EXERCISE

Q1. Select the best answers for the following MCQs.

i. For which purpose if structure is used in programming

A. Repetition
B. Selection
C. Sequence
D. Input of data

ii. Which statement is suitable to use in a situation where there are only two choices based on a condition?

A. If statement
B. If-else-if statement
C. If-else statement
D. Switch statement

iii. Which statement can be used in place of switch statement?

A. If statement
B. If-else statement
C. If-else-if statement
D. Conditional operator

iv. Which statement can be used in place of conditional operator?

A. If statement
B. If-else statement
C. Else-if statement
D. Switch statement

v. Which statement is used to exit from the body of switch statement?

A. Default

B. Continue

C. Exit

D. Break

vi. Which of the following is a multiple selection statement?

A. If statement

B. If-else statement

C. If-else-If statement

D. None of these

vii. Which of the selection structures tests only for equality?

A. If statement

B. If-else statement

C. Else-if statement

D. Switch statement

viii. What will be printed when the following code is executed?

```
X=1;
Switch(x)
{
        Case 1;
        Case2;
        Case 3;
    Printf("\n x is a positive number");
    Break;
Default
```

Printf("\n value of x is 1"); }

A. Value of x is 1

B. X is a positive number

C. Nothing will be printed

D. It will give error

Answers

i. B	**ii. C**	**iii. C**	**iv. B**
v. D	**vi. C**	**vii. D**	**vii. B**

SHORT QUESTIONS

Q2. Give short answers to the following questions.

i. Differentiate between if and if-else selection structures.

Ans: if Selection Structure:

The if statement has the following **general form / Syntax.**

If (condition)

{

Block of statements

}

If-else Selection Structure:

The if-else statement is used in situation where some code is to be executed if a condition is true and some other code is to be executed if the condition is false.

The **if-else** statement has the following **general form / Syntax.**

```
If (condition)
{
        Block of statements
}
Else
{
        Block of statements
}
```

ii. Differentiate between else-if and switch selection structures.

Ans: else-if Selection Structures:

The if-else statement is used in situation where some code is to be executed if a condition is true and some other code is to be executed if the condition is false.

The if-else statement has the following general form / Syntax.

```
If (condition)
{
    Block of statements
}
Else
{
      Block of statements
      }
```

- When if-else statement Is executed, the condition is evaluated.

Switch Selection Structure:

The switch statement has the following general form

```
Switch (expression)
{
Case const-1;
        Statements;
        Break;
Case const-2:
    Statements;
    Break;
    .
    .
    .
Default:
        Statements;
}
```

