Data Structure Lab

Assignment-2 (pds2016autumn@gmail.com, File Name: A2_ROLLNO.c/cpp)

Date of Assignment: 11-August-2021 **Date of Submission: 16-August-2021**

1. The security guards of IIT Bhubaneswar are standing in a row facing towards the main building. For a given security guard, you have to find out the first security guard taller than him standing in the row in front of him in linear time. The input is given as an array of n real numbers, denoting the heights of the security guards. For each security guard i, find the one j (j > i) with next greater height. If no security guard is taller than the current one, print -1.

   Input:

   n = 8 5 3 2 8 8 7 7 9
   n = 8 5 3 2 8 8 7 7 8

   Output:

   Case 1: 0 - > 3 1 -> 3 2 -> 3 3 -> 7 4 -> 7 5 -> 7 6 -> 7 7 -> -1
   Case 2: 0 - > 3 1 -> 3 2 -> 3 3 -> -1 4 -> -1 5 -> 7 6 -> 7 7 -> -1

2. A 2-D matrix A of order M X N is given where the starting cell is A[i1][j1] and the finishing cell is A[i2][j2]. Rishabh starts from the starting cell and has to reach the finishing cell. He can move only towards **right, left, up** and **down**. In the matrix, 0 means invalid road segment and 1 means a valid road segment. Write a C/C++ program that helps Rishabh to reach the finishing cell. The output of the program is the sequence of <i, j>s in the 2-D matrix that starts from <i1, j1> and end at <i2, j2>. Read M and N. Read i1, j1, i2, j2. Read A[i][j] ϵ {0, 1} for all i, j. **Assumption**: reachability is assured.

Input:

5 9 i1 = 0 j1 = 2 i2 = 2 j2= 8

4	**0**	**0**	**1**	**1**	**0**	**1**	**1**	**1**	**1**
3	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**0**	**0**
2	**1**	**0**	**1**	**1**	**0**	**1**	**1**	**1**	**1**
1	**1**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**0**
0	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**

Output:

<0,2> <0,1> <0,0> <1,0> <2,0> <3,0> <3,1> <3,2> <2,2> <2,3> <1,3> <1,4> <1,5> <2,5> <2,6> <2,7> <2,8>