Input and Output with C

Formatted Input Output functions

- printf() //Formatted Output Function
- scanf() //Formatted Input Function

printf() function

- The printf() function is used to print string or data values or a combination of string anddata values on the output screen (User screen).
- The printf() function is built-in function defined in a header file called "**stdio.h**".
- When we want to use printf() function in our program we need to include the respective header file (stdio.h) using the **#include** statement.

To print only plain text

The printf() function has the following syntax...

Syntax:

```
printf("message to be display!!!");
```

Example Program

```
#include<stdio.h>
#include<conio.h>
int main()
        {
            printf("Hello World");
            return 0;
        }
```

Output :

```
Hello World
```

In the above example program, we used the printf() function to print a string on to the output screen.

To print data values

- The printf() function is also used to display data values.
- When we want to display data values we use **format string** of the data value to be displayed.

Syntax:

```
printf("format string",variableName);
```

Example Program

```
#include<stdio.h>
#include<conio.h>
int main()
{
int i = 10;
float x = 5.5;
printf("%d %f",i, x);
return 0;
}
```

Output :

```
10  5.5
```

In the above example program, we used the printf() function to print data values of variables i and x on to the output screen.

Here i is a an integer variable so we have used format string %d and x is a float variable so we have used format string %f.

To print text along with the data values

The printf() function can also be used to display string along with data values.

Syntax:

```
printf("String format string",variableName);
```

Example Program

```
#include<stdio.h>
#include<conio.h>
int main()
{
int i = 10;
float x = 5.5;
printf("Integer value = %d, float value = %f",i, x);
return 0;
}
```

Output:

```
Integer value=10 , float value=5.5
```

scanf() function

- The scanf() function is used to read multiple data values of different data types from the keyboard.
- The scanf() function is built-in function defined in a header file called "**stdio.h**".
- When we want to use scanf() function in our program, we need to include the respective header file (stdio.h) using **#include** statement.

The scanf() function has the following syntax:

```
scanf("format strings",&variableNames);
```

Example Program

```
#include<stdio.h>
#include<conio.h>
int main()
{
int i;
printf("Enter any integer value: ");
scanf("%d",&i);
printf("  \n You have entered %d number",i);
 return 0;
}
```

Output:

```
Enter any integer value: 10
You have entered 10 number
```

- In the above example program, we used the scanf() function to read an integer value from the keyboard and store it into variable 'i'.
- The scanf function also used to read multiple data values of different or the same data types.

Example Program

```
#include<stdio.h>
#include<conio.h>
int main()
{
int i;
float x;
printf(" Enter one integer followed by one float value : ");
scanf("%d %f",&i, &x);
printf("\n integer = %d, float = %f",i, x);
return 0;
}
```

Output:

```
Enter one integer followed by one float value: 10  5.5
Integer= 10 , float=5.5
```

Unformatted Input Output functions

- putchar()
- puts()

//Unformatted output function

- getchar()
- gets()

// Unformatted input function

putchar()

- The putchar() function is used to display a single character on the output screen.
- To print multiple characters we need to write multiple times or use a looping statement.

Example Program

```
#include<stdio.h
#include<conio.h>
int main()
{
char ch 'A';
putchar(c);
return 0;
}
```

Output:

```
A
```

puts() function

- The puts() function is used to display a string on the output screen.
- The puts() functions prints a string or sequence of characters till the newline.

Example Program

```
#include<stdio.h>
#include<conio.h>
int main()
{
char name[30];
printf("\nEnter your favourite website: ");
gets(name);
puts(name);
return 0;
}
```

Output:

```
Enter your favourite website:  Hello World
Hello World
```

getchar() function

- The getchar() function is used to read a character from the keyboard and return it tothe program.
- This function is used to read a single character. To read multiple characters we need to write multiple times or use a looping statement.

Example Program

```
#include<stdio.h>
#include<conio.h>
int main()
{
char ch;
printf("\nEnter any character : ");
ch = getchar();
printf("\nYou have entered : %c\n",ch);
return 0;
}
```

Output:

```
Enter any character : A

You have entered : A
```

gets() function

- The gets() function is used to read a line of string and stores it into a character array.
- The gets() function reads a line of string or sequence of characters till a new line symbol enters.

Example Program

```
#include<stdio.h>
#include<conio.h>
int main()
{
char name[30];
printf("\nEnter your favourite website: ");
gets(name);
printf("%s",name);
}
```

Output:

```
Enter your favourite website: www.hello.in

www.hello.in
```

Format Specifiers or Control Strings

- The format specifiers is used during input and output. Using format specifier the compiler can understand that what type of data is in input and output operations
- It begins with %(percentage) sign followed by a character. The character indicates the type of data of the corresponding variable.

Data Types	Format Specifier
int	%d
short	%d
long	%ld
char	%c
float	%f
double	%lf
long double	%Lf

Escape sequences

- Escape sequence begins with a backslash \ followed by a character or characters.
- Escape sequences are used to format the output text. Each escape sequences has its own predefined function.

Escape Sequence	Meaning
\n	New Line
\t	Horizontal Tab
\b	BackSpace
\r	Carriage Return
\a	Audible bell
\'	Printing single quotation
\"	printing double quotation
\?	Question Mark Sequence
****	Back Slash
\f	Form Feed
\v	Vertical Tab
\0	Null Value
\nnn	Print octal value
\xhh	Print Hexadecimal value