C FUNCTIONS

- In c, we can divide a large program into the basic building blocks known as function.
- The function contains the set of programming statements enclosed by {}.
- A function can be called multiple times to provide reusability and modularity to the C program.
- In other words, we can say that the collection of functions creates a program.
- The function is also known as *procedure* or *subroutine* in other programming languages.

ADVANTAGE OF FUNCTIONS IN C

There are the following advantages of C functions.

- By using functions, we can avoid rewriting same logic/code again and again in a program.
- We can call C functions any number of times in a program and from any place in a program.
- We can track a large C program easily when it is divided into multiple functions.
- Reusability is the main achievement of C functions.
- However, Function calling is always a overhead in a C program.

FUNCTION ASPECTS

- There are three aspects of a C function.

```
c       add ( a , b )
int add(int a, int b);
```

Function declaration

- A function must be declared globally in a c program to tell the compiler about the function name, function parameters, and return type.

Function call

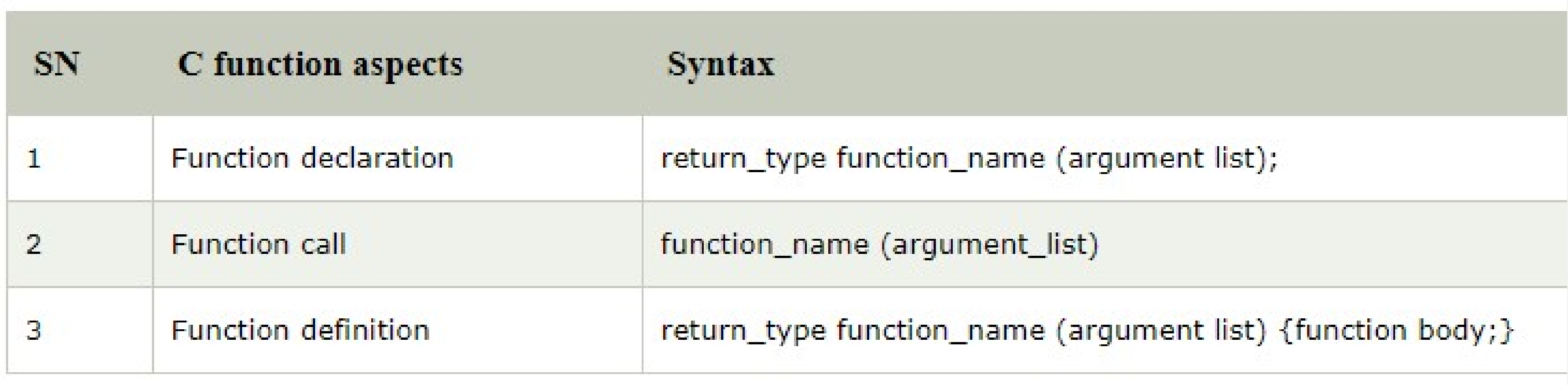
```
x = add(i, j);
```

- Function can be called from anywhere in the program. The parameter list must not differ in function calling and function declaration. We must pass the same number of functions as it is declared in the function declaration.

```
int add(int a, int b)
{ int c,         | c = a + b,
                 } return c;
```

Function definition

- It contains the actual statements which are to be executed. It is the most important aspect to which the control comes when the function is called. Here, we must notice that only one value can be returned from the function.



SN	C function aspects	Syntax
1	Function declaration	return_type function_name (argument list);
2	Function call	function_name (argument_list)
3	Function definition	return_type function_name (argument list) {function body;}

