

## Independent set in a path

For a graph  $G = (V, E)$ , a subset  $U$  of  $V$  is an independent set if there is no edge  $(v_1, v_2)$  for any  $v_1$  and  $v_2$  in  $U$ . Finding the maximum independent set of a graph is an important but very difficult problem. However, the problem can be easily solved when the graph is special.

Peter is an excellent performer and receives many invitations, one for each day. For each performance, he can obtain a pay of money. However, to ensure the qualities, Peter never performs in two consecutive days. Please write a program to help Peter to decide which invitations he should accept such that the total pay is maximized.

This problem is about how to find the maximum weighted independent set of a path.

A path with positive weighted vertices can be regarded as a one-dimension array.

Given an array  $A$  of positive integers, find an independent set of its members such that the sum of these members is maximum. A set is independent if no two consecutive members are in the set. That is, if  $A[i]$  in the set, neither  $A[i - 1]$  nor  $A[i + 1]$  is in the set.

[中文]

對於圖  $G = (V, E)$ , 點的子集合  $U$  稱為 independent set 若任兩個  $U$  中的點皆無邊相連。計算 maximum independent set 是一個重要但困難的問題，不過在某些特殊圖上此問題可以很容易的求解。

Peter 是一個優秀的表演者，他接到許多的邀約，每天均有一場。每一場表演都可以得到某些金額的報酬，但是為了表演的品質 Peter 絕對不會連續兩天都進行表演，請你寫一支程式協助他決定應該接受那些表演以得到最大的報酬。

這是一個在圖為 path 時的 maximum independent set 問題。我們可將其視為一個正整數的一維陣列，對於所給的正整數陣列  $A$ ，目標是找一個總和最大的獨立集，在此一個集合被稱為獨立集如果每有任兩個相連的元素被選中，也就是說，若  $A[i]$  在此集合中，則  $A[i - 1]$  與  $A[i + 1]$  都不在此集合中。

**Input:** The input consists of several test cases, each in one line. Each case starts from an integer  $n$  indicating the number of elements in the array  $A$ . Followed this integer there are  $n$  positive integers which are  $A[0], A[1], \dots, A[n-1]$ . We suppose that  $n \leq 500$  and  $0 < A[i] < 1000$ . The case with  $n = 0$  is the end of the input.

**Output:** For each case, output the maximum of the sum of the independent set of  $A$  in one line.

Sample Input:

3 1 2 3

4 10 9 1 7

5 5 9 7 2 1

0

Output of the sample input:

4

17

13