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M.S. degree in Computer Science from University of Management & Technology, Lahore. He has more than 10 years teaching and professional experience in IT field. He is currently serving as an Assistant Professor of CS&IT department in University of Sargodha, Sub-Campus Mandi Bahauddin.

A standard linear barcode is positioned in the bottom right corner of the page.

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```
#include <stdio.h>
#include "C:/Privacy.h"
#define 0 CORRUPTED
#define 1 NORMALY_ENDED
:
    OnButtonClick(UserI
```

Zeeshan Ashraf

## How to Program in C++

## With 100 Examples

**Zeeshan Ashraf**

**How to Program in C++**



**Zeeshan Ashraf**

# **How to Program in C++**

**With 100 Examples**

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# Dedication

This book is dedicated to my parents and my family.

---

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My acquisition editor for this book was Sophie Campbell. She was very patient and kind. It was very easy to work with her.

All books are the product of a team work and I thank all the members of the LAMBERT academic publishing: including the project editor.

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## **Table of Contents**

### **Chapter 1: Introduction**

Brief History of C++ .....	2
C++ Compiler.....	2
How to Run the Compiler .....	3
Step 1:.....	3
Step 2:.....	3
Step 3:.....	3
Step 4:.....	4
Step 5:.....	4
How to Run the Program.....	5
Step 1:.....	5
Step 2:.....	5
How to Execute the Program .....	5
Step 1:.....	5
Step 2:.....	5
Program # 1: Simple Program.....	6
Program # 2: Swap the Numbers .....	7
Program # 3: Arithmetic Operation Sum .....	8
Program # 4: Temperature Conversion to Centigrade .....	9
Program # 5: Find out the Symbol from ASCII.....	10
Program # 6: Reverse Number.....	11

### **Chapter 2: Decisions**

If, else if & nested if:.....	13
Program # 1: Given number is Odd or Even.....	13
Program # 2: Greater number from given Numbers .....	14
Program # 3: Find out the Grade.....	15
Program # 4: Calculate the Salary of Servant .....	16
Program # 5: Find out the smaller Number.....	17
Goto Statement.....	18

---

Program # 1: Table of Number .....	18
Program # 2: Game: Find out the Hidden Number .....	19
Relational Operators.....	21
Program # 1: Student Result .....	21
Program # 2: Electricity Bill .....	23
Program # 3: Upper & Lower Case.....	24
Program # 4: Age .....	25
Program # 5: Preprocessor Directives.....	28
<b>Chapter 3: Switch-Case</b>	
Switch-Case.....	30
Program # 1: Vowel Character.....	30
Program # 2: Roman Numbers.....	31