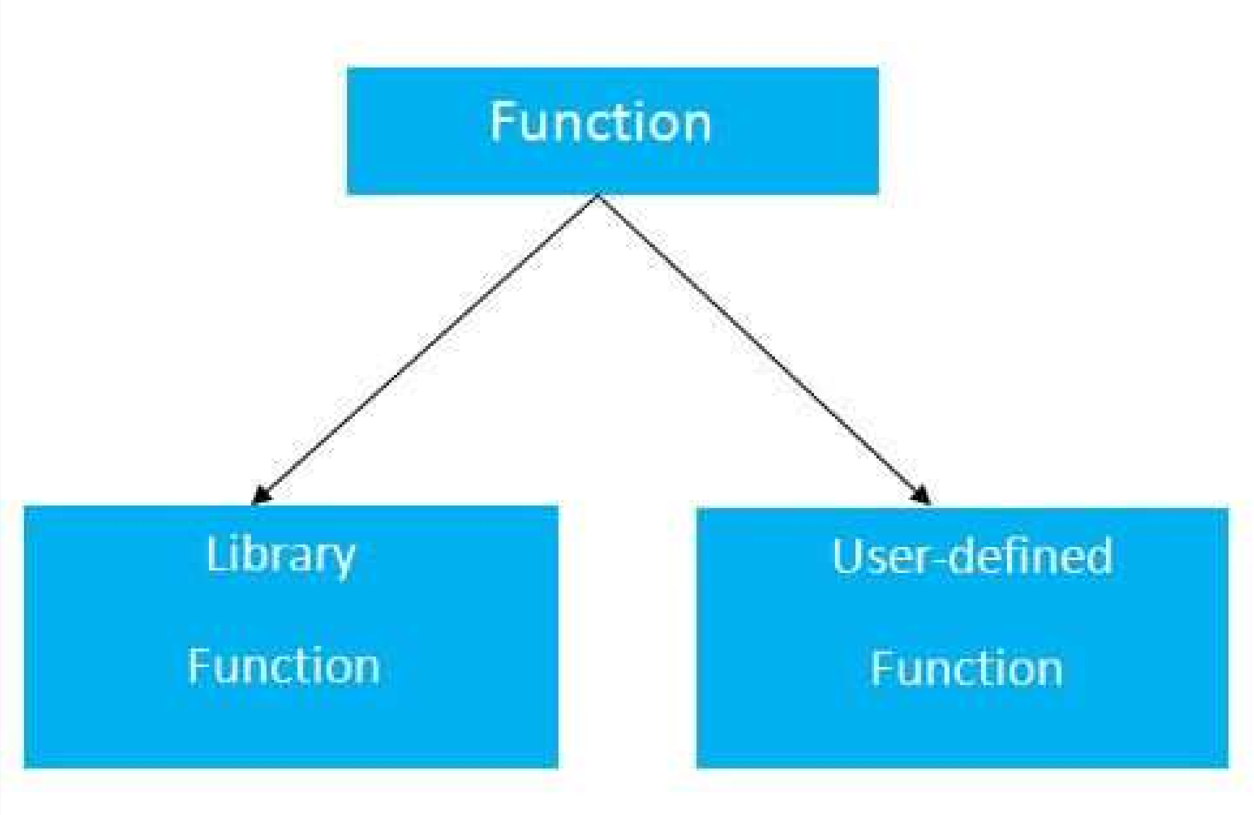
- The syntax of creating function in c language is given below:

```
return_type function_name(data_type parameter...)
{
//code to be executed
}
```

TYPES OF FUNCTIONS

There are two types of functions in C programming:

- **Library Functions**: are the functions which are declared in the C header files such as scanf(), printf(), gets(), puts(), ceil(), floor() etc.
- **User-defined functions**: are the functions which are created by the C programmer, so that he/she can use it many times. It reduces the complexity of a big program and optimizes the code.



Function

Library Function

User-defined Function

RETURN VALUE

- A C function may or may not return a value from the function.
- If you don't have to return any value from the function, use void for the return type.

