CPSC 231 - Lab

LISTS
List

List is a collection of values.

List is an Object
How to initialize a list

<list variable name> = [<first value>, <second value>, ...]

students = ["Ethan", "Michael", "Kate"]
list = [1, "Hello", 3.14, False]
grades = ["A"] * 20
How to access elements?

Using index

students = ["Ethan", "Michael", "Kate"]

students[1]
>> "Michael"

Students[2] = "Sepehr"

["Ethan", "Michael", "Sepehr"]
How to add an element to a list?

students = ["Ethan", "Michael", "Kate"]

student.append("sepehr")
>> ["Ethan", "Michael", "Kate", "Sepehr"]

students.insert(0,"sepehr")
>> ["Sepehr", "Ethan", "Michael", "Kate"]
How check if item exists

students = ["Ethan", "Michael", "Kate"]

"Sepehr" in students #False

"Kate" in students #True
How to get list length?

students = ["Ethan", "Michael", "Kate", "Michael"]

code:

len(students)
>> 4

students.count("Micheal")
>> 2
How to remove an element?

```python
students = ["Sepehr", "Ethan", "Michael", "Kate", "Sepehr"]

students.remove("Sepehr")

>> ["Ethan", "Michael", "Kate", "Sepehr"]

remove() just removes the first element that is equal to the given parameter

del students[1]

>> ["Sepehr", "Michael", "Kate", "Sepehr"]
```
How to find an element?

```python
students = ["Sepehr", "Ethan", "Michael", "Kate", "Sepehr"]

students.find("Sepehr")
>> 1

find() just removes the first element that is equal to the given parameter
How to copy a list?

You cannot copy a list simply by typing list2 = list1, because: list2 will only be a reference to list1, and changes made in list1 will automatically also be made in list2.

There are ways to make a copy, one way is to use the built-in List method copy().

```python
new_list = old_list.copy()
new_list = list(old_list)
```
You can sort lists

```python
students = ['Sepehr', 'Ethan', 'Michael', 'Kate']
student.sort()
>> ['Ethan', 'Kate', 'Michael', 'Sepehr']

student.reverse()
>> ['Kate', 'Michael', 'Ethan', 'Sepehr']
```
2D list

2D list is a list of lists.

TicTacToe = [ [ "", "", "", "O" ],
               [ "X", "O", "X" ],
               [ "O", "X", "" ] ]