

Rollercoasters

Summary

You are planning a visit to an amusement park with three friends and need to decide which rollercoasters you want to go on. Once you're there you have to visit the amusements in the order laid out on the map because it's a big, crowded place, and to avoid the queues you need to book in advance. Each of your friends has their own special way of picking which amusements they would like to visit, it's your job to help them figure out how much fun they are going to have at the amusement park, based on their respective strategies.

Below, we provide 3 variants of the problem - Easy, Medium and Hard. We encourage you to solve them in order as you may be able to reuse some parts of your solutions as you move on to harder problems.

Easy

Your first friend — Alice — will go on any rollercoaster that she finds scary, and has **10 units of fun** every time she does. Your input is a file where each line represents a rollercoaster as either a **0** or a **1**. Each rollercoaster Alice finds scary is represented with a 1, and each rollercoaster she does not is represented with a 0. **What is the total amount of fun Alice has on the trip?**

EXAMPLES

Given the following description of which rollercoasters Alice does and does not find scary:

```
0
0
1
1
1
0
0
1
1
1
```

we see that Alice finds **6** rollercoasters scary, so has **$6 * 10 = 60$** units of fun.

Medium

Your second friend — Bob — has a completely different criteria, he wants each rollercoaster he goes on to be **scarier than the previous one** and he **doesn't want to travel far between rollercoasters** — Bob is willing to travel any distance to get to the first rollercoaster and, luckily, the exit of each rollercoaster is next to the entrance of the next on the map, so he'll go from one to the next, but if he has to go further between rides, his day is ruined (he'll have no fun). Like Alice, Bob has **10 units of fun** for each rollercoaster he goes on, so he wants to **maximize the number of rollercoasters visited** subject to his criteria.

Your input is a sequence of numbers (each on their own line) describing how scary each rollercoaster is, in the order they appear on the amusement park map. **How much fun does Bob have on the trip?**

EXAMPLES

On a trip to an amusement park with 4 rollercoasters, Bob tells you that he rates the scariness of each rollercoaster as follows:

1
2
1
3

In this example, Bob can visit at most **2** rollercoasters and still have fun (so he can have at most **20** units of fun). This could be either by visiting the first and then the second rollercoaster (Scariness 1 and 2), or the third and then the fourth (Scariness 1 and then 3).

Hard

Charlotte, the last friend on the trip, is a bit more relaxed than Bob. She wants each rollercoaster she visits to be **scarier than the previous one**, but she **doesn't mind traveling between rollercoasters**. Like Alice and Bob, she has **10 units of fun** for each rollercoaster she goes on, so again she wants to **maximize the number of rollercoasters visited**, subject to her criteria. Your input is the same as for Bob. **How much fun does Charlotte have on the trip?**

EXAMPLES

In each example, the first column shows the contents of the input and every subsequent row shows the rollercoasters that Charlotte will visit in **bold** and in green. Note that in some cases there may be multiple possible sequences of rollercoasters Charlotte visits which will maximize fun.

Example 1: 30 units of fun.

Input	Soln 1
1	1
2	2
3	3

Example 2: 10 units of fun.

Input	Soln 1	Soln 2	Soln 3
5	5	5	5
3	3	3	3
1	1	1	1

Example 3: 40 units of fun

Input	Soln 1
1	1
10	10
2	2
20	20
3	3
4	4

Example 4: 40 units of fun

Input	Soln 1
6	6
7	7
8	8
1	1
2	2
3	3
4	4

Example 5: 40 units of fun

Input	Soln 1	Soln 2
1	1	1
3	3	3
2	2	2
4	4	4
5	5	5
1	1	1

Input

You will find the actual input to all variants of the problem in the relevant Dropbox folder. File `input1.txt` contains input for the Easy variant. Input for Medium and Hard is the same and you can find it in file `input2.txt`.