Example without return value:

fdL → void hello(void);

void hello();

```
void hello(){
printf("hello c");
}
```

fd

fc → hello(),

- If you want to return any value from the function, you need to use any data type such as int, long, char, etc.
- The return type depends on the value to be returned from the function.

fdl → int get();

fc → a = get(),

Example with return value:

fd ↗

```
int get(){
return 10;
}
```

```
float get(){
return 10.2;
}
```

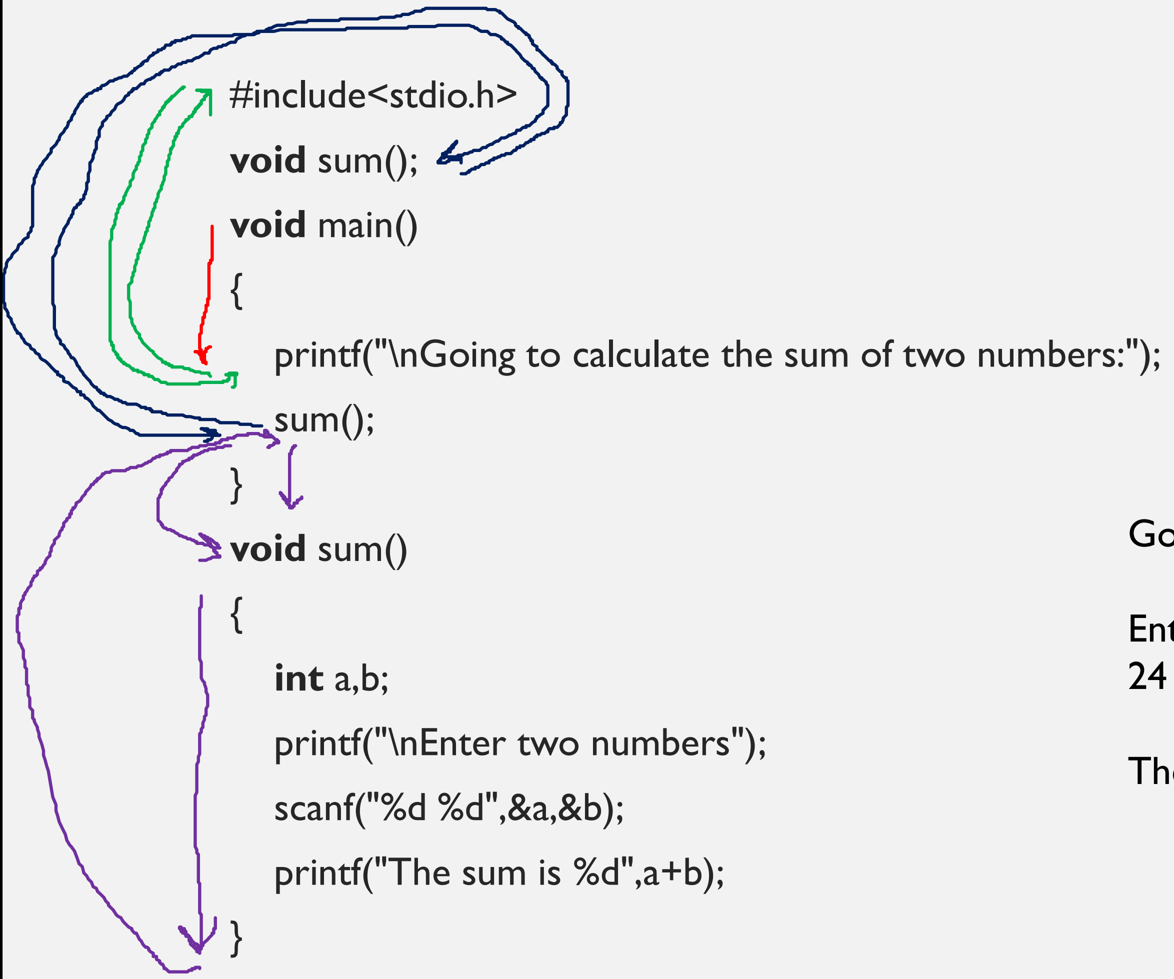
DIFFERENT ASPECTS OF FUNCTION CALLING

- A function may or may not accept any argument. It may or may not return any value.
- Based on these facts,There are four different aspects of function calls.
  - function without arguments and without return value
  - function without arguments and with return value
  - function with arguments and without return value
  - function with arguments and with return value

