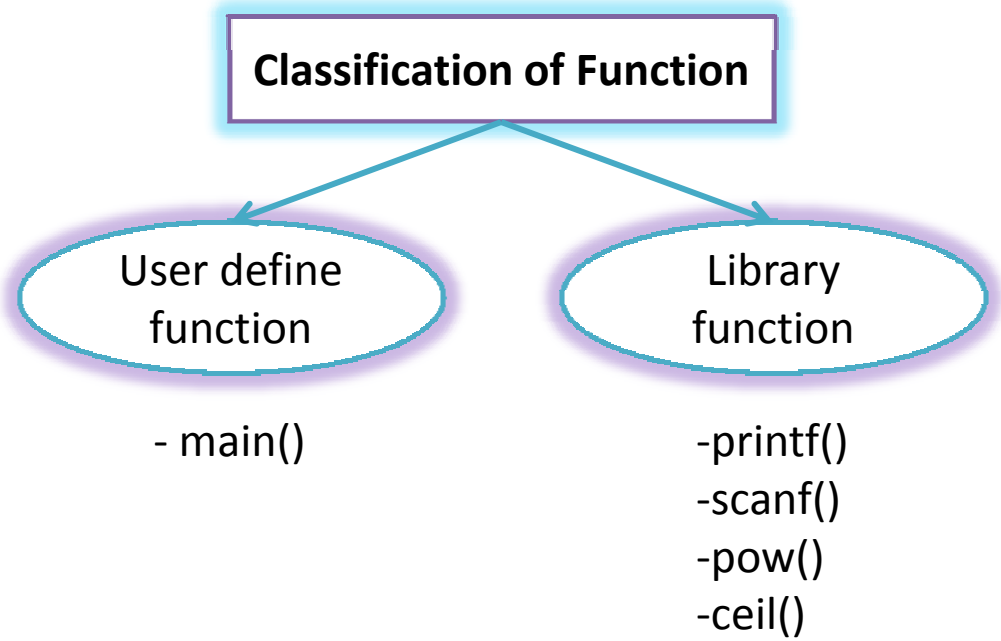
FUNCTIONS
in
-C Programming-

What is a function

- A large program in c can be divided to many subprogram
- The subprogram posses a self contain components and have well define purpose.
- The subprogram is called as a ***function***
- Basically a job of ***function*** is to do something
- C program contain at least one function which is main().



Advantages of function

- It is much easier to write a structured program where a large program can be divided into a smaller, simpler task.
- Allowing the code to be called many times
- Easier to read and update
- It is easier to debug a structured program where there error is easy to find and fix

Example

```
#include <stdio.h>

long cube(long x);  /* Function prototype*/

long input, answer;

int main( void )
{
  printf("Enter an integer value: ");
  scanf("%d", &input);
  answer = cube(input);  /* calling function*/
  printf("\nThe cube of %ld is %ld.\n", input, answer);

  return 0;
}

long cube(long x) /* Function definition*/
{
  long x_cubed;

  x_cubed = x * x * x;
  return x_cubed;
}
```

Arguments/formal parameter

Return data type

Actual parameters

- Function names is cube
- Variable that are requires is long
- The variable to be passed on is X(has single arguments)—value can be passed to function so it can perform the specific task. It is called **arguments**

Output

Enter an integer value:4

The cube of 4 is 64.

How the function works

- C program doesn't execute the statement in function until the function is called.
- When function is called the program can send the function information in the form of one or more argument.
- When the function is used it is referred to as the ***called function***
- Functions often use data that is passed to them from the ***calling function***
- Data is passed from the calling function to a called function by specifying the variables in a argument list.
- **Argument** list cannot be used to send data. Its only copy data/value/variable that pass from the calling function.
- The called function then performs its operation using the copies.

Function prototypes

- Provides the compiler with the description of functions that will be used later in the program
- Its define the function before it been used/called

- Function prototypes need to be written at the beginning of the program.

