



Unit IV – Part 03 (Recursive Function)

Lecture Slide



AS2022



Recursion



- **Recursion** is the is a process of calling a function by itself
- It is sometimes called '*circular definition*'-the process of defining something in terms of itself
- In recursion, the statements within the body of a called function in turn calls itself(the same function)



Recursion



- A recursive function must have an *if statement* somewhere to force the function to return without the recursive call being executed
- If there is no if statement to stop the recursion function, the function will never return



Recursion



○ In every recursive solutions, it has two major required cases:

1. Base Case
2. Recursive Case

1. Base Case

- Acts as the terminating condition
- The case where the problem is simple enough to be solved directly
- No need of having any further calls to the same function



Recursion



2. Recursive Case

- The problem at hand is divided into simpler sub-parts
- The function calls itself with sub-parts of the problem obtained in the earlier step
- The result is obtained by combining the solutions of simpler sub-parts



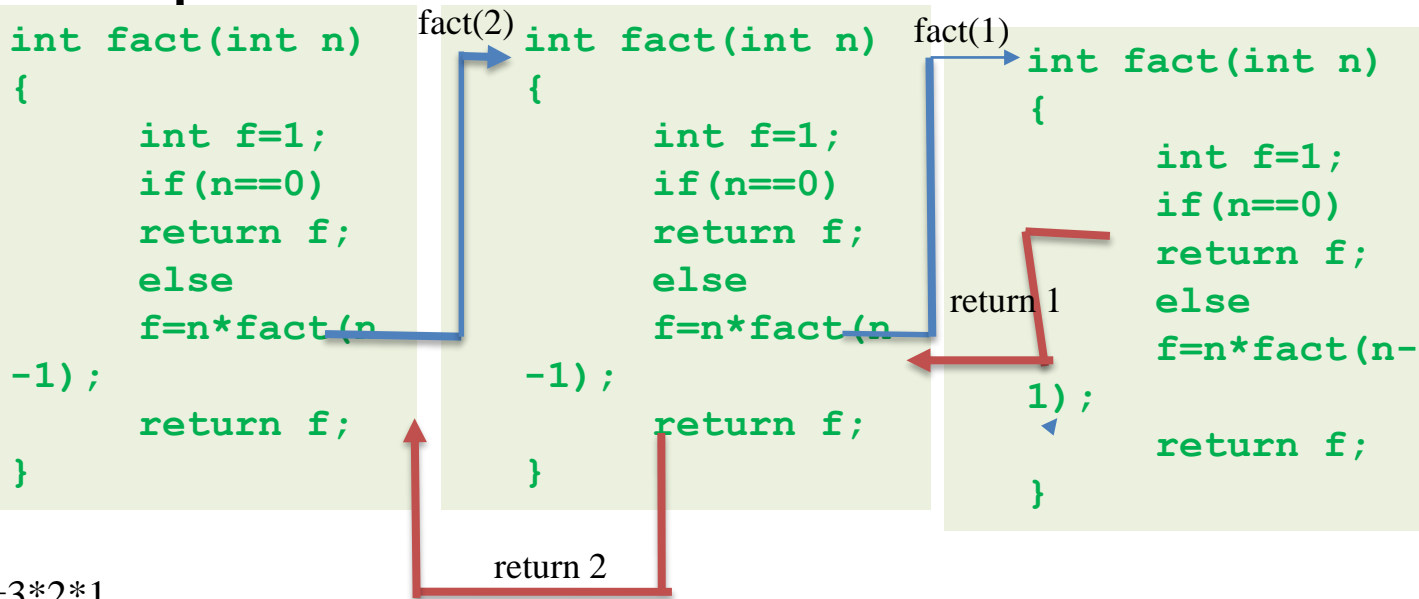
Recursion:Example 1:



```
main()  
{  
    printf("This is recursion  
example");  
    main();  
}
```



Example 2: Recursive function to find the factorial



$f=3*2*1$

$f=n*\text{fact}(2)$

$=3*2*\text{fact}(1)$

$=3*2*1$

$=6$

Base Case: $n=1$, Recursive Case: factorial function that calls itself with smaller value of n



Recursion: Example 3



Recursive function to find the multiplication table.

```
void mult(int no,int min,int Max)
{
    if (min==Max+1)
        return;
    else
    {
        printf ("\n%d*%d=%d",no,min, (no*min) );
    }
    mult (no,++min,Max) ;
}
```




Recursion: Example 4



A recursive function `repeatName()` that calls itself till a length word/string is entered.

```
void repeatName()  
{  
    char n[50];  
    printf("\nName:");  
    scanf("%s",n);  
    if(strlen(n)==1) //Base Case  
        return;  
    else  
    {  
        printf("\nName entered is %s",n);  
        repeatName(); //Recursive call  
    }  
}
```



Home Assignment



1. Write a program to calculate x^y using recursion
2. Write a program to print the Fibonacci series using recursion



Thank you