EXAMPLE FOR FUNCTION WITHOUT ARGUMENT AND RETURN VALUE

```
#include<stdio.h>
✓ void printName();
void main ()
{
    printf("Hello ");
  ✓ printName();
}
✓ void printName()
{
    printf("Javatpoint");
}
```

```
Hello Javatpoint
```



```
#include<stdio.h>
void sum();
void main()
{
    printf("\nGoing to calculate the sum of two numbers:");
    sum();
}
void sum()
{
    int a,b;
    printf("\nEnter two numbers");
    scanf("%d %d",&a,&b);
    printf("The sum is %d",a+b);
}
```

```
Going to calculate the sum of two numbers:

Enter two numbers 10
24

The sum is 34
```

EXAMPLE FOR FUNCTION WITHOUT ARGUMENT AND WITH RETURN VALUE

```
#include<stdio.h>
int sum();
void main()
{
    int result;
    printf("\nGoing to calculate the sum of two numbers:");
    result = sum();
    printf("%d",result);
}
int sum()
{
    int a,b;
    printf("\nEnter two numbers");
    scanf("%d %d",&a,&b);
    return a+b;
}
```

```
Going to calculate the sum of two numbers:

Enter two numbers 10
24

The sum is 34
```

```
#include<stdio.h>
float square();
void main()
{
    printf("Going to calculate the area of the square\n");
    float area = square();
    printf("The area of the square: %f\n",area);
}
float square()
{
    float side;
    printf("Enter the length of the side in meters: ");
    scanf("%f",&side);
    return side * side;
}
```

```
Going to calculate the area of the square

Enter the length of the side in meters: 10

The area of the square: 100.000000
```

EXAMPLE FOR FUNCTION WITH ARGUMENT AND WITHOUT RETURN VALUE

```
#include<stdio.h>
void sum(int, int);
void main()
{
    int a,b,result;
    printf("\nGoing to calculate the sum of two numbers:");
    printf("\nEnter two numbers:");
    scanf("%d %d",&a,&b);
    sum(a,b);
}
void sum(int a, int b)
{
    printf("\nThe sum is %d",a+b);
}
```

```
Going to calculate the sum of two numbers:

Enter two numbers 10
24

The sum is 34
```

```c
#include<stdio.h>
void average(int, int, int, int, int);
void main()
{
    int a,b,c,d,e;
    printf("\nGoing to calculate the average of five numbers:");
    printf("\nEnter five numbers:");
    scanf("%d %d %d %d %d",&a,&b,&c,&d,&e);
    average(a,b,c,d,e);
}
void average(int a, int b, int c, int d, int e)
{
    float avg;
    avg = (a+b+c+d+e)/5;
    printf("The average of given five numbers : %f",avg);
}
```

```
Going to calculate the average of five numbers:
Enter five numbers:10
20
30
40
50
The average of given five numbers : 30.000000
```

EXAMPLE FOR FUNCTION WITH ARGUMENT AND WITH RETURN VALUE

```
#include<stdio.h>
int sum(int, int);
void main()
{
    int a,b,result;
    printf("\nGoing to calculate the sum of two numbers:");
    printf("\nEnter two numbers:");
    scanf("%d %d",&a,&b);
    result = sum(a,b);
    printf("\nThe sum is : %d",result);
}
int sum(int a, int b)
{
    return a+b;
}
```

```
Going to calculate the sum of two numbers:
Enter two numbers:10
20
The sum is : 30
```

```
#include<stdio.h>
int even_odd(int);
void main()
{
 int n,flag=0;
 printf("\nGoing to check whether a number is even or odd");
 printf("\nEnter the number: ");
 scanf("%d",&n);
 flag = even_odd(n);
 if(flag == 0)
 {
    printf("\nThe number is odd");
 }
 else
 {
    printf("\nThe number is even");
 }
}
```

```
int even_odd(int n)
{
    if(n%2 == 0)
    {
        return 1;
    }
    else
    {
        return 0;
    }
}
```

```
Going to check whether a number is even or odd
Enter the number: 100
The number is even
```