CL1002 – Programming Fundamentals Lab

Lab # 08

Functions

Instructor: Engr. Muhammad Usman

Email: usman.rafiq@nu.edu.pk

Department of Computer Science,

National University of Computer and Emerging Sciences FAST Peshawar

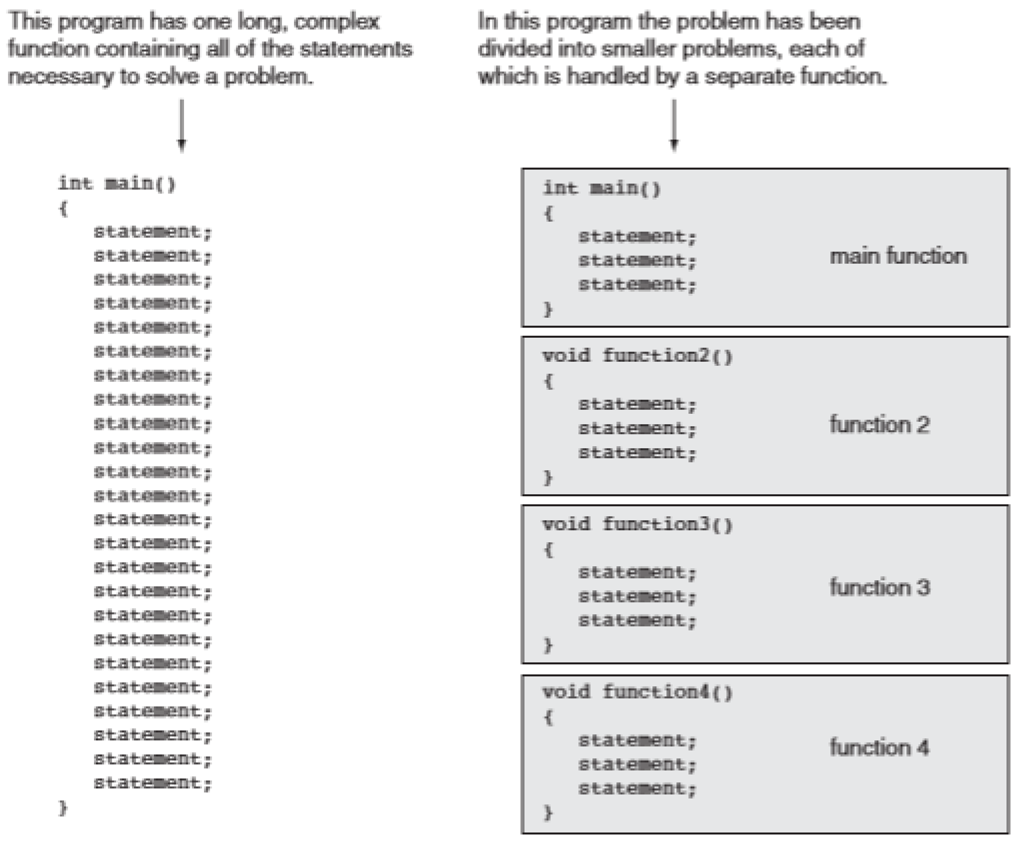
Functions:

Functions are like building blocks.

A function is a collection of statements that performs a specific task.. They let you divide complicated programs into manageable pieces.

We can create functions of our own choice to perform some tasks. Such functions are called user-defined functions. User define functions are the one that programmer writes it by himself.

Functions are commonly used to break a problem down into small manageable pieces. Instead of writing one long function that contains all of the statements necessary to solve a problem, several small functions that each solve a specific part of the problem can be written. These small functions can then be executed in the desired order to solve the problem. This approach is sometimes called divide and conquer because a large problem is divided into several smaller problems that are easily solved. The figure 1 illustrates this idea by comparing two programs: one that uses a long complex function containing all of the statements necessary to solve a problem, and another that divides a problem into smaller problems, each of which are handled by a separate function.


