Assignment 1

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Download all latex-tikz codes from

https://github.com/Krutikmehta/C−and−DS/ assignment1.tex

1 PROBLEM

(CS-2020/CS/Q.NO:46) Consider the following C functions.

```c
int fun1(int n){
    static int i=0;
    if(n>0){
        i++;
        fun1(n−1);
    }
    return i;
}
```

```c
int fun2(int n){
    static int i=0;
    if(n>0){
        i += fun1(n);
        fun2(n−1);
    }
    return i;
}
```

Return the value of fun2(5) -

2 SOLUTION

Both the functions have static local variable. Static local variables have two characteristics -

1) The scope of such variable is just within the function.
2) The variable is not destroyed after function execution(it retains value). So, when function modifies the static local variable during the first function call, then this modified value will be available for the next function call also.

Explanation fun1(n) returns the value of i(which has scope limited to fun1) after incrementing it by n.

fun2(n) calls fun1(i) from i=n to i=1 and adds the value returned by fun1 to i(which has scope limited to fun2).

when the first time fun1() is called for n=5, i is initialzed to 0.

The return value of each call is tabulated below.

fun1(5)	i=i+5;	i = 5.
fun1(4)	i=i+4;	i = 9.
fun1(3)	i=i+3;	i = 12.
fun1(2)	i=i+2;	i = 14.
fun1(1)	i=i+1;	i = 15.

All values returned by fun1() are added to static local variable i in fun2() -
therefore ,
i = 5+9+12+14+15 = 55.
Hence, ans = 55.