while i <= 5:
    print(i)

print("Finished")
```

```
0
1
2
3
4
5
'Finished'

Process finished with exit code 0
```

4) Program for printing all the elements of a list

```
lst = [7, 5, 4, 8]

i = 0
while i < len(lst):
    print(lst[i])

print("Finished")
```

```
7
5
4
8
'Finished'

Process finished with exit code 0
```