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

Ms. Devi G
Assistant Professor
Department of Computer Science and Engineering

Recursion

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

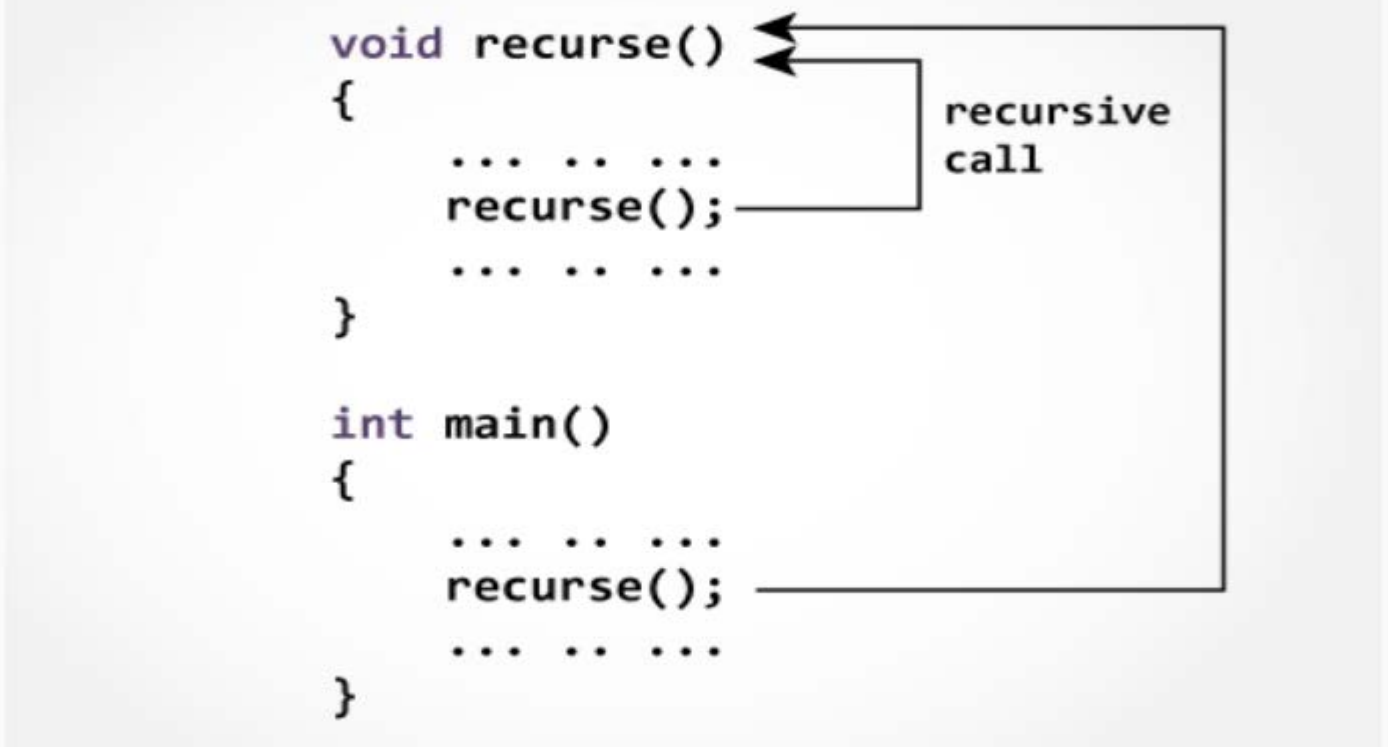
How recursion works?

```
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

```c
#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
```

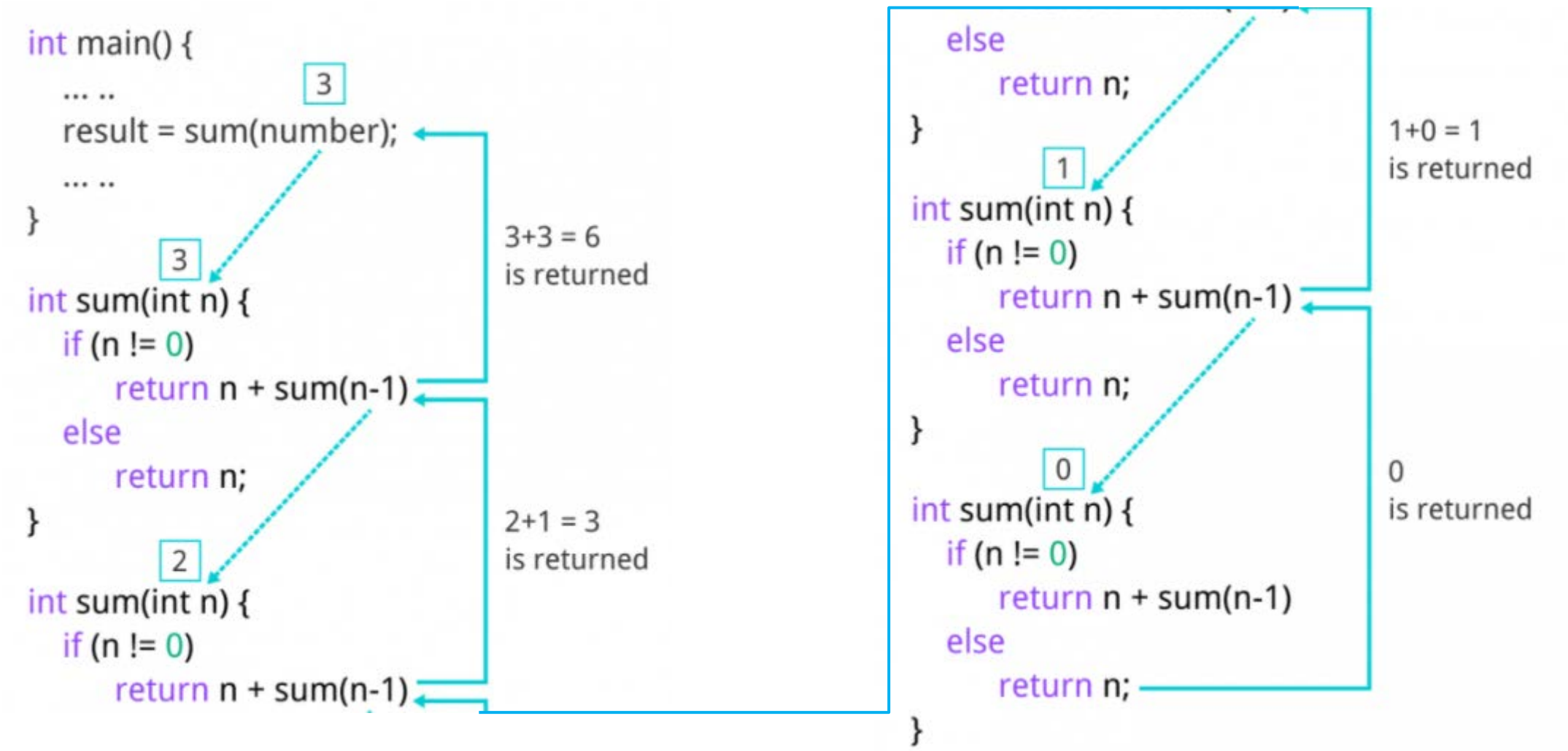
C Recursion

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);
... ..
}
3
int sum(int n) {
if (n != 0)
return n + sum(n-1)
else
return n;
}
3
int sum(int n) {
if (n != 0)
return n + sum(n-1)
else
return n;
}
2
int sum(int n) {
if (n != 0)
return n + sum(n-1)
else
return n;
}
1
int sum(int n) {
if (n != 0)
return n + sum(n-1)
else
return n;
}
0
int sum(int n) {
if (n != 0)
return n + sum(n-1)
else
return n;
}
3+3 = 6
is returned
2+1 = 3
is returned
1+0 = 1
is returned
0
is returned


Thank You!