

## LAB 4

### HOME ASSIGNMENTS

Q1)Write a python program to select smallest element from a list in an expected linear time.

CODE:

```
def find_smallest_element(nums):
    smallest = nums[0]
    for num in nums[1:]:
        if num < smallest:
            smallest = num
    return smallest
nums = [10, 20, 5, 40, 15]
smallest = find_smallest_element(nums)
print(f"The smallest element in the list is: {smallest}")
```

OUTPUT:

```
-----
The smallest element in the list is: 5
```

Q2)Write a python program to implement bubble sort.

CODE:

```
def bubble_sort(arr):
    n = len(arr)
    for i in range(n):
        for j in range(0, n - i - 1):
            if arr[j] > arr[j + 1]:
                arr[j], arr[j + 1] = arr[j + 1], arr[j]
arr = [64, 34, 25, 12, 22, 11, 90]
print("Original array:", arr)
```

bubble\_sort(arr)

OUTPUT:

```
-----
Original array: [64, 34, 25, 12, 22, 11, 90]
Sorted array: [11, 12, 22, 25, 34, 64, 90]
```

Q3)Write a python program to multiply two matrices

CODE:

```
def matrix_multiply(A, B):
    rows_A = len(A)
    cols_A = len(A[0])
    rows_B = len(B)
    cols_B = len(B[0])
    if cols_A != rows_B:
        raise ValueError("Matrices cannot be multiplied due to incompatible dimensions.")
    result = [[0 for _ in range(cols_B)] for _ in range(rows_A)]
    for i in range(rows_A):
        for j in range(cols_B):
            for k in range(cols_A):
                result[i][j] += A[i][k] * B[k][j]
    return result

A = [
    [1, 2, 3],
    [4, 5, 6]
]
B = [
    [7, 8],
    [9, 10],
    [11, 12]
]
result = matrix_multiply(A, B)
print("Product of A and B:")
for row in result:
    print(row)
```

OUTPUT:

```
Product of A and B:
[58, 64]
[139, 154]
```

Q4) Write a Python class to find validity of a string of parentheses, '(', ')', '{', '}', '[' and ']'. These brackets must be close in the correct order, for example "()" and "()[]{}" are valid but "[", "({[})" and "{{{" are invalid.

CODE:

```
class ParenthesesValidator:
    def __init__(self, s):
        self.s = s

    def is_valid(self):
```

```

stack = []
bracket_map = {'(': ')', '[': ']', '{': '}'}
for char in self.s:
    if char in bracket_map.values():
        stack.append(char)
    elif char in bracket_map:
        if stack and stack[-1] == bracket_map[char]:
            stack.pop()
        else:
            return False
    return not stack
if __name__ == "__main__":
    s = input("Enter a string of parentheses: ")
    validator = ParenthesesValidator(s)
    if validator.is_valid():
        print("The parentheses are valid.")
    else:
        print("The parentheses are invalid.")

```

OUTPUT:

```

Enter a string of parentheses: Enter a string of parentheses: ({[()]})
The parentheses are valid.

```

Q5)Write a Python class to reverse a string word by word.

CODE:

```

class StringReverser:
    def __init__(self, input_string):
        self.input_string = input_string

    def reverse_words(self):
        words = self.input_string.split()
        reversed_words = words[::-1]
        return ' '.join(reversed_words)
if __name__ == "__main__":
    input_string = input("Enter a string: ")
    reverser = StringReverser(input_string)
    reversed_string = reverser.reverse_words()
    print("Reversed string word by word:")
    print(reversed_string)

```

OUTPUT:

```
Enter a string: Hello World !  
Reversed string word by word:  
! World Hello
```

Q6)Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.

CODE:

```
import math  
  
class Circle:  
    def __init__(self, radius):  
        self.radius = radius  
  
    def area(self):  
        return math.pi * self.radius ** 2  
  
    def perimeter(self):  
        return 2 * math.pi * self.radius  
  
if __name__ == "__main__":  
    radius = float(input("Enter the radius of the circle: "))  
    circle = Circle(radius)  
    # Calculate and print the area and perimeter  
    print(f"The area of the circle is: {circle.area():.2f}")  
    print(f"The perimeter (circumference) of the circle is: {circle.perimeter():.2f}")
```

OUTPUT:

```
Enter the radius of the circle: 2  
The area of the circle is: 12.57  
The perimeter (circumference) of the circle is: 12.57
```