FUNCTIONS IN C

Definition

- A set of statements working together with common goal is known as function.
- Also known as subprograms which are used to compute a value or perform a specific task.
- They can't run independently and are always called by the main() program or by some other function.

Categories of functions

- Library functions
- User-Defined functions

Library functions

These are also known as Pre defined functions.

Ex.

scanf(), printf(), getch(), strlen(), strcmp(),
strcat(), sqrt(), pow()
are this are library functions.

User Defined Functions

- User defined functions are self-contained blocks of statements which are written by the user to compute or perform a task.
- They can be called by the main program repeatedly as per the requirement.

Uses of functions

- They are very much useful when a block of statements has to be written/executed again and again.
- They are useful when program size are too large and complex.
- It works like top-down modular programming technique to solve a problem.
- They are also used to reduce the difficulties during debugging a program.

ELEMENTS OF USER-DEFINED FUNCTION

- In order to make use of user-defined functions, we need to establish three elements that are related to functions.

- Function declaration
- Function Call
- Function definition

Function declaration

Syntax:

function_type function_name(arguments list);

Ex.

int add(int , int);

Function call

The program that calls the function is referred to as the calling program or calling functions

Syntax:

function_name(actual parameters);

Ex.

add(a,b);

Function definition

The function definition is an independent program module that is specially written or implement the requirements of the function.

Function with no arguments & no return value.

```
void series( );
main( )
{
series( );   /* function called */
getch(  );
}
```

```
Void series( )
{
int x , n , i , s=0;
printf("Enter the value x & n");
Scanf("%d%d", &x ,&n);
For(i=1; i<=n; i++)
s=s+pow(x,i);
Printf("Sum of series is %d",s);
}
```

Function with arguments & no return value

```
void series(int , int);
main( )
{
int x , n;
printf(“”Enter the value of x & n);
scanf(“%d%d”,&x&n);
series(x,n);   /* function call with actual
   arguments */
getch();
}
```

```
void  series(int x , int n)
{
int i , s=0;
for(i=1;i<=n;i++);
s=s+pow(x,i);
printf("Sum of series is %d",s);
}
```

Functions with arguments & return one value

```
int series(int , int);
 main( )
{
int x , n , r;
printf("Enter x & n");
Scanf("%d%d",&x&n);
r=series(x,n);
printf("Sum of series is %d",r);
getch( );
}
```

```
int series(int x , int n)
{
int i , s=0;
for(i=1;i<=n;i++)
s=s+pow(x,i);
return(s);
}
```

Function with no argument & no return value

```
int series( );
main( )
{
int r;
r=series( );
printf("Sum of series %d",r);
getch( );
}
```

```
int series( )
{
int x , n , i , s=0;
printf("Enter x & n");
scanf("%d%d",&x,&n);
for(i=1;i<=n;i++)
s=s+pow(x,i);
return(s);
}
```

Categories

- No Return and No argument
- No return with argument
- Return and no argument
- Return and argument

Define a function `int factorial(int n)` that returns the factorial of a given number. Use this function in the main program to display the factorial.

Write a C program that defines a function `float calculateSalary()` which takes **no parameters**, but inside the function:

- Prompts the user to enter **basic pay** and **allowances**,
- Calculates the **gross salary** = basic pay + allowances + (10% of basic pay as bonus), and
- **Returns** the gross salary to the `main()` function.

Display the returned gross salary from `main()`.

→ **Concept:** Function without parameters but with return value — performs internal input and returns computed data.

Calculate Grade Using Function

Write a function `char calculateGrade(float marks)` that returns a grade based on the marks entered by the user:

- A for marks ≥ 90
- B for 80–89
- C for 70–79
- D for 60–69
- F for below 60

Display the result from the `main()` function.

Concept: Function with parameters and return value (decision making).

Find Maximum of Three Numbers Using Function

Create a function `int findMax(int a, int b, int c)` that returns the largest of three integers entered by the user.

Concept: Decision control, function with multiple parameters.

Write a C program that defines a function
`void displayBill()`
which takes **no parameters** and **does not return** any value.
Inside the function:
•Ask the user to enter the number of electricity units consumed.
•Compute the total charge based on the rule:
- ₹5 per unit for the first 100 units,
- ₹7 per unit beyond 100 units.

•Display the final bill amount.
→ **Concept:** Function without parameters and without return value — handles input, processing, and output internally.

Write a function `int sumDigits(int n)` that returns the sum of the digits of an integer.

Write a function `calculateAverage()` that calls another function `findSum()` to find the sum of three numbers before computing their average.

→ **Concept:** One user-defined function invokes another for modular design.

Write a C program that defines a function `void displayBill(int item1, int item2, int item3)` which accepts the prices of three purchased items as arguments and prints the **total bill amount** and the **average price per item** directly inside the function.

Thank you