

General Instructions

- Maintain a proper observation of the experiments you perform in lab sessions.
- Keep your code with proper hierarchical structure for your future reference.
- Do not write your own C file. Build on the starter code provided.

Experiment 1

Write a recursive function to find the sum of cubes of the first 'n' natural numbers. Verify the result using the formula below.

$$\sum_{i=1}^n i^3 = \left(\frac{n(n+1)}{2} \right)^2$$

Experiment 2

Write a recursive function that evaluates a polynomial of degree 'n' ($p(x) = \sum_{i=0}^n a_i x^i$). The coefficients of the polynomial are stored in an array. **The recursive function must have the coefficient array as a pointer.**

💡 **Modify the function such that you perform only $2n$ multiplications.**

Experiment 3

Repeat the same experiment of **LAB-5 Experiment-1**, place all functions inside a header file and reproduce the result.

Experiment 4 (OPTIONAL)

Write a C program that stores an array of positive numbers using the structure provided below. Then, write a recursive function that checks whether an element is in the array or not. To implement the recursive function, you need only the address of the first structure, which has a link to the next element. The address of the last element is kept as NULL.

```
struct Arr_Elem{
    int val;
    struct Arr_Elem *Next_Elem;
};
typedef struct Arr_elem element;
```

In the above structure, the pointer Next_Elem stores the address of the next element in the array.

💡 **This method of storing data is known as a Linked List, which will be studied in detail during your next semester.**