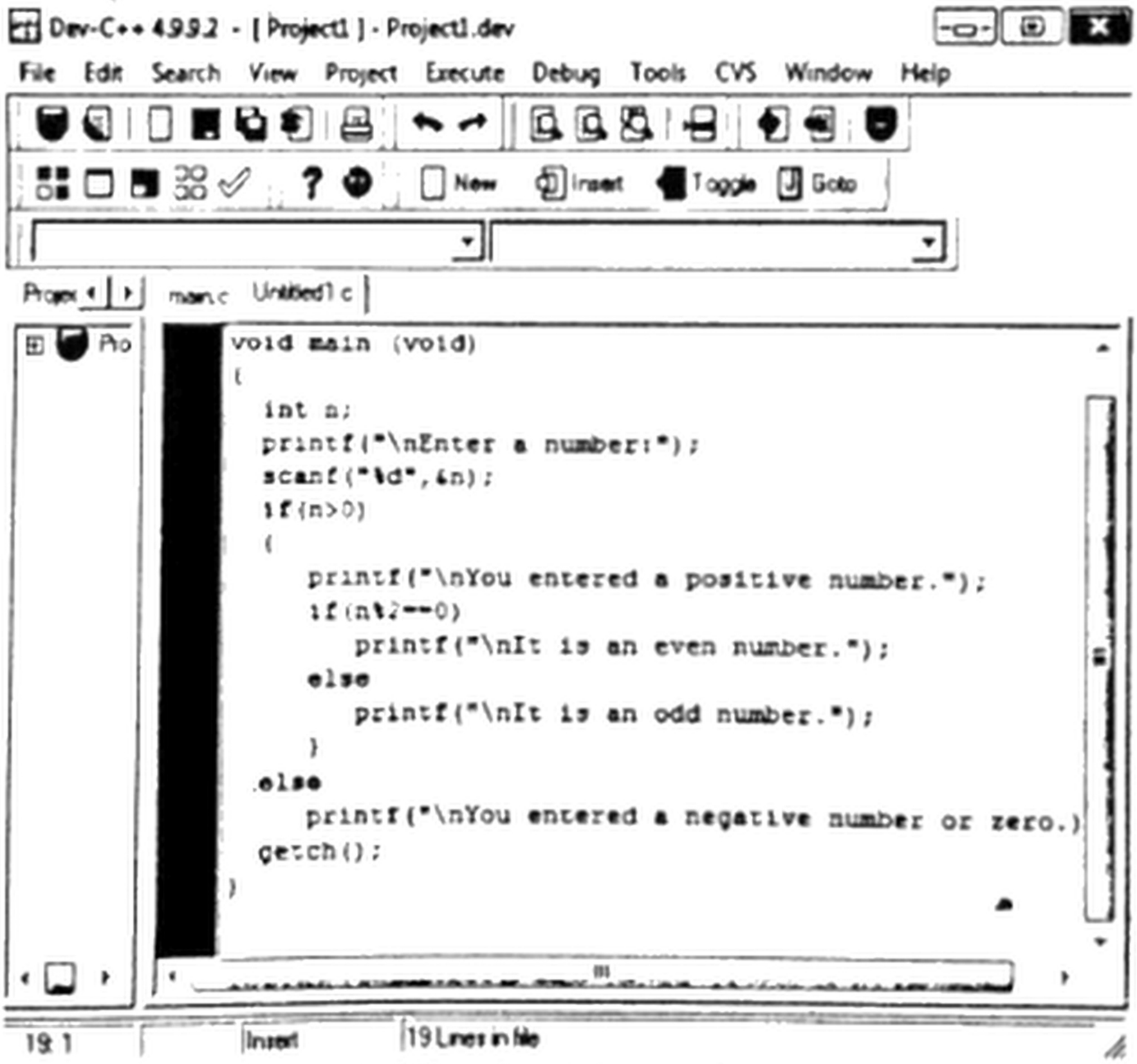
- The switch statement is similar to the else-if statement. It is used when multiple choices are given and one choice is to be selected.

iii. What is nested selection structure?

Ans: Nested Selection Structure:

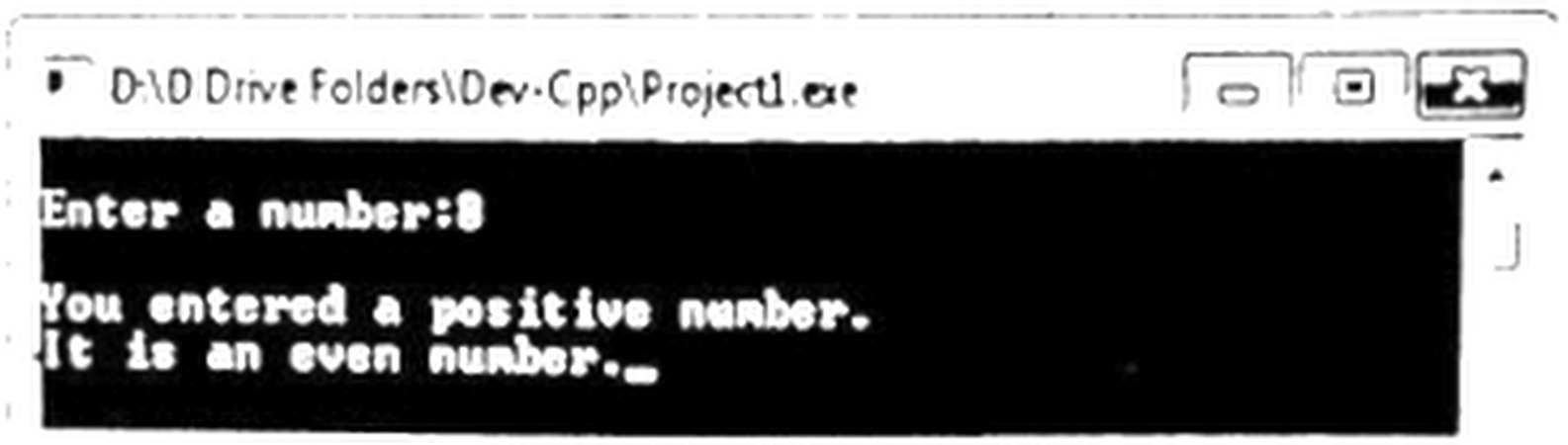
The selection structure that is within another selection structure is known as nested selection structure. Sometimes, in computer programming, it is required to use a selection structure within another selection structure. This is also supported in C language. In C language, the programmer can have a selection structure (**if, if-else, else-if** or **switch** statement) within another selection structure.

