

Aim :- To learn about the C library, preprocessor directive, Input - Output statement.

Software Required :- Turbo C / C++

Theory :-

- C libraries:

A library in C consists of pre-defined functions, constant keywords and header files like `<stdio.h>`, `<conio.h>`, `<String.h>`, `<stdlib.h>`, etc. A library in C is a group of function and declarations, exposed for use by other programs.

(a) `<stdio.h>` : Defines core input and output functions like `printf()`, `scanf()`.

(b) `<conio.h>` : Contains functions for console input/output functions like `clrscr()`, `getch()`.

(c) `<String.h>` : Defines string handling functions like `strrev()`, `strlen()`, `strcpy()`, `strcat()`, `strcmp()`.

- Preprocessor Directive:

Preprocessor programs provide preprocessors directives which tell the compiler to preprocess the source code before compiling. All of these preprocessor directives begin with a `#, #` (hash) symbol.

This (,,#") symbol at the beginning indicates that it is a C/C++ program indicates that it is a pre-processor directive. We can place these preprocessor directive anywhere in our program. Examples of some preprocessor directives are #include, #define, #ifdef etc.

- Input - Output Statements:-

Input means to provide the program with some data to be used in the program & Output means to display data on screen or write the data to a pointer or a file.

C programming language provides many built-in functions to read any given input and to display data on screen when there is a need to output the result.

There are two types of input-output functions:

1. Formatted Input - Output functions: printf(), scanf().

2. Non-formatted Input - Output functions: getch(), getchel(), putch(), putche(), etc.

Output of the Code:-

Enter two numbers: 2

3

Code:

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a,b,c;
    printf("Enter two numbers:");
    scanf("%d %d",&a,&b);
    int c;
    c = a+b;
    printf("Added result=%d",c);
    getch();
}
```

Viva Questions

Question 1 What is the identifier in C language?

Answer- An identifier is used for any variable, function, data definition, labels in your program etc.

Before starting any language, you must at least know how you name an identifier.

In C language, an identifier is a combination of alphanumeric characters, i.e. first begin with a letter of the alphabet or an underline and the remaining are letter of an alphabet any numeric digit, or the underline.

Question 2 Define Pre-defined functions in C language?

Answer. Pre-defined functions, also known as built-in functions or standard library functions, are functions that are provided as part of the C programming language. These functions are already implemented and available for use without required any additional code or library.

Predefined functions cover a wide range of operations, including input / output, mathematical calculations, string manipulation, memory management, date and time handling, and more.

They are included in the standard library of C.

Question 3 What is input-output statement in C language?

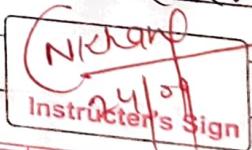
Answer Input means to provide the program with some data to be used in the program and Output means to display data on screen or write the data to a printer or a file. C programming language provides many built-in functions to read any given input and to display data on screen when there is a need to output the result.

Question 4 Define preprocessor directives in C?

Answer Preprocessor directives are lines of the source file where the first non whitespace character is ~~#~~, which distinguishes them from other lines of text. The effect of each preprocessor directive is a change to the text and the result is a transformation of the text that does not contain the directives nor comments.

Question 5 Explain the keyword in C?

Answer Keyword are predefined or reserved word that have special meanings to the compiler. These are part of the syntax and cannot be used as identifiers in the program. A list of Keywords in C or reserved words in the C programming language are mentioned below: auto, break,



Aim :- Program to learn about data-type, variables, If - else statement.

Software Required:- Turbo C / C++

Theory :-

Data types -

Each variable in C has an associated data type. Each data type requires different amounts of memory and has some specific operations which can be performed over it.

Data type	Memory (Bytes)	Range	Format Specification
Short int	2	-32,768 to 32,767	%hd
Unsigned short int	2	0 to 65,535	%hu
Unsigned int	4	0 to 4,294,967,295	%u
Int	4	-2,147,483,648 to +2,147,483,647	%d

Data type	Memory (Bytes)	Range	Format Specifier
long int	4	-2,147,483,648 to 2,147,483,647	%ld
Unsigned long int	4	0 to 4,294,967,295	%lu
long long int	8	$-(2)^{63}$ to $[(2)^{63}-1]$	%lld
Unsigned long int	8	0 to 18,446,744,073,709, 551,615	%llu
Signed char	1	-128 to 127	%c
Unsigned char	1	0 to 255	%C
Float	4		%f
double	8		%lf
long double	12		%Lf

Type Conversion:-

1. Implicit Type - Conversion -

- Done by the compiler on its own, without any external trigger from the user.
- Generally takes place when in an expression more than one data type is present. In such condition type conversion (type promotion) takes place to avoid loss of data.
- All the data types of the variables are upgraded to the data type of the variable with largest data type.

2. Explicit type - Conversion -

The process is also called type casting and it is user defined. Here the user can type cast the result to make it of a particular data type.

Variables :-

Variable is basically a memory location that is used to hold the values which can be changed or varied as required.

Variable Declaration :-

Declaring a variable means to reserve memory for a variable.

Syntax =>

Data type variablename ;

variable initialisation:-

Initialisation of a variable means to provide some fixed value to the variable.

Syntax =>

Data type variablename = value ;

If - else statements :-

If else statements in C are used to control the program flow based on some condition. They are used to execute some statement code block if the expression is evaluated to true, otherwise executes else statement code block. The basic format of if else statement is :-

Syntax -

```
if ( test expression )
{
    // execute your code
}
else
{
    // execute your code
}
```

Instructor's Sign

Output of the Code 1 $\alpha = 10.7$ $z = 108.000000$ Output of the Code 2 $Sum = 2$ Code:-

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a = 10;
    char y = "A";
    a = a + y;
    float z = a + 1.0;
    printf (" a=%d \n z=%f ", a, z);
    getch();
}
```

8.

```
#include <stdio.h>
#include <conio.h>
void main()
{
    double m = 1.0;
    int sum = (int)21 + 1;
    printf (" sum = %d ", sum);
    getch();
}
```

Output of the code 3.

