# Experiment 8: Lists

**Aim:** To understand and implement Lists using Python.

**Theory: Lists:**

Lists is a sequence of values which can be of any type. These values are called 'elements'. The simplest way to create a list is to enclose the elements in square brackets. The elements need not be of the same type. Another list can be nested in a list too. For every element, an index is assigned. The index starts from zero.

**Example 1:** [2, 4.0, 'hello', True]

[2, 6.9, 'python, [1, 2]]

**Example 2:** Consider two lists L1=[1,2,3,4] and L2=[5,6,7,8]. The operations using these two lists are shown in the table below.

| Operator | Description | Example |
|---|---|---|
| Length | It displays the length of the list | len(L1) >> 4 |
| Concatenation | It concatenates the elements of the lists present on either side of the + operator | L1+L2>>[1,2,3,4,5,6,7,8,] |
| Repetition | The * operator repeats the list as many times as mentioned | L1*2>>[1,2,3,4,1,2,3,4] |
| Iteration | For loop iterates the elements of the list | for i in L1:<br>print(i)<br>>>1<br>2<br>3<br>4 |

**Using Built-in Functions with Lists:**

**(i) To create a list:**

list_name = [value1, value2, value3]

**(ii) To add a single element in a list:**

list_name,append[value4]

**(iii) To add multiple elements in a list**

list.extend([value5, value6])

**(iv) To access a list:**

list_name[index no.] #access single element

list_name[index_start : index_end] #access multiple elements

If the first index is not mentioned, elements are accessed from the beginning. If the last index is not mentioned, elements are accessed from given index to the end of the list.

**(v) Deleting element (s) of a list:**

list_name.remove(value6)

del list_name [index no.]

**(vi) Sorting the elements of a list:**

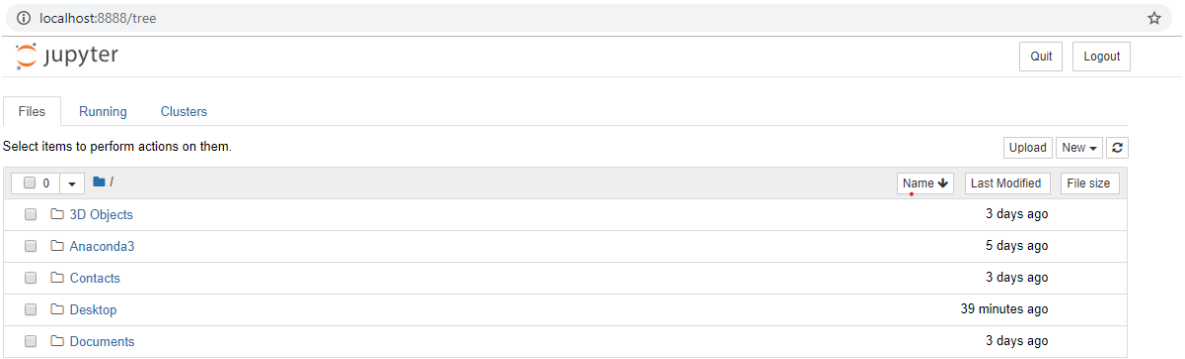
list_name.sort()

**(vii) Finding the maximum element in the list:**

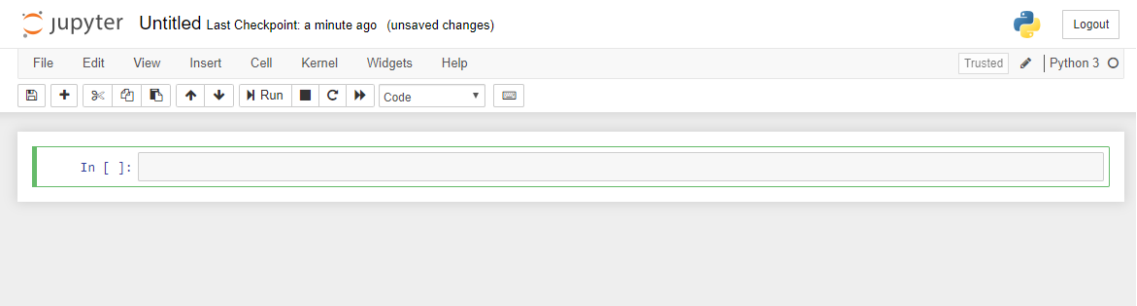
max(list_name)

**Steps:**

1. Open Jupyter Notebook.




2. Open a New File by clicking New → Python3; a new python3 file opens, where we will be writing the codes.




3. Example Code: #creating a list *# indicates this is a comment*
   List1= [1,2,3,4] #creates a list with name 'List1'
4. To obtain the result, press "**Ctrl+Enter**".

**Code:**

In: #creating a list
marks=[1,2,3,4,5,6,7,8,9,10]

In: marks
Out: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

In: marks[5]
Out: 6

In: marks[0:6]
Out: 1, 2, 3, 4, 5, 6

In: #adding an element

marks.append(11)

In: marks

Out: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]

In: #adding multiple elements
marks.extend([12,13])
Out: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]

In: marks.append([14,15])
In: marks
Out: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, [14,15]]

In: #deleting elements
marks.remove([14,15])
In: marks
Out: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]

In: del marks [0]

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In: marks
Out: [2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]

In: #accessing elements in a list
In: for mark in marks:
        print(mark)
Out: 2
     3
     4
     5
     6
     7
     8
     9
    10
    11
    12
    13

In: #accessing elements in a list
In: for mark in marks:
        print(mark+1)
Out: 3
     4
     5
     6
     7
     8
     9
    10
    11
    12
    13
    14
```

**Observation:** In Python, a single list can hold a sequence with various datatypes.

**Practice Questions:**

1. Consider the lists:

   (i) test = [‘This’, ‘is’, ‘1’, ‘list’]
   What will test [1] return?

   (ii) numbers = [17, 123]
   numbers [1] = 5
   What are the elements that the list contains?

2. Write a program to create a list, whose elements have to be given by the user and find the maximum element of the list.

3. Write a program to count the positive and negative numbers in the list: [5, -8, 2, -9, 10, -1].