This program has one long, complex function containing all of the statements necessary to solve a problem.
In this program the problem has been divided into smaller problems, each of which is handled by a separate function.
main function
function 2
function 3
function 4

```
int main()
{
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
}
```

```
int main()
{
   statement;
   statement;
   statement;
}
```

```
void function2()
{
   statement;
   statement;
   statement;
}
```

```
void function3()
{
   statement;
   statement;
   statement;
}
```

```
void function4()
{
   statement;
   statement;
   statement;
}
```

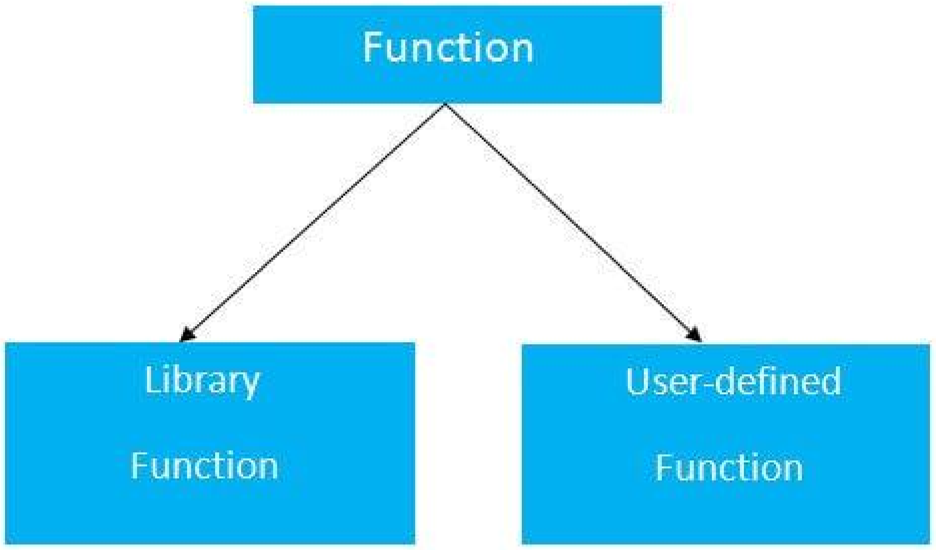
Advantage of functions

- 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.

Types of Functions

There are two types of functions in C programming:

1. **Library Functions:** are the functions which are declared in the C header files such as scanf(), printf(), gets(), puts() etc.
2. **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 Aspects

There are three aspects of a C function.

- **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** 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 arguments as it is declared in the function declaration.

- **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.

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

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

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.
Let's see a simple example of C function that doesn't return any value from the function.

Example without return value:

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

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.
Let's see a simple example of C function that returns int value from the function.

Example with return value:

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

In the above example, we have to return 10 as a value, so the return type is int. If you want to return floating-point value (e.g., 10.2, 3.1, 54.5, etc), you need to use float as the return type of the method.

```
float get(){

return 10.2;

}
```

Now, you need to call the function, to get the value of the function.

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.

1. function without arguments and without return value
2. function with arguments and without return value
3. function without arguments and with return value
4. function with arguments and with return value

1. Function without argument and return value

Example 1

```
#include <stdio.h>
void printme();
int main ()
{
   printf("Hello\n");
   printme();
   return 0;
}
void printme()
{
   printf("Function without any parameter and return type\n");
}
```

Output

```
Hello
Function without any parameter and return type
```

2. Function with argument and without return value

Example 2

```
#include<stdio.h>
void sum(int a, int b);
int main()
{
 sum(4,3);

 return 0;
}
void sum(int a, int b)
{
   printf("The sum is %d\n",a+b);
}
```

Output

```
The sum is 7
```

3. Function without argument and with return value

Example 3

```
#include<stdio.h>
int sum();
int main()
{
 int result;
 result = sum();
 printf("Result = %d\n",result);
 return 0;
}
```

```
int sum()
{
   int a =4,b=3;
   return (a+b);
}

```

Output

```
Result = 7
```

4. Function with argument and with return value

Example 4

```
#include<stdio.h>
int sum(int a, int b);
int main()
{
   int a=3,b=4,result;


   result = sum(a,b);
   printf("The sum is : %d\n",result);
   return 0;
}
int sum(int a, int b)
{
  int temp = a +b;
   return temp;

}
```

Output

```
Result = 7
```

References:

https://www.javatpoint.com/functions-in-c