- When this program is executed, it reads an integer number stores it in the variable n and then the condition (n>0) is evaluated.
- IF it is true, it prints the message that the entered number is a positive number and then the nested if-else statement is executed.
- The nested if-else statement prints whether n is an even number or an odd number
- If the condition (n>0) is false then the statements following the first if are skipped and the last statement after the else is executed which prints the message that the user entered a negative number or zero



Using nested if – else statement in a program

Execution of the program is shown in Fig.



Execution of Program 11

iv. Write the following statement using if-else statement.

K= (a+b>20)? A+3*b:a-b;=

Ans: If (a+b)>20

K=1+3*b;

Else

K=a-b;

v. Write the following statement using conditional operator.

If (x>y)

Z=(x+y)/3;

Else

Z=x-5*y;

Ans: z=(x>y) ? (x+y)/3 : x-5*y ;

vi. What will be the output of the following code?

Int n, count, sum;

N=28; count=15; sum=20;

If (n<25)

```
{  count=count+5;
    Printf("\nCount=%d",count);   }
Else
{    count=count=5;
     Sum=sum+n;
     Printf("\nCount=%d",count);
     Printf("\nSum=%d",sum);        }
```

Ans: Count=10

Sum= 58

EXTENSIVE QUESTIONS

Q3. What is control structure? Explain conditional control structure with examples.

Ans: Control Structure:

In a programming language, a control statement is an instruction which determines the sequence of execution of other statements in a program.

Control structures are used in programs to implement decisions.

Conditional control structure:

Conditional Statement:

A conditional statement is an instruction in a programming language that contains a condition. When a conditional statement is executed first the condition is evaluated and then based on the result (true or false), a particular statement or a set of statements is executed.

Conditional statements of C language are **if, if-else, else-if** and **switch** statements.

Structures of If Statements:

The if statement has the following general form.

If (condition)

{

Block of statements

}

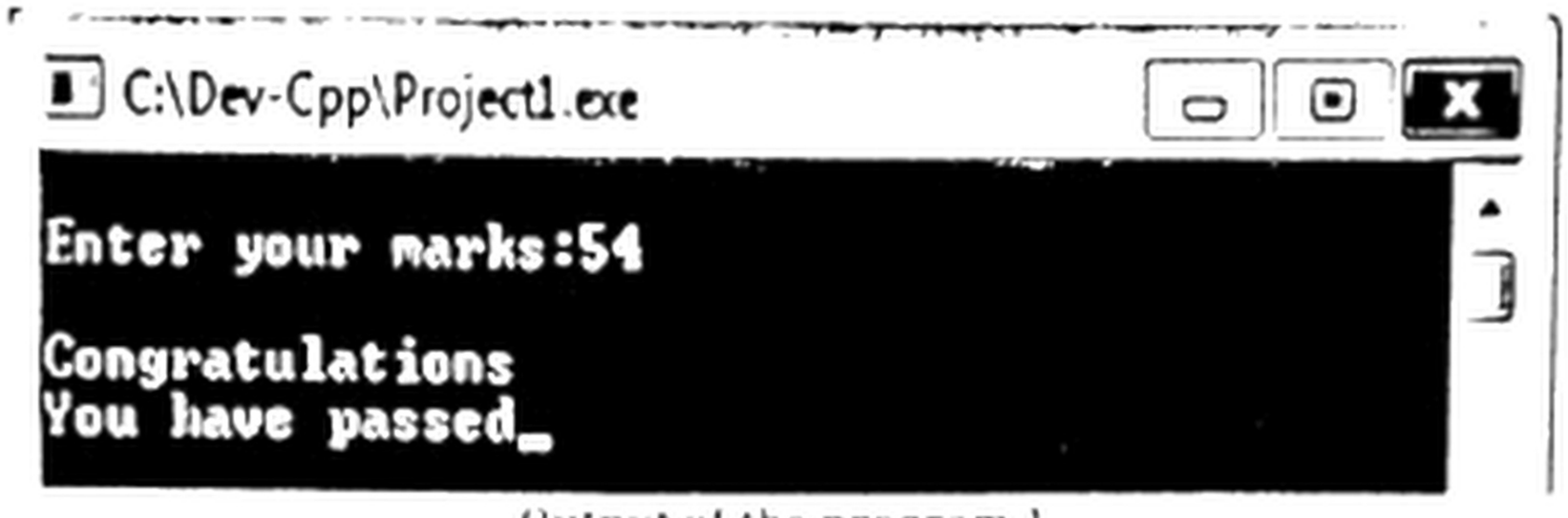
Use of If Statement:

