

1.Design and Run

formula.c is used to receive and output result, if the input did not follow the rules, the program would use nCr function circularly to solve these problems. Since the formula is $n!/((n-r)!*r!)$, nCr function will calculate 3 factorial. While $n \leq 12$, there is no overflow problem.

2.Time Complexity

nCr function just calculate 3 factorial, running time is $O(n)$. The time complexity is $O(n)$.
formula.c program in the loop use n times nCr function, the time complexity is $O(n^2)$.