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CMSI 282
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High Noon

Catalan Number Generator

Code:

```
import java.math.BigInteger;
```

```
public class Catalan {  
  
    private static BigInteger[] results;  
  
    public static void main (String[] args) {  
  
        int n = Integer.parseInt(args[0]);  
  
        results = new BigInteger[n + 1];  
        results[0] = BigInteger.ONE;  
        results[1] = BigInteger.ONE;  
        results[2] = BigInteger.ONE;  
  
        System.out.println(catalan(n));  
    }  
  
    public static BigInteger catalan (int n) {  
        if (results[n] != null) {  
            return results[n];  
        } else {  
            BigInteger total = BigInteger.ZERO;  
  
            for (int i = 1; i < n; i++) {  
                total = total.add(catalan(n - i).multiply(catalan(i)));  
            }  
            results[n] = total;  
            return total;  
        }  
    }  
}
```

Results:

```
$~/Documents/Class/CMSI_282_Algorithms/Catalan: java Catalan 5  
14  
$~/Documents/Class/CMSI_282_Algorithms/Catalan: java Catalan 7  
132  
$~/Documents/Class/CMSI_282_Algorithms/Catalan: java Catalan 10  
4862  
$~/Documents/Class/CMSI_282_Algorithms/Catalan: java Catalan 100  
227508830794229349661819540395688853956041682601541047340
```