Example:

Program 1: The program in Fig, demonstrates the use of if statement

```
# include <stdio.h>
# include <conio.h>
void main(void)
{
    int marks;
    printf("\nEnter your marks:");
    scanf("%d",&marks);
    if (marks>32)
    {
        printf("\nCongratulations");
        printf("\nYou have passed");
    }
    getch();
}
```

Program to demonstrate the use of if statement



Output of the program 1

Structure of If-Else Statement:

The if-else statement is used in situation where some code is to be executed if a condition is true and some other code is to be executed if the condition is false.

The **if-else** statement has the following general form.

If (condition)

{

Block of statements

}

Else

{

Block of statements

}

- When if-else statement is executed, the condition is evaluated.
- If the condition is true then the block of statements following if will be executed and the block of statements following else will be skipped.
- If the condition is false then the block of statements following if will be skipped and the block of statements following else will be executed

- If a single statement is to be executed after if or else then braces are not required.

Structure of If-Else-If Statement:

The else-if is a type of conditional statement that combines more than two conditions. It allows the programmer to make a decision based on several conditions.

The else-if statement has the following general form.

```
If(condition-1)
{
        Block of statements
}
Else if(condition-2)
{
        Block of statements
}
Else if(condition-3)
{
        Block of statements
}


Else
{
    Block of statements to be executed
```

When none of the conditions is true

}

- When this statement is executed, condition-1 is evaluated, if it is true then the block of statements following if is executed and if it is false, the next condition is evaluated.
- If any condition is true then the following block of statements is executed
- If none of the conditions is true then the block of statements following else is executed automatically
- If a single statement is to be executed after if, else if or else instead of a set of statements then the braces are not required.

Switch Statement:

The **switch** statement has the following general form.

Switch (expression)

{

Case const-1:

Statements;

Case const-2:

Statements;

Break;

.

.

.

Default:

Statements;

}

- The switch statement Is similar to the else-if statement. It is used when multiple choices are given and one choice is to be selected.

Q4. What is the purpose of switch () statement? Explain with the help of one example.

Ans: Switch Statement:

