

Lab 2

COSC2006001L3(LAB) – Data Structure I

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Part 1: Factorial of a Number

Problem Statement:

Write a program to calculate the factorial of a number using recursion. The factorial of a number n is the product of all positive integers less than or equal to n (e.g., factorial(5) = 5 * 4 * 3 * 2 * 1).

Instructions:

- Write a recursive function factorial(int n) that calculates the factorial of a number.
- Include a base case (factorial(0) = 1) and a recursive case (factorial(n) = n * factorial(n-1)).
- Add print statements to trace the function's execution and test the function with factorial(5).

Code:

```
public class Factorial
{
    public static void main(String[] args)
    {
        System.out.println("The factorial of 5 is: "+factorial(5));
    }
}
```

```
//created the function to calculate the factorial using recursive
```

```
public static int factorial(int n)
{
    if(n==0)
        return 1;
    return factorial(n-1)*n;//used recursive method
}
```

Output:

```
The factorial of 5 is: 120
PS C:\Users\nitis\DS Lab\DS Lab1\DS Lab#1>
```

Part 2: Sum of Numbers from 1 to N

Problem Statement:

Write a program to calculate the sum of all numbers from 1 to n using recursion. For example, the sum of numbers from 1 to 5 is $1 + 2 + 3 + 4 + 5 = 15$.

Instructions:

- Write a recursive function `sum(int n)` that calculates the sum of numbers from 1 to n.
- Include a base case (`sum(1) = 1`) and a recursive case (`sum(n) = n + sum(n-1)`).
- Add print statements to trace the function's execution and test the function with `sum(5)`.

Code:

```
public class Sum
{
    public static void main(String[] args)
    {
        System.out.println("The sum form 1 to 5 is: "+sum(5));
    }

    //created the function to calculate the sum of sequence of numbers using recursive
    public static int sum(int n)
    {
        if(n==1)
            return 1;
        return sum(n-1)+n;//used recursive method
    }
}
```

Output:

```
The sum form 1 to 5 is: 15
PS C:\Users\nitis\DS Lab\DS Lab1\DS Lab#1>
```

Thank you...