Formula

• Design and Implementation

• Design

This program is designed to print the formula for $(1 + x)^n$.
The program also needs to print out its execution time.
In formula.c, it calls nCr.s to compute $\frac{n!}{r!(n-r)!}$.
There are 2 functions in nCr.s. They are:
1. int nCr (int n, int r)
2. Factorial (int n)
The function nCr has two parameters, the input integer and the degree of the polynomial.
In the function nCr, another function Factorial will be used to compute n!.
Factorial function takes an integer as a parameter and return the factorial of that number by keep multiply until the parameter number is no longer bigger than 1.

• Implementation

The biggest challenge I met is how to solve the problem that this algorithm is easily reaching the overflow.
I use .jo in the Factorial function to detect the occurrence of an overflow and return 0 to the nCr function.
When nCr detect overflow then return 0 to indicate error and the main function in formula will output error message states "Overflow Detected". Also, the main function will output error message if the input argument is not a positive integer.

• Big O

Big O for factorial function is O(n) since the function just

simply return the result of multiplying n numbers. Big O for nCr function is O(n), it calls the factorial function and divides a constant from the return value of factorial function.

Big O for formula.c is $O(n^2)$, it calls the nCr function n times, and the big O for nCr is O(n) so $n*n = n^2$.