COMPETITIVE CODING
with
RAMAN CLASSES

... An interactive series for those willing to learn and code

Problem: Jumping Jupang

Topic	: **Arrays**
Difficulty	: **EASY**
Programming Language	: **C++**
Time to Spend	: **20 min**

Problem Statement

Problem:
Mr. Balireddy wants to travel from Hyderabad to Delhi for a 'Date'. There are n stations to be covered(including Hyderabad and Delhi). Each station connects to the station next to it and to the station placed at 3rd position with its respect(if exist). Hyderabad is at position 1 and Delhi is at position N. Mr. Balireddy has to pay a cost for taking a particular route. The cost of travelling from a station to a station next to it is "a" and to the station 3rd to it is "b".

Since Mr. Balireddy is saving money for a date he plans to spend as less as possible on travel. Your task is to find the minimum possible amount which Mr. Balireddy has to pay to meet his date.

Problem Statement

Input :

8
1 2

Output :

5

Input Description :

The first line contains a single integer denoting the number of stations.

The second line contains two integer denoting the cost of going to next station and the station 3rd to it respectively.

Problem Statement

Output Description :

Print a single integer denoting the minimum amount needed by Mr. Balireddy to travel to meet his date.

Let Us Revise

In order to solve this problem, go through the following concepts.

1. Dynamic Programming
2. Using Loop Statements

Problem Description

We are given cost of traveling to one station to next station by ‘a’ and to travel to 3rd station from it as ‘b’. We need to travel from station 1 to n in such a way that the total cost of travelling is minimum.

For example: if a=1 and b=2 and n=4

Possible costs to travel are: 1(1->2) + 1 (2->3) + 1 (3->4) = 3
2 (1 -> 4) = 2

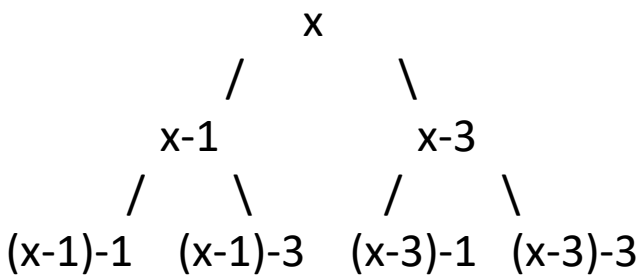
Minimum of them is 2.

Output: 2

Let Us Think

In order to solve this problem, let us think and analyse how to get started with this problem.

Try out different examples in the paper. After analysing it a little you can see, all the roots from station 1 to x



Leaf nodes of this tree are station 1.

Let Us Think

So problem boils down to find the one route such that its cost of travelling is minimum among all possible routes.

Let Us Think

As you have seen that the problem can be sub-divided into smaller problems.
So the recursive equation is:

cost(x) = min(a + cost(x-1) , b + cost(x-3))

As sub - problems also overlaps.

Dynamic Programming can be used to solve this problem.

Let Us Think

Now you know the logic. Lets proceed with the code.

Let Us Think

Now you know the logic. Lets proceed with the code.

Things we need to do for this problem:

Create a Bottom up of table cost[n+1] where cost[i] represents minimum cost to reach station i and print cost[n].

Let Us Code

Create a Bottom up of table cost[n+1] where cost[i] represents minimum cost to reach station i and print cost[n].

```
//Bottom up tabel cost[n+1]
//where cost[i] represents minimum
//cost to travel station i.
int cost[n + 1] = { 0 };

cost[0] = 0;
cost[1] = 0;
cost[2] = a;
cost[3] = a + a;
for (int i = 4;i <= n;i++) {
    cost[i] = min(a + cost[i - 1], b + cost[i - 3]);
}

cout << cost[n] << endl;
```

Tweak n Try

Modify the code to find the minimum cost to travel station n from station 1, if the cost to travel next station is “a” and 2nd next equation is “b” and 3rd next equation is “c”. (a, b, c and n given by user)

Thank You !

... brought to you by

www.ramanclasses.in