Laboratory Report Cover Sheet

SRM Institute of Science and Technology
College of Engineering and Technology
Department of Electronics and Communication Engineering

18ECO109J Embedded System Design using Raspberry Pi

Fifth Semester, 2023-24 (Odd semester)

Name : Arnav Aggarwal

Register Number : RA2111032010002

Day Order : 3

Venue : TP1117-VLSI Simulation Lab

Title of the Experiment : Programs on List Operations

Date of conduction : 10.08.2023

Date of Submission : 18.08.2023

Particulars	Max. Marks	Marks Obtained
Pre-lab / Algorithm	10	
Lab Performance	20	
Post-lab	10	
Total	**40**	

REPORT VERIFICATION

Date : 10.08.2023

Faculty Name : Dr.Kanaparthi V Phani Kumar

Signature :

LAB-3 Programs on List Operations

Aim:

To explore programs on list operations using python 3

Task:

1. Write a python program to interchange first and last elements in a list.
2. Write a Python program to find N largest and smallest elements from the list
3. Write a python program to find the cumulative sum of elements in a list
4. Write a python program to find positive numbers from a list.
5. Write a Python program to generate and print a list of first and last 5 elements where the values are squares of numbers between 1 and 30 (both included).

Algorithms:

Task 1:

1.Start
2.Define a function that takes a list as an argument to perform the logic that interchanges the first and the last element.
3.Create an old_list which takes the values.
4.Call the function with old_list as an argument and pass it to new_list and store the result in the list.
5.End

Task 2:

1.Start
2.Import **heapq** module.
3.Define a function that takes a list and ‘n’ as an argument to perform the logic that finds the N largest and smallest element of a list.
4.Create a my_list which takes the values.
5. Call the function with my_list as an argument and pass it to largest,smallest variables and print the result.
6.End

Task 3:

1.Start
2.Define a function that takes a list as an argument to perform the logic that calculates the cumulative sum.
3.Create a my_list which takes the values.
4 Call the function with my_list as an argument and pass it to sum_list and store the result in the list.
5.End

Task 4:

1.Start
2.Define a function that takes a list as an argument to perform the logic that filters out the positive numbers from a list.
3.Create a my_list which declares the elements.
4 Call the function with my_list as an argument and pass it to positive_nums and store the result in the list.
5.End

Task 5:

1.Start
2.Create a list comprehension which iterates over the range of numbers from 1 to 31.
3.Extract the first and last five elements and store them in the variables from this list using negative indexing and slicing.
4 Print the square of the first and last five elements of the list.
5.End

Programs:

Task 1:

```
1.Write a python program to interchange first and last elements in a list.
```

In [1]:
```
#Name: Arnav Aggarwal
#Register No.RA2111032010002
def element(lst):
    if len(lst) >= 2:
        lst[0], lst[-1] = lst[-1], lst[0]
    return lst

old_list = [1, 2, 3, 4, 5]
new_list = element(old_list)
print(new_list)
```

Task 2:

```
2.Write a Python program to find N largest and smallest elements from the list.
```

In [4]:
```
#Name: Arnav Aggarwal
#Register No.RA2111032010002
import heapq
def largest_smallest(lst, n):
    largest = heapq.nlargest(n, lst)
    smallest = heapq.nsmallest(n, lst)
    return largest, smallest
my_list = [10, 5, 8, 20, 3, 15]
n = 2
largest, smallest = largest_smallest(my_list, n)
print(f"{n} largest elements: {largest}")
print(f"{n} smallest elements: {smallest}")
```

Task 3:

```
3.Write a python program to find the cumulative sum of elements in a list
```

In [3]:
```
#Name: Arnav Aggarwal
#Register No.RA2111032010002
def list_sum(lst):
    lst_sum = []
    total = 0
    for num in lst:
        total += num
        lst_sum.append(total)
    return lst_sum

list1 = [1, 2, 3, 4, 5]
sum_list = list_sum(list1)
print(sum_list)
```

Task 4:

```
4.Write a python program to find positive numbers from a list.
```

In [5]:
```
#Name: Arnav Aggarwal
#Register No.RA2111032010002
def positive_numbers(lst):
    pos_nums = [num for num in lst if num > 0]
    return pos_nums

my_list = [-1, 2, -3, 4, -5, 6]
positive_nums = positive_numbers(my_list)
print(positive_nums)
```

Task 5:

```
5.Write a Python program to generate and print a list of first and last 5 elements where the values are square of
numbers between 1 and 30 (both included).
```

In [6]:
```
#Name: Arnav Aggarwal
#Register No.RA2111032010002
squared_list = [num ** 2 for num in range(1, 31)]
first_5 = squared_list[:5]
last_5 = squared_list[-5:]

print("First 5 squared elements:", first_5)
print("Last 5 squared elements:", last_5)
```

Output :

Task 1:

```
[5, 2, 3, 4, 1]
```

Task 2:

```
2 largest elements: [20, 15]
2 smallest elements: [3, 5]
```

Task 3:

```
[1, 3, 6, 10, 15]
```

Task 4:

```
[2, 4, 6]
```

Task 5:

```
First 5 squared elements: [1, 4, 9, 16, 25]
Last 5 squared elements: [676, 729, 784, 841, 900]
```

Pre Lab Questions:

1. What is a list? Relate String and List?
2. How to create a list in python? Illustrate the use of negative indexing of list with example.
3. Start with the list[8,9,10]. Do the following using list functions
   (a) Set the second entry (index 1) to 17
   (b) Add 4, 5 and 6 to the end of the list.
   (c) Remove the first entry from the list.
   (d) Sort the list
   (e) Double the list
   (f) Insert 25 at index 3

Post Lab Questions:

1. Write a Python | Program to create two lists with EVEN numbers and ODD numbers from a list.

```
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```

In [7]:
```
#Name: Arnav Aggarwal
#Register No.RA2111032010002
def separate_even_odd(lst):
    even_numbers = [num for num in lst if num % 2 == 0]
    odd_numbers = [num for num in lst if num % 2 != 0]
    return even_numbers, odd_numbers

my_list = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
even_nums, odd_nums = separate_even_odd(my_list)
print("Even numbers:", even_nums)
print("Odd numbers:", odd_nums)
```

```
Even numbers: [2, 4, 6, 8, 10]
Odd numbers: [1, 3, 5, 7, 9]
```

2. Write a Python program to multiply all numbers of a list.

```
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```

In [8]:
```
#Name: Arnav Aggarwal
#Register No.RA2111032010002
def multiply_list(lst):
    result = 1
    for num in lst:
        result *= num
    return result

my_list = [2, 3, 4, 5]
product = multiply_list(my_list)
print("Product of numbers:", product)
```

```
Product of numbers: 120
```

Result:

Thus, the various list operations were studied and performed in python3.