

Marshall Boy

June 03, 2021

Overview

Marshall is a good boy but he is bored because of staying in the house for a long time. One day when he was playing with his toys, He saw his old magnets, but they were interleaved. He was thinking about how he separates magnets without getting bored.

He saw an interesting property among magnets. The property was, some of the magnets with the same color were in a row. he said to himself if I, can separate k magnets with the same color in a row I, will give myself K^2 points for separating them. He was so obsessed with his gaming idea, so he started to separate magnets to get the maximum points he can obtain from separating the magnets.

Input:

You will give an array of numbers that each number denotes the color of a magnet.

Output:

Print one number which is the maximum total points Marshall can get from separating magnets.

Examples:

Input:

Magnets = [1, 1, 1]

Output:

$$3*3 = 9$$

[there is one choice separating all three magnets to get maximum points]

Input:

Magnets = [1, 3, 2, 2, 2, 3, 4, 3, 1]

Output:

$3*3 = 9$ remaining Magnets: [1, 3, 3, 4, 3, 1]

$1*1 = 1$ remaining Magnets: [1, 3, 3, 3, 1]

$3*3 = 9$ remaining Magnets: [1, 1]

$2*2 = 4$ remaining Magnets: []

Summation: $9+1+9+4 = 23$

Hint: For each group of colors Marshall has two choices: either he can remove it or maintain part of it for the future to make a larger group.

Goals

1. **Design Dynamic Programming Algorithm** which can help Marshall for obtaining maximum total points from separating the magnets.

Attention

The approach must be dynamic programming.