



ShareChat Online Assessment

1. Budget Hiring

You want to hire some employees. There are N employees in total each having a skill U and wants a salary V .

These employees are not independent and rather have made some groups. Thus there are Q statements each stating that X and Y belong to the same group. If you want to hire a person then, his entire group must be hired. You have a budget B . You want to hire employees such that you get the maximum possible skill within the budget.

Example:

Consider $N = 4$, $Q = 2$, $B = 17$

Let the employees and their respective skills be:

1. 12 7
2. 9 5
3. 13 8
4. 15 11

Let the grouping be:

- 1 3
- 2 4

Therefore, employee 1 and 3 can be hired within the budget of 17. The skill acquired will be 25.

Function Description:

Complete the solve function provided in the editor. This function takes the following 3 parameters and return the maximum possible skill that you can get within the budget.

- *skillcost*: Represents the skill and cost of each employee.
- *groupings*: Represents the grouping of employees.
- *B*: Denotes the available budget

Input Format:

First line contains 2 integers N and 2.

Then N lines follow each representing 2 integers U and V (skill and salary).

Then there are 2 integers Q and 2.

Q lines follow representing 2 integers X and Y .

Last line contains an integer denoting budget B .

Output Format:

Print a single integer representing

Solve using DFS + Knapsack

2. Alphabetical String

While creating an account on a new website, you choose a certain string of letters as your new password. However, you are alerted that the website requires your password to be an alphabetical string. It explains: "A string of lowercase letters is called Alphabetical if deleting zero or more of its letters can result in the alphabetical string *abcdefghijklmnopqrstuvwxyz*."

Because of this requirement you need to be sure that your password is alphabetical. Your goal is to find the minimum number of letters that must be inserted in order to make your password alphabetical.

Example:

Given string S: "*xyzabcdefghijklmnopqrstuvw*". The optimal solution is to insert "*xyz*" in the end of the string to obtain the alphabetical string "*xyzabcdefghijklmnopqrstuvwxyz*". Note that this is alphabetical because if you delete the first three letters "*xyz*". It results in the alphabet string "*abcdefghijklmnopqrstuvwxyz*". Because this requires three letter insertions. There is no way to make fewer than three insertions and end up with an alphabetical string.

Functional Description:

Complete the solve function provided in the editor. This function takes the following 1 parameter and returns the minimum number of letters that must be inserted in order to make your password alphabetical.

Input:

First line contains an integer T denoting the number of test cases.

Each of the next T lines contains a string S denoting the password that you are required to make alphabetical.

Output:

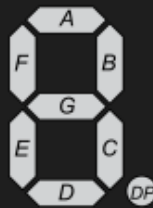
For each test case, print the minimum number of letters that must be inserted in order to make your password alphabetical.

Solve using LCS

3. Alice and her gadget

Alice recently bought a gadget, having seven-segment display. The gadget is having seven switches named a, b, c, d, e, f, g and each switch corresponds to a segment to be displayed in the gadget. Alice found a string of numbers, now she decided to display each number in her gadget one by one. The gadget can display only one number from her string at a time. Numbers are displayed in the below pattern.

Alice is a bit lazy and she wants to do it with minimum toggles. Initially, all switches are off. Help Alice to find her that minimum number.



a	b	c	d	e	f	g	Outputs
1	1	1	1	1	1	0	0
0	1	1	0	0	0	0	1
1	1	0	1	1	0	1	2
1	1	1	1	0	0	1	3
0	1	1	0	0	1	1	4
1	0	1	1	0	1	1	5
0	0	1	1	1	1	1	6
1	1	1	0	0	0	0	7
1	1	1	1	1	1	1	8
1	1	1	0	0	1	1	9

Example:

Consider Length = 2, N = 15. You must determine the minimum number of toggles required.

For displaying 1 we need to toggle 2 switches.

For displaying 5 after 1, we need to toggle 5 switches.

So, the answer would be 7.

Solve using brute force