Department of Statistics & Computer Science

University of Kelaniya ACADEMIC YEAR – 2021/2022

COSC 21063/ BECS 21223/ COST 44233-

Data Structures and Algorithms

Practical Tutorial 02

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1. Write a program which prints given string as it is using queues.
2. Write a program which appends two given strings such that the second string is appended to the end of the first string using a queue.

   Input:

   string1 : Hello

   string2 : World

   Output: HelloWorld

3. Write a function that will read one line of input from the terminal. The input is supposed to consist of two separated by a colon (:). As its result, your function should proceed a single character as follows.
   - N: No colon in the line
   - L: The left part is longer than the right
   - R: The right part is longer than the left
   - D: The right and left parts have the same length but different
   - S: The right and left parts are exactly the same

   Example:

Input	Output
Sample Sample	N
Short : Long	L
Sample : Sample	S

   Write a code for the above scenario using queues.

4. Write a program to change the first half of a number with its second half using queue operations.

Input	Output
987654	654987

5. Write a program that reads a string that the user provides and prints the vowels in the string in ascending order of the alphabet using a queue.

Input	Output
ALGORITHMS	A O I

6. Rearrange the elements of an even-length queue of integers by interleaving the first and second half of the queue.
   Input: 10 20 30 40 50 60 70 80 90 100
   Output: 10 60 20 70 30 80 40 90 50 100

7. Student in a class have marks of 3 subjects Mathematics, chemistry, and physics. For each student in the class should calculate the total & the average marks. Using Queue, write a C program to read the marks and print only the average marks of each student in order of data inserted. (Hint: You should define a suitable user-defined data type to keep student number, marks of 3 subjects, total and average mark.

8. An automated car park contains a single lane that can hold up to 10 cars. Car arrives from the west end of the car park and leave from the east end. If a customer comes to get a car that is not at the east end, all cars to the east of the car are moved out, the car driven out, and the other cars are restored in the same order that they were in originally. Whenever a car leaves, all cars to the west are moved forward so that at all times all the empty spaces are in the west part of the car park. Write a program that reads a group of input lines. Each line contains 'A' for arrival or a 'D' for departure and a license plate number.

   E.g.: "A GR-4587" indicates that the car with license plate number GR-4587 has arrived.

   Cars are assumed to arrive and depart in the order specified by the input. The program should print a message each time that a car arrives or departs. When a car arrives, the message should specify whether there is room for the car in the car park. If there is no room for a car, the car waits until departure line is read for the car park. If there is no room for a car, the car waits until a departure line is read for the car. When room becomes available, another line should be printed. Write a program for the above scenario using queues.