Experiment No. 06

*Lab 06 –Python lists*

**Lab Objectives:**

1. Introduction to Python Lists

**Python List**

A list is a container which holds comma separated values (items or elements) between square brackets where items or elements need not all have the same type. In general, we can define a list as an object that contains multiple data items (elements). The contents of a list can be changed during program execution. The size of a list can also change during execution, as elements are added or removed from it.

**Program 1: Write a program to copy a list.**

**Code:**

original\_list1 = [10, 22, 44, 23, 4]

new\_list2 = list(original\_list) print(original\_list1) print(new\_list2)

**Output:**

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**Program 2:** Using the following interactive session as an aid, explain in your own words what

the list methods extend(), copy(), and clear() do.

>>> lst = [2, 3, 4]

>>> lst.extend([5, 6])

>>> lst

[2, 3, 4, 5, 6]

>>> lst2 = lst.copy()

>>> lst2

[2, 3, 4, 5, 6]

>>> lst.clear()

>>> lst

[]

>>> lst2

[2, 3, 4, 5, 6]

**Output:**

**Program 3:** Write a Python function which takes no argument and generate and print a list of first and last

6 elements where the values are cube of numbers between 1 and 30 (both included).

**Code:**

def CubeValues():

lst = list()

for i in range(1,31):

lst.append(i\*\*3)

print(l[:6])

print(l[-6:]) CubeValues()

Program 4: Use of Extend method with list

lis1 = [2, 1, 3, 5]

# initializing list 1

lis2 = [6, 4, 3]

# using extend() to add elements of lis2 in lis1

lis1.extend(lis2)

# displaying list after sorting

print ("List elements after extending are : ", end="")

for i in range(0, len(lis1)):

    print(lis1[i], end=" ")

print ("\r")

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**Programming Exercise**

1. Take a sample list [2, 1, 3, 5, 4, 3, 8]

# Apply del(), remove(), sort(), insert(), pop(), extend()…)

*2*. A ladder put up right against a wall will fall over unless put up at a certain angle less than

90 degrees. Given variables length and angle storing the length of the ladder and the angle that it forms with the ground as it leans against the wall, write a Python expression involving length and angle that computes the height reached by the ladder. Evaluate the expression for these values of length and angle:

(a)16 feet and 75 degrees (b)20 feet and 0 degrees (c)24 feet and 45 degrees (d)24 feet and 80 degrees

**Note:** You will need to use the trig formula:

height = length \* sin(angle)

The math module sin() function takes its input in radians. You will thus need to convert the angle given in degrees to the angle given in radians using:

radians = π \* degrees / 180

3. Write the relevant Python expression or statement, involving a list of numbers lst and using

list operators and methods for these speciﬁcations:

(a)An expression that evaluates to the index of the middle element of lst

(b)An expression that evaluates to the middle element of lst

(c)A statement that sorts the list lst in descending order

(d)A statement that removes the ﬁrst number of list lst and puts it at the end

**Note:** If a list has even length, then the middle element is deﬁned to be the rightmost of

the two elements in the middle of the list.

4. Start by assigning to variables monthsL and monthsT a list and a tuple, respectively, both containing strings 'Jan', 'Feb', 'Mar', and 'May', in that order. Then attempt the following with both containers:

(a)Insert string 'Apr' between 'Mar' and 'May'. (b)Append string 'Jun'.

(c)Pop the container.

(d)Remove the second item in the container. (e)Reverse the order of items in the container.

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(f)Sort the container.

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**Note:** when attempting these on tuple monthsT you should expect errors.

6. Write the corresponding Python assignment statements: (a)Assign 6 to variable a and 7 to variable b.

(b)Assign to variable c the average of variables a and b.

(c)Assign to variable inventory the list containing strings 'paper', 'staples', and 'pencils'. (d)Assign to variables first, middle and last the strings 'John', 'Fitzgerald', and 'Kennedy'. (e)Assign to variable fullname the concatenation of string variables first, middle, and last. Make sure you incorporate blank spaces appropriately.