Summary

Sessions (04-01-2023)

- Because we have a limited size of stack memory, therefore, those problems which run millions of times / unlimited then in this case recursion doesn't work. It will show an error like StackOverflow.

- If we use recursion then we always need extra space complexity.

- Space complexity of the iteration concept is constant. Iteration will take less time compared to recursion.

- In terms of performance, iteration is better than recursion. But in terms of code iteration is more complex to write rather than recursion.

- As we know iteration is better in terms of performance still we use recursion for simplicity of code therefore in the market we have some compiler that converts our code from recursion into iteration. But there is a condition that a compiler follows recursion which is tail recursion and this concept is known as **TCO(Tail call optimization)**.

- Example of sum of Natural numbers using recursion :

```
// sum of natural numbers => n=5 then 1 + 2 + 3 + 4 + 5 = 15
sumOfNatural(int n) {
    // base case or stop condition
    if (n == 1) {
        return 1;
    }
    return n + sumOfNatural(n-1); // recursive call
}
```

- Always write a base case before a recursive call.

- **Recursion tree / trace tree** :