- The function prototype must have :

  A return type indicating the variable that the function will be return

Syntax for Function Prototype

return-type function_name(arg-type name-1,...,arg-type name-n);

Function Prototype Examples

- double squared(double number);
- void print_report(int report_number);
- int get_menu_choice(void);

Function Definitions

- It is the actual function that contains the code that will be execute.
- Should be identical to the function prototype.

Syntax of Function Definition

return-type function_name(arg-type name-1,...,arg-type name-n) ---- **Function header**

```
{
declarations;
statements;
return(expression);
}
```

Function Body

Function Definition Examples

```
float conversion (float celsius)
 {
      float fahrenheit;
      fahrenheit = celcius*33.8
      return fahrenheit;
  }
```

The function name's is conversion

This function accepts arguments celcius of the type float. The function return a float value.

So, when this function is called in the program, it will perform its task which is to convert fahrenheit by multiply celcius with 33.8 and return the result of the summation.

Note that if the function is returning a value, it needs to use the keyword return.

Function return types

Can be any of C's data type:

char
int
float
long.....

Examples:

```
int func1(...)        /* Returns a type int.   */
float func2(...)      /* Returns a type float. */
void func3(...)       /* Returns nothing.      */
```

Types of Functions

Function can be divided into 4 categories:

A function with no arguments and no return value
A function with no arguments and a return value
A function with an argument or arguments and returning no value
A function with arguments and returning a values

A function with no arguments and no return value

- Called function does not have any arguments
- Not able to get any value from the calling function
- Not returning any value
- There is no data transfer between the calling function and called function.

```
#include<stdio.h>
#include<conio.h>
void printline();

void main()
{
    printf("Welcome to function in C");
    printline();
    printf("Function easy to learn.");
    printline();
    getch();
}

void printline()
{
    int i;
    printf("\n");
    for(i=0;i<30;i++)
    {       printf("-");    }
    printf("\n");
}
```

```
Welcome to function in C
------------------------------
Function easy to learn.
------------------------------
```

A function with no arguments and a return value

- Does not get any value from the calling function
- Can give a return value to calling program

```
#include <stdio.h>
#include <conio.h>
int send();

void main()
{
    int z;
    z=send();
    printf("\nYou entered : %d.",z);
    getch();
}

int send()
{
    int no1;
    printf("Enter a no: ");
    scanf("%d",&no1);
    return(no1);
}
```

```
Enter a no: 46

You entered : 46.
```

A function with an argument or arguments and returning no value

- A function has argument/s
- A calling function can pass values to function called , but calling function not receive any value
- Data is transferred from calling function to the called function but no data is transferred from the called function to the calling function
- Generally Output is printed in the Called function
- A function that does not return any value cannot be used in an expression it can be used only as independent statement.

```c
#include<stdio.h>
#include<conio.h>
void add(int x, int y);

void main()
{
    add(30,15);
    add(63,49);
    add(952,321);
    getch();
}

void add(int x, int y)
{
    int result;
    result = x+y;
    printf("Sum of %d and %d is %d.\n\n",x,y,result);
}
```

```
Sum of 30 and 15 is 45.

Sum of 63 and 49 is 112.

Sum of 952 and 321 is 1273.
```

A function with arguments and returning a values

- Argument are passed by calling function to the called function
- Called function return value to the calling function
- Mostly used in programming because it can two way communication
- Data returned by the function can be used later in our program for further calculation.

```
#include <stdio.h>
#include <conio.h>
int add(int x,int y);

void main()

{
    int z;

    z=add(952,321);
    printf("Result %d. \n\n",add(30,55));
    printf("Result %d.\n\n",z);

    getch();
}
int add(int x,int y)

{
    int result;
    result = x + y;
    return(result);
}
```

Result 85.

Result 1273.

Send 2 integer value x and y to add()

Function add the two values and send back the result to the calling function

int is the return type of function

Return statement is a keyword and in bracket we can give values which we want to return.