Foundations of Algorithms – IE2072

Sri Lanka Institute of Information Technology
Assignment (30% of total assessments)

Due Date: 10th May Friday

Develop C or Java source codes for the following applications.

Question 1 (10 marks)

You are an IT company's manager. Based on their performance over the last N working days, you must rate your employee. You are given an array of N integers called workload, where workload[i] represents the number of hours an employee worked on an i^{th} day. The employee must be evaluated using the following criteria:

- Rating = the maximum number of consecutive working days when the employee has worked more than 6 hours.

Task

Determine the employee rating.

Example

Assumptions

- *N* = 12
- *workload* = [2, 3, 7, 8, 7, 6, 3, 8, 12, 11, 12, 10]

Approach

Workload with consecutive hours > 6 = [2, 3, **7, 8, 7**, 6, 3, **8, 12, 11, 12, 10**] => Longest Interval = [8,12,11,12,10]

Therefore return *5*.

Input format

- The first line contains an integer *N d*enoting the number of working days.
- The second line contains a space-separated integer array *workload* where *workload[i]* represents the number of hours an employee worked on an i^{th} day.

Output format

Print the employee rating.

Sample Input	Sample Output
7	3
3 7 8 12 4 9 8	

Question 2 (20 marks)

You are given a N * M grid in which each cell consists of either 0 or 1. A cell (i,j) is blocked if its value is **1**. Standing at a cell (i,j), you can perform the following steps.

1. You can move right to the very next cell which is not blocked.
2. You can move down to the very next cell which is not blocked.

You are initially located at cell (1,1). Determine the number of ways in which you can reach (N,M) starting from your initial location.

Example: Let **3 * 3** grid be

0	1	0
1	0	0
0	0	0

If you are standing at cell (1,1), then:

- By performing step 1, you can jump to cell (1,3) and,
- By performing step 2, you can jump to cell (3,1)

The answer will be 2.

Input format

- The first line contains N and M denoting the number of rows and the number of columns.
- Each of the next N lines consists of a string of length M.

Output format

Print a single line containing the number of ways to reach (N,M) from (1,1)

Sample Input	Sample Output
3 3 000 011 000	3

Submit your original source codes and the document which contains the source codes and screenshots of the outputs.

The link will be available in courseweb on or before the deadline mentioned.

Copied source codes (ChatGPT, etc…) will get 0 mark without any clarifications.

The absence for the viva session (will be scheduled after the deadline) will also get 0 marks.

IE2072 – Foundations of Algorithms
Assignment Assessment Sheet-2023 Regular

Student IT No:
Name:

	Question 1 (10)		**Question 2(20 marks)**	
	Marks	**Allocated Marks**	**Marks**	**Allocated Marks**
Ability to take the input/s as a keyboard input	2		2	
Correct output	2		6	
Knowledge about the implemented logic	3		7	
Works on exceptional cases	2		3	
Document submission	1		2	
Total for each Question				
Total				

Comments: