SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF AIML

23ITT101-PROGRAMMING IN C AND DATA STRUCTURES

I YEAR - II SEM

UNIT 2 – DECISIONS STATEMENTS AND FUNCTIONS

TOPIC 4 – Call by value & Call by reference

Call by Value

- In call by value method, the value of the actual parameters is copied into the formal parameters. In other words, we can say that the value of the variable is used in the function call in the call by value method.
- In call by value method, we can not modify the value of the actual parameter by the formal parameter.
- In call by value, different memory is allocated for actual and formal parameters since the value of the actual parameter is copied into the formal parameter.
- The actual parameter is the argument which is used in the function call whereas formal parameter is the argument which is used in the function definition.

Call by Reference

- In call by reference, the address of the variable is passed into the function call as the actual parameter.
- The value of the actual parameters can be modified by changing the formal parameters since the address of the actual parameters is passed.
- In call by reference, the memory allocation is similar for both formal parameters and actual parameters. All the operations in the function are performed on the value stored at the address of the actual parameters, and the modified value gets stored at the same address.

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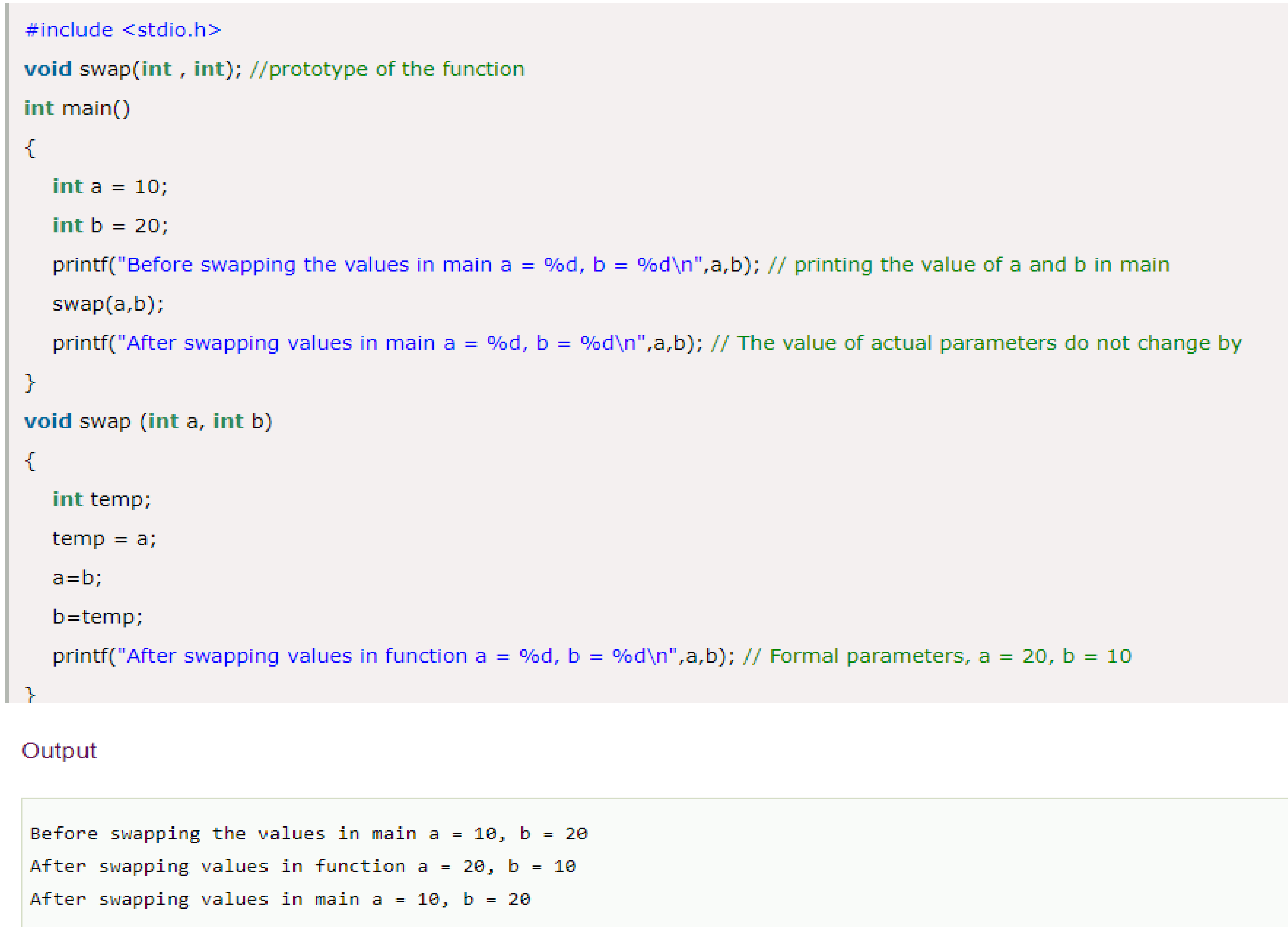
Call by Value



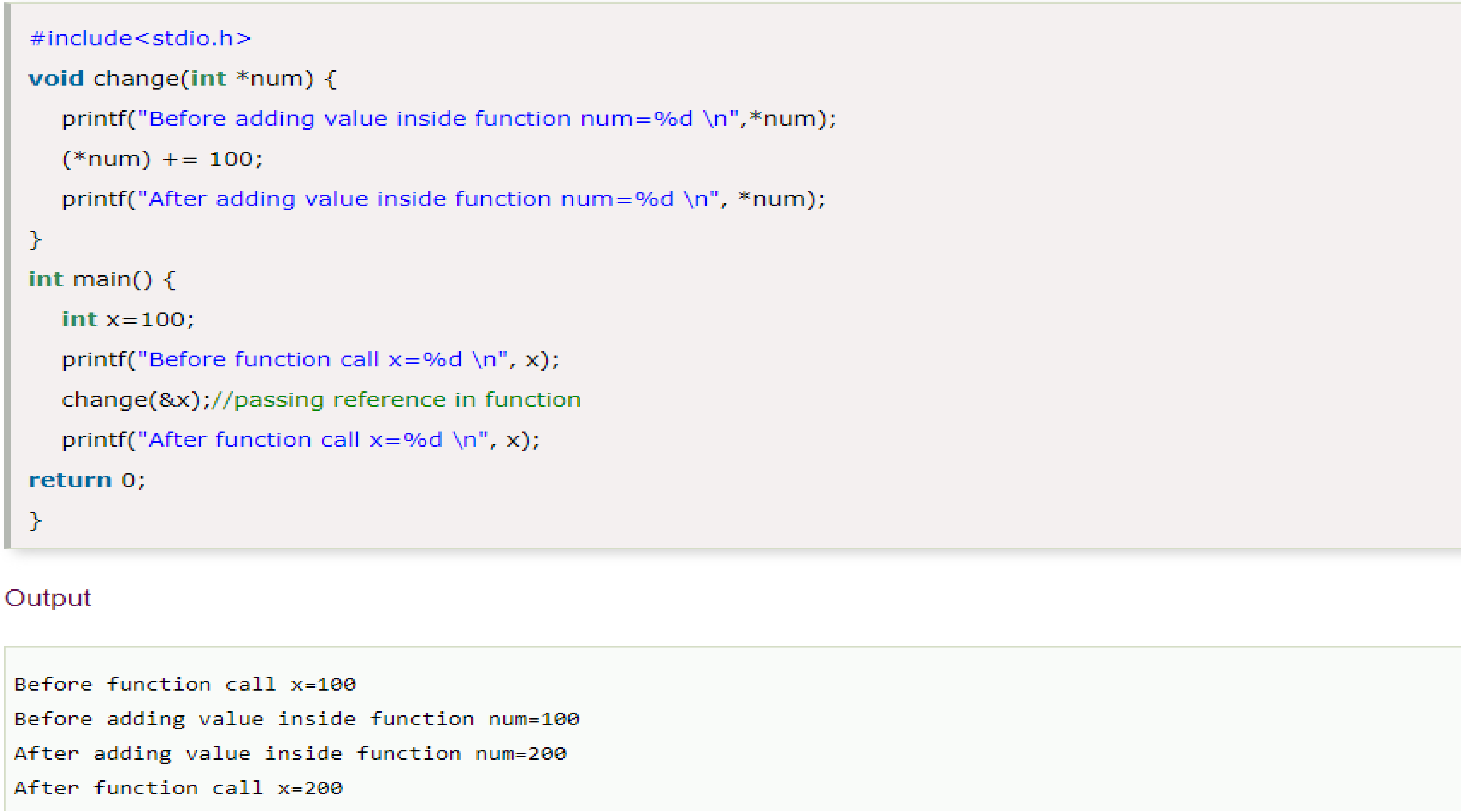
```c
#include <stdio.h>
void swap(int , int); //prototype of the function
int main()
{
    int a = 10;
    int b = 20;
    printf("Before swapping the values in main a = %d, b = %d\n",a,b); // printing the value of a and b in main
    swap(a,b);
    printf("After swapping values in main a = %d, b = %d\n",a,b); // The value of actual parameters do not change by
}
void swap (int a, int b)
{
    int temp;
    temp = a;
    a=b;
    b=temp;
    printf("After swapping values in function a = %d, b = %d\n",a,b); // Formal parameters, a = 20, b = 10
}
```

Output

```
Before swapping the values in main a = 10, b = 20
After swapping values in function a = 20, b = 10
After swapping values in main a = 10, b = 20
```

;

Call by Reference



```
#include<stdio.h>
void change(int *num) {
    printf("Before adding value inside function num=%d \n",*num);
    (*num) += 100;
    printf("After adding value inside function num=%d \n", *num);
}
int main() {
    int x=100;
    printf("Before function call x=%d \n", x);
    change(&x);//passing reference in function
    printf("After function call x=%d \n", x);
return 0;
}
```

Output

```
Before function call x=100
Before adding value inside function num=100
After adding value inside function num=200
After function call x=200
```

Difference

- In Call by value method original value is not modified whereas, in Call by reference method, the original value is modified.
- In Call by value, a copy of the variable is passed whereas in Call by reference, a variable itself is passed.
- In Call by value, actual and formal arguments will be created in different memory locations whereas in Call by reference, actual and formal arguments will be created in the same memory location.
- Call by value is the default method in programming languages like C++, PHP, Visual Basic NET, and C# whereas Call by reference is supported only Java language.
- Call by Value, variables are passed using a straightforward method whereas Call by Reference, pointers are required to store the address of variables.