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package Practicals;

public class BinomialCoefficientDP {

    // Function to calculate Binomial Coefficient (nCr) using DP
    public static int binomialCoeff(int n, int r) {
        int[][] dp = new int[n + 1][r + 1];

        // Base cases and bottom-up DP filling
        for (int i = 0; i <= n; i++) {
            for (int j = 0; j <= Math.min(i, r); j++) {
                if (j == 0 || j == i)
                    dp[i][j] = 1;
                else
                    dp[i][j] = dp[i - 1][j - 1] + dp[i - 1][j];
            }
        }

        return dp[n][r];
    }

    public static void main(String[] args) {
        int n = 5, r = 2;

        int result = binomialCoeff(n, r);
        System.out.println("Binomial Coefficient C(" + n + ", " + r + ") = " + result);

        // Display complexities
        System.out.println("Time Complexity: O(n * r)");
        System.out.println("Space Complexity: O(n * r)");
    }
}

```