**NATIONAL PUBLIC SCHOOL, HSR, BENGALURU**

**COMPUTER SCIENCE ASSIGNMENT 4-DATA STRUCTURE**

**Instructions:-**

* ***The programs should be user friendly.***
* ***Each program should have comment at the top saying the aim of the program.***
* ***Program should be documented properly with necessary comments.***
* ***The program outputs should formatted*.**

Q1 Write a Menu Driven program in Python which accepts an integer list of the size given by user

a) Sort the list (as per the user choice in ascending or descending)

* Bubble Sort
* *Selection Sort*
* Insertion Sort

b) Shuffle the list (Pick an element randomly and swap it with the first element and carry on.)

c) Display the list

d) Exit

Q2. Write a Menu Driven program to read a nested integer list of size specified by the user.

Print the following report:-

Row/column/diagonal having the maximum sum (sum of all elements in that row/column/diagonal)

Row/column/diagonal having the maximum product (multiplication of all elements in that row/column/diagonal)

***Note:-Don’t use list functions sum and max***

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |
| 4 | 0 | 9 | 3 |
| 7 | 5 | 1 | 2 |

**The output should be- The maximum sum is 26 of row 2 having elements (5, 6, 7, 8)**

Q3. Write a menu driven python program to store the given set of data in a stack of **Magazines** (MagName, type, Frequency, Price). Perform all stack operation (PUSH, POP, PEEK, and DISPLAY)

Sample Data MagName=”ABC Auto”, type= Trade, Frequency=Monthly, price=250

***Use separate functions to implement each menu options.***

Q4. Write a Menu Driven program in Python to implement a Queue of cars (brand, cname, price) using list. The menu options are:-

1. Add
2. Remove
3. Show

iv) Search # Search for a particular car whose cname is given by user

v) Number of cars in the Queue

vi) Exit

***Use separate functions to implement each menu options***.

Q5. Write a Menu Driven program in Python to implement Stack operations for preparing of Selection List of a college Entrance.

No. of seats available are 7 (Stack size)

A dictionary M\_List contains RegNo as Key and Marks as Value

Push the keys (RegNo) of the dictionary into a stack S\_List, where the corresponding value (marks) is greater than 98.5.

Write menu to perform following options

1. Add Element to M\_List
2. Refresh S\_ List – Push element from the dictionary (Reg No & Mark)t to S\_List if it is meeting the required condition (Overflow to be checked) – After adding it to the S\_List, remove the element from M\_List
3. Show Selection List
4. Search for a Candidate’s Result (in STACK)
5. Withdraw the admission – POP from stack
6. Exit

***Use separate functions to implement each menu options.***

***Date of submission***

***30/06/2022***