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NPTEL ONLINE COURSE

Discrete Mathematics

Let Us Count

Catalan Numbers - Part 2

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Let us take up this problem that we discussed just now of going from $0,0$ to $5,5$. As you can see there are 4 rights, I'm sorry 5 rights and 5 ups for you to reach $5,5$ but then let me take an example of let's say right up, right up, right right up, right and then up up. You see let me try looking at this instance by actually going up and then seeing what exactly happens here; right and an up, right and an up, two rights and an up and then a right and an up up you observed something very important here that you never crossed the diagonal. Although you touched the diagonal you never crossed it. So here goes my question. In how many ways can we start from $0,0$ and go towards $5,5$ and end our journey in $5,5$ without trespassing the diagonal. By trespassing I mean you cannot cross this fence. I am putting a fence here. The fence is a diagonal. You can however touch the diagonal. What is the question? The question is in how many ways can you reach your destination $5,5$ from your starting point $0,0$ without trespassing the fence which happens to be our diagonal.

So let me count the total number of ways for this now.

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Department of Higher Education

Ministry of Human Resource Development

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