Computer Engineering Department, SVNIT, Surat
Exam: End Semester, Dec -2020
Sub: Data Structures (CS210)
Date : 11th December 2020

Section A

Marks 25

Writing Time: 2:30 to 3:45 PM **Uploading Time: 3:45 to 4:00 PM**

Instructions:

1. Copy from any book or online material or other answer-book is strictly prohibited. No marks for copied work
2. Use your own examples for explaining the theories
3. Submit Section A before starting the Section B
4. Timely uploading of each section is mandatory, late receipt will not be considered in any condition/situation (Each section to be uploaded separately)
5. Answers to be hand written on Answer-sheet like pages
6. Answers must be uploaded in sequential order of the questions
7. It is compulsory to mention **Stu Code :Question number : PageNumber** On **top right of each page**

Q.1 Department keeps a list of subject along with the prerequisite subject. The goal is to get sequence of all the courses to be taken to select the particular Major subject X. [6]

Write an algorithm to input each pair of subject (S1, S2) where S1 is prerequisite for S2. Find the sequence of subjects S1, S2,…Sk as sequence of prerequisite for X

E.g. Input: [(S1,S2), (S1, S9), (S3, S6), (S2,S3), (S4, Y), (S3,S4), (S3,S5), (S5,X)], X
Output : S1,S2,S3,S5

Q.2 You are given a Queue which is tobe used as Stack: [6]
Write an algorithm to implement the stack functions (PUSH and POP) using the Queue functions (INSERT and DELETE). Input initial queue followed by set of stack operations, Display Queue after each stack operation.

Test your algorithm with given Queue as input and perform various Stack Operations

Iiput :
Queue : 3 : 4 : 8 : 10
Input : POP
Queue status : 4:8:102
Input : PUSH 15
Queue status : 15:4:8:10
Input: POP
Queue status :3:4:8:10

Q.3 Given an input line in capital letters, convert first and last letter of each word in SmallCap for the given line. It's provided that the input line is in Uppercase. [6]

Note: proper DS and efficient algorithm is expected rather than putting IF statement for every possible cases

Input : HE IS A STUDENT OF COMPUTER ENGINEERING DEPARTMENT
Output: he is a sTUDENt of cOMPUTEr eNGINEERINg dEPARTMENt

OR

Q.3 Problem: Given the long Text content (A Book) , find frequency count of words along with the location information. [6]
The process will reads in a text file given by the user where each line is identified by a line number. Process has to count the repetition of each word and to maintain a list of location on which it appears. Ignore case and punctuation.

Write an algorithm to solve the problem with the most suitable data structure.

Dry Run your algorithm and show the intermediate result after each step of your algorithm for the given sample Input.

Input:

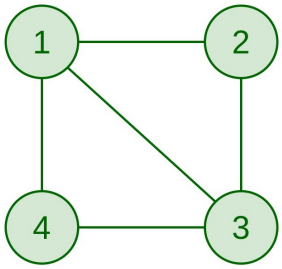
1. Pet ownership can be fun, but it can also be a big responsibility. 2. With each type of pet comes a different responsibility. 3. Some pets have fun while taking walks, while others like swimming in water. 4. If you understand your pet, you can have fun for many years to come.

Output:

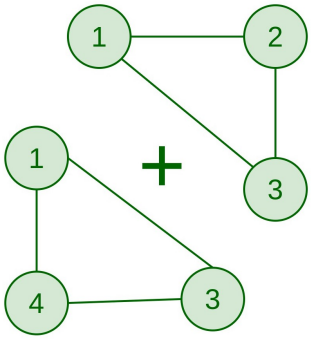
Pet , 4, 1,2,3,4,
Ownership, 1,1
Can 2,1,4
:
:
Responsibility 2,1,2

Q.4 Given a set of cities and distance between every pair of cities, the problem is to find the all possible circular path for the given city X given the numbers of cities to be covered in the path. [7]

Example:



Input 1,2 [start point, total number of other cities to be traversed]
Output : 1,2,3
1,3,4



Input : 1,3
Output 1,2,3,4