Sardar Vallabhbhai National Institute of Technology
Surat-395007
Web Programming and Python (AI104)

Assignment – 7 and 8
Object-Oriented Programming

1. Write a Python program to create a class representing a linked list data structure. Include methods for displaying linked list data, inserting and deleting nodes.

2. Write a Python program to create a class representing a queue data structure. Include methods for enqueueing and dequeuing elements.

3. Write a Python program to create a class representing a bank. Include methods for managing customer accounts and transactions.

4. Create a class "Employee" with attributes name and salary. Implement overloaded operators + and - to combine and compare employees based on their salaries.

5. Create a base class "Shape" with methods to calculate the area and perimeter. Implement derived classes "Rectangle" and "Circle" that inherit from "Shape" and provide their own area and perimeter calculations.

6. Create a class "BankAccount" with attributes account number and balance. Implement methods to deposit and withdraw funds, and a display method to show the account details.

7. Create a class for representing any 2-D point or vector. The methods inside this class include its magnitude and its rotation with respect to the X-axis. Using the objects define functions for calculating the distance between two vectors, dot product, cross product of two vectors. Extend the 2-D vectors into 3-D using the concept of inheritance. Update the methods according to 3-D.

8. Decode the message:
   A message containing the letters from A-Z can be encoded into the numbers using the mapping A-> 1, B-> 2, C-> 3, ..., Z-> 26. To decode an encoded message, you need to group the digits and do the reverse mapping. You are required to display all the possible decoded messages. For example: "11106" can be decoded into:
   a. "AAJF" with the grouping (1 1 10 6)
   b. "KJF" with the grouping (11 10 6)

9. Create a tokenizer for your own language (mother tongue you speak). The tokenizer should tokenize punctuations, dates, urls, emails, numbers (in all different forms such as “33.15”,

“3,22,243”, “313/77”), social media usernames/user handles. Use regular expressions to design this. [Hint: Use unicode blocks for your language, check wikipedia pages]