The switch statement has the following general form

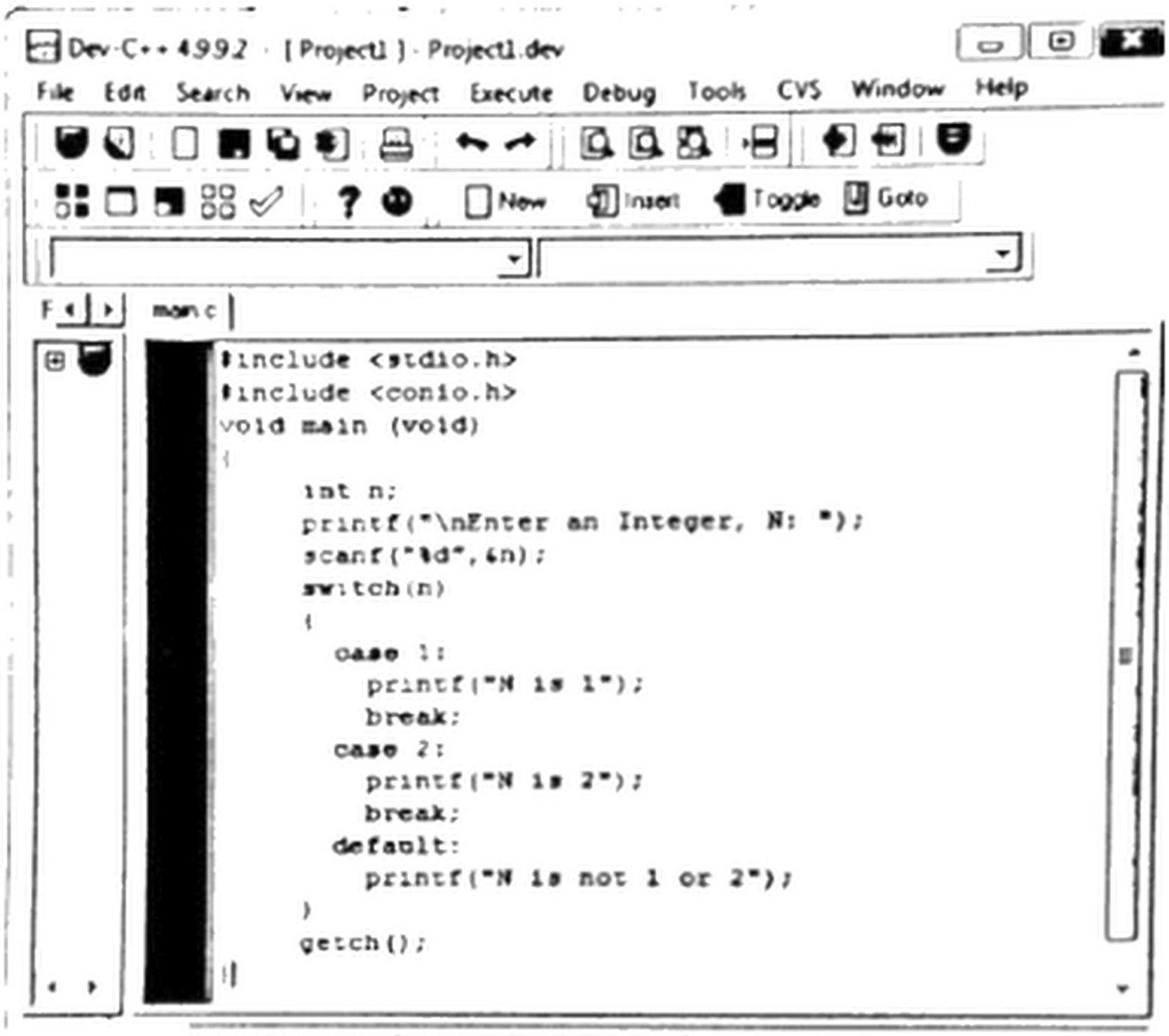
```
Switch (expression)
{
 Case const-1:
        Statements;
        Break;
Case const-2:
        Statements;
        Break;
        .
        .
        .
Default:
        Statements;
}
```

Purpose of switch statement:

- The switch statement is similar to the else-if statement. It is used when multiple choices are given and one choice is to be selected.

- In switch statement, it is allowed to use a variable within the parenthesis instead of an expression based on which statements under a case can be executed
- The purpose of break statement is to exit the body of the switch statement after executing the statements under a case and transfer control to the first statement following the end of the switch statement.
- If no case is matched then the statements under the default keyword are executed. Its use is optional. If it is not used then the control exits from the body of the switch statement and goes to the first statement following the end of the switch statement.
- The expression should be of type int, char but not float.

Program: The program in Fig. uses a variable of type integer as switch variable.



Program to demonstrate use of switch statement

- When this program is executed, the switch variable must have an integer value.

The value of switch variable n is compared with the constant values following the case keyword and if it matches, control is transferred to the statements following that particular case.

- If the switch variable does not match any of the case constants, control goes to the keyword default which is at the end of the switch statement.
- Notice the use of break statement is this program, it terminates the switch statement when the body of the statements in a particular case has been executed.

Lab Activities

1. **Write a program that reads a number and prints its square of it is greater than 10.**
2. **Write a program that reads two numbers and prints the larger.**
3. **Write the above program using conditional operator.**
4. **Write a program that reads a number (n) and prints a message based on its value as given below**

Value of n	Message to print
N is greater than zero	It is a positive number
n is less than zero	It is a negative number
n is equal to zero	It is equal to zero

5. **Write a program that reads temperature (t) in Celsius and prints a message as given below.**

Temperature	Message to print
t>35	It is hot
t<20 t<35	Nice day
t<20	It is cold

6. **Write a program that reads marks (m) of a subject and prints the letter grade as a given below**

Marks obtained	Grade

m ≥ 80	A
m ≥60, m<80	B
m ≥40, m<60	C
m<40	F

7. Write a program that reads basic pay of an employee and calculates and prints his net pay as given below

Net Pay= Basic Pay + House Rent

Basic Pay	House Rent
<25000	30% of Basic Pay
≥25000 and ≤40 000	40% of Basic Pay
≥40 000	50% of Basic Pay