Lists

**Lists are just like dynamically sized arrays**

**Lists need not be homogeneous always which makes it the most powerful tool in Python.**

**A single list may contain DataTypes like Integers, Strings, as well as Objects.**

**Lists are mutable, and hence, they can be altered even after their creation.**

# Lists

# We can store multiple datatyped elements in a single list

# We use [] to denote a list

# writing an empty list

x = []

print(x)

print(type(x))

# list maintains insertion order

x = [11,23.45,'hello','a',True]

print(x)

# list support loops

x = [11,23.45,'hello','a',True]

for i in x:

    print(i)

# list elements have indexes

x = [11,23.45,'hello','a',True]

print(x)

print(x[0])

print(x[1])

print(x[4])

# processing list elements using loop

x = [11,23.45,'hello','a',True]

for i in range(0,5):

    print(x[i])

# list supports reverse indexing

x = [11,23.45,'hello','a',True]

print(x)

print(x[0])

print(x[1])

print("\*\*\*\*\*\*\*\*\*\*\*\*\*")

#reverse indexing

print(x[-1])

print(x[-2])

# list can have same datatyped values

x = ['a','b','c','d','e']

print(x)

# replacing a value in a list

x = [11,23.45,'hello','a',True]

print(x)

x[4] = False

print(x)

# reverse of a list

l = [11,22,33,44,55]

print(l)

l.reverse()

print(l)

# List Functions

# NOTE: changes made to a list will be affected to the original list

# NOTE: By copying you cannot take backup of a list

# adding a new value to the existing list using fun append()

# by using append() the new will be appended as the list index

# append fun returns 'None'

x = [11,23.45,'hello','a',True]

print(x)

x.append(100)

print(x)

# adding a new element at a desired position using insert() function

# insert(position, new element)

x = [11,23.45,'hello','a',True]

print(x)

x.insert(2,1000)

print(x)

# Add multiple values to a list

list = [1, 2, 3]

list.extend([4, 5, 6])

print(list)

# deleting an element using fun pop()

# pop() deletes the last element of the list by default

# pop() also returns the deleted element

x = [11,23.45,'hello','a',True]

print(x)

print(x.pop())

print(x)

# deleting desired element using pop(index)

x = [11,23.45,'hello','a',True]

print(x)

y = x.pop(1)

print(x)

print("Deleted element: ", y)

# deleting an element using the value

# fun used is remove(element)

x = [11,23.45,'hello','a',True]

print(x)

x.remove('a')

print(x)

# getting index for any element of a list using fun index(element)

x = [11,23.45,'hello','a',True]

print(x)

print(x.index('hello'))

# list support duplicate values

x = [11,23.45,'hello','a',True,11,2,'a']

print(x)

# you will get IndexError

x = [11,23.45,'hello','a',True]

print(x)

print(x[50])

# sorting elements of a list using fun sort()

# by default sort() fun arranges the elements in ascending order

x = [11,1,22,3,44,5,66]

print("Before sorting: ", x)

x.sort() # ascending order

print("After sorting: ", x)

x.sort(reverse=True)

print("Descending Order: ", x)

# for string values sort() fun arranges in dictionary order

x = ['a','c','e','f','g','b']

print(x)

x.sort()

print(x)

x = ['apple','astronut','mango','banana','apricot']

print(x)

x.sort()

print(x)

# any operation on a list or its copy will change both the lists

x = [1,22,3,44,5,66,7]

y = x # getting copy of list x in y

print(x)

print(y)

x.sort()

print(x)

print(y) # y also will be sorted

# sorting elements of a list using fun 'sorted()'

# sorted() fun will return sorted list, without disturbuing the original list

x = [1,22,3,44,5,66,7]

y = sorted(x)

print(x)

print("sorted list: ", y)

# To find the max and min value of a list

prices = [589.36, 237.81, 230.87, 463.98, 453.42]

print(max(prices))

print(min(prices))

# to find the no of elements of a list

list\_1 = [50.29]

list\_2 = [76.14, 89.64, 167.28]

print('list\_1 length is ', len(list\_1))

print('list\_2 length is ', len(list\_2))

# To wipe out all the elements of a list

months = ['January', 'February', 'March', 'April', 'May']

print(months)

months.clear()

print(months)

# To find no of occurances of an element

fruits = ['cherry', 'apple', 'cherry', 'banana', 'cherry']

x = fruits.count("cherry")

print(x)

# To remove a value from the list

fruits = ['apple', 'banana', 'cherry', 'orange', 'pineapple']

print(fruits)

fruits.remove("banana")

print(fruits)

# To copy the elements of a list

fruits = ['apple', 'banana', 'cherry', 'orange']

x = fruits.copy()

print(x)

x.append('kiwi')

print(x)

print(fruits)

# list in list(nested lists)

l = [11,2,33,4,55,['one',2,'3',45.67],77,8,9]

print(l)

print(l[4])

print(l[5]) # gets inner list

print("First element of inner list: ", l[5][0])

print("First element of inner list: ", l[5][0][0])

print("First element of inner list: ", l[5][0][1])

print("First element of inner list: ", l[5][0][2])

# multiple values stored directly in a variable will get 'tuple' datatype

# to convert a tuple to list using fun list()

l = 11,2,33,4,55,6,77

print(l)

print(type(l)) # tuple

l = list(l)

print(l)

# appending loop generated values to an empty list

l = []

print(l)

for i in range(1,11):

    l.append(i)

    pass

print(l)

# list as a fun parameter

l = [11,22,3,44,5,66]

def test(l):

    for i in l:

        print(i)

        pass

    pass

test(l)

# list as return value

l = []

def test():

    for i in range(1,11):

        l.append(i)

        pass

    return l

result = test()

print(result)