Enter a number : 68

68 is even

```
3. #include <stdio.h>
#include <conio.h>
void main()
{
    int n,
    printf("Enter a number:");
    scanf("%d", &n);
    if (n%2 == 0)
    {
        printf("\n%d is even", n);
    }
    else
    {
        printf("\n%d is odd", n);
    }
    getch();
}
```

Output of the code +

Enter the coordinates! -3, -5

III Quadrant

```
t. #include < stdio.h>
#include < conio.h>
void main()
{
    int x, y;
    printf("Enter the coordinates: ");
    scanf("%d %d", &x, &y);
    if (x > 0 && y > 0)
    {
        printf(" I Quadrant");
    }
    else if (x < 0 && y > 0)
    {
        printf(" II Quadrant");
    }
    else if (x < 0 && y < 0)
    {
        printf(" III Quadrant");
    }
    else if (x > 0 && y < 0)
    {
        printf(" IV Quadrant");
    }
    else if (x == 0 && y == 0)
    {
        printf(" Origin");
    }
    getch();
}
```

Viva Questions

Question 1 What do you mean by data type in C language?

Answer:- Data types in the C programming language are used to specify what kind of value can be stored in a variable. The memory size and type of the value of a variable are determined by the variable data type. In a C program each variable or constant or array must have a data type specifies how much memory is to be allocated and what type of values are to be stored in that variable or constant or array.

Question 2 Define variable in C language?

Answer:- Variable is the name of a memory location that we use for storing data. We can change the value of a variable in C or any other language and we can also reuse it multiple times. We use symbols in variables for representing the memory location - so that it becomes easily identifiable by any user.

Question 3 What is conditional statement in C language?

Answer:- The conditional statement requires the programmer to specify one or more

conditions to be evaluated or tested by the program, along with a statement or statements to be executed if the condition is determined to be true, and optionally, other statements to be executed if the condition is determined to be false.

Question 4 What is if - else statement in C language?

Answer- The if else statement is a decision-making statement that is used to decide whether the part of the code will be executed or not based on the specified condition (test expression). If the given condition is true, then the code inside the if block is executed, otherwise the code inside the else block is executed.

Question 5 What are the key features in the C language?

Answer- Features are as follows:

- Portability: It is a platform-independent language.
- Modularity: Possibility to break down large programs into small modules.
- Flexibility: The possibility of programmers to control the language.
- Extensibility: Possibility to add new features by the programmers.
- Speed: C comes with support to system programming hence it compiles and executes with high speed when compared with other high level languages.

NKharaf
Instructor's sign

Aim:- Programs to understand nested if - else statement and switch statement.

Software Required : Turbo C / C++

Theory :-

Nested If - else statement - You can combine multiple if-else / if-else-if ladders when a series of decision are involved. So you can make sure that your program executes certain instructions when a series of conditions are met.

Some cases of if - else statement -

1. if (condition)

{

// block of statement

if (condition)

{

* // block of statement

}

2. if (Condition)
{

//block of statement
}

else

{

if (Condition)
{

//block of statement
}

else

{

//block of statement
}

}

3. if (Condition)
{

//block of statement
}

}

else if (Condition)

{

if (Condition)
{

{

//block of statement
}

}

else

{

//block of statement
}

}

Output of the code:-

Enter three numbers : 45

67

23

67 is longest

Code:-

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a,b,c;
    clrscr();
    printf("Enter three numbers");
    scanf("%d %d %d", &a, &b, &c);
    if (a>b)
    {
        if (a>c)
            printf("%d is longest", a);
        else
            printf("%d is longest", c);
    }
    else
    {
        if (b>c)
            printf("%d is longest", b);
        else
            printf("%d is longest", c);
    }
}
```

Output of the code

Enter a character: g

g is constant

```
2. #include <stdio.h>
#include <conio.h>
void main()
{
    char ch;
    clrscr();
    printf("Enter the character");
    scanf("%c", &ch);
    switch(ch)
    {
        case 'a':
        case 'A':
        case 'E':
        case 'e':
        case 'i':
        case 'I':
        case 'o':
        case 'O':
        case 'U':
        case 'u':
            printf("%c is vowel", ch);
            break;
        default: printf("%c is constant", ch);
    }
}
```

Viva Questions

Question How is nested if else statement different from if-else-if statement?

Answer If else statements are used for decision making by specifying which block of code is to be executed when a certain condition is met.

Nested if-else statements are just if-else statements inside other if-else statements to provide better decision making.

If else-if statements are used when the user has to decide among multiple options. One of the conditions controlling the if is true, the statement associated with that if is executed and the rest of the else-if ladder is bypassed. If none of the statement of the condition is true then the final else statement will be executed.

Question Why do we use switch-case statements?

Answer The switch case statement is an alternative to the if else if ladder that can be used to execute the conditional code based on the value of the variable specified in the switch statement. The switch block consists of cases to be executed based on the value of the switch variable.

Question 3: What is the role of break statement?

1

Answer: A break statement is used to end the execution of a loop or switch statement and transfer control to the statement. Terminate the processing of a particular case within a switch statement.

Question 4: What is the role of continue statement?

Answer: The continue statement is used to skip the current iteration from a loop and move the next loop.

or

It modifies the control flow inside loops, namely in the for, while, and do-while loops.

Question 5: Why don't we use break statement in the default part of switch-case?

Answer: The program continues to next labeled statement, executing the statements until a break or the end of the statement is reached without break. There is no need to use break statement in the default part.