



# **SNS COLLEGE OF TECHNOLOGY**

**Coimbatore-35.**

**An Autonomous Institution**

**COURSE NAME : 19CST101 PROGRAMMING FOR PROBLEM SOLVING**

**I YEAR/ I SEMESTER**

**UNIT-IV FUNCTIONS AND POINTERS**

**Topic: Functions**

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# Recursion

A function that calls itself is known as a recursive function. And, this technique is known as recursion.

## How recursion works?

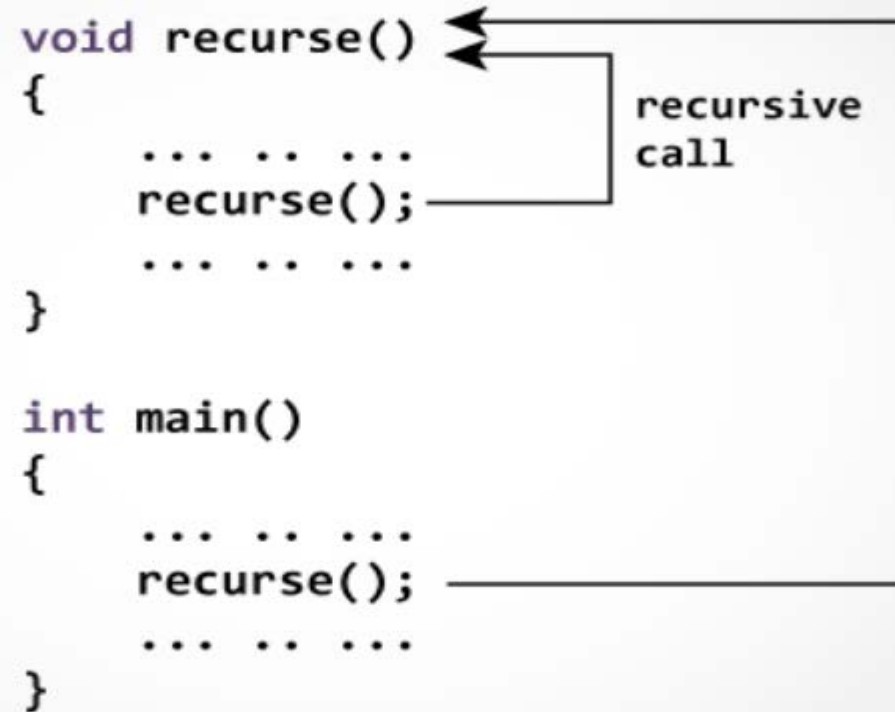
```
void recurse()
{
    ... ..
    recurse();
    ... ..
}

int main()
{
    ... ..
    recurse();
    ... ..
}
```



# C Recursion

How does recursion work?



The recursion continues until some condition is met to prevent it.



## Example: Sum of Natural Numbers Using Recursion



```
#include <stdio.h>
int sum(int n);

int main() {
    int number, result;

    printf("Enter a positive integer: ");
    scanf("%d", &number);

    result = sum(number);

    printf("sum = %d", result);
    return 0;
}

int sum(int n) {
    if (n != 0)
        // sum() function calls itself
        return n + sum(n-1);
    else
        return n;
}
```

### Output

```
Enter a positive integer:3
sum = 6
```



# C Recursion



Initially, the `sum()` is called from the `main()` function with `number` passed as an argument.

Suppose, the value of `n` inside `sum()` is 3 initially. During the next function call, 2 is passed to the `sum()` function. This process continues until `n` is equal to 0.

When `n` is equal to 0, the `if` condition fails and the `else` part is executed returning the sum of integers ultimately to the `main()` function.



# C Recursion

```
int main() {
    ... ..
    result = sum(number);
    ... ..
}

int sum(int n) {
    if (n != 0)
        return n + sum(n-1);
    else
        return n;
}

int sum(int n) {
    if (n != 0)
        return n + sum(n-1);
}
```

3  
3  
2

3+3 = 6  
is returned

2+1 = 3  
is returned

```
else
    return n;
}

int sum(int n) {
    if (n != 0)
        return n + sum(n-1);
    else
        return n;
}

int sum(int n) {
    if (n != 0)
        return n + sum(n-1);
    else
        return n;
}
```

1  
0

1+0 = 1  
is returned

0  
is returned



**Thank You!**