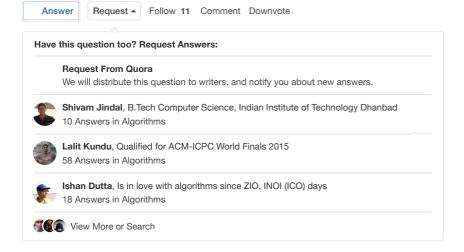Search Quora

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# How to solve square brackets problem on SPOJ(SPOJ : SQRBR   )?

🔗 http://www.spoj.com/problems/SQRBR/

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**Shivam Jindal**, B.Tech Computer Science, Indian Institute of Technology Dhanbad
10 Answers in Algorithms

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**Ishan Dutta**, Is in love with algorithms since ZIO, INOI (ICO) days
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## 5 Answers

**Raziman T.V.**, IOI silver medallist (2007), ACM ICPC world finalist (2011, 2012)
Updated Dec 27, 2013

This problem can be solved by dynamic programming.

Let count(i,j) be the number of valid ways of filling the first i positions such that there are j more brackets of type '[' than of type ']'. Valid ways would mean that it is the prefix of a matched  bracket expression and that the locations at which we have enforced '[' brackets have been satisfied. It is easy to see that count(2N,0) is the final answer we need.

The base case of the DP is that count(1,1)=1. You have to fill the first position with a '[' bracket, and there is only way to do this. count(1,i)=0 for i>1.
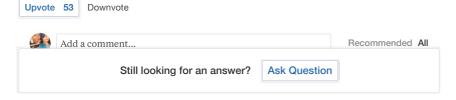
The recurrence for i>1 is:

- count(i,0) = count(i-1,1)

- count(i,j) = count(i-1,j-1) + count(i-1,j+1) for j>0

If i is a location where we have enforced a '[' bracket, the recurrence changes to:

- count(i,0) = 0

- count(i,j) = count(i-1,j-1) for j>0

Using these relations, count(2N,0) can be found in $O(N^2)$ time.

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