# 7th Assignment, Fall 2025

2023315976 김동건

1. Write a C program to find the total number of possible combinations of r items that can be selected from a set of n items, nCr (Combination), using a recursive function

1.1 Code

```c
#include <stdio.h>

int combinations(int n, int r) {
    if (r == 0 || r == n) {
        return 1;
    }
    if (r == 1) {
        return n;
    }
    if (r > n / 2) {
        r = n - r;
    }

    return combinations(n - 1, r - 1) + combinations(n - 1, r);
}

int main(){
    int n, r;

    printf("Enter 'n' and 'r' to compute combination: ");
    scanf("%d %d", &n, &r);

    printf("The number of combinations: C(%d, %d) = %d", n, r, combinations(n, r));

    return 0;
}
```

1.2 Execution terminal

```
Enter 'n' and 'r' to compute combination: 7 3
The number of combinations: C(7, 3) = 35
```

2. Write a C program to perform the following operations using functions.

2.1 Code

```c
#include <stdio.h>

double calculate_expression(double a, double b, double c, double k) {
    return (a * b) / k + (b * c) / (k + 1) + (c * a) / (k + 2);
}

int main() {
    double x, y, z, k;
    double result;

    printf("Enter 4 numbers for x, y, z and k (k should not be -1 or -2) (double):\n");
    scanf("%lf %lf %lf %lf", &x, &y, &z, &k);

    while (k == -1 || k == -2) {
        printf("Error: k cannot be -1 or -2. Please enter a valid value for k again: ");
        scanf("%lf", &k);
    }

    if (k == 0) {
        printf("Error: k cannot be 0. Division by zero is not allowed.\n");
        return 1;
    }

    result = calculate_expression(x, y, z, k);

    printf("The output of your program: %.2f\n", result);

    return 0;
}
```

2.2 Execution terminal

```
Enter 4 numbers for x, y, z and k (k should not be -1 or -2) (double):
3.5 2.0 4.0 2.0
The output of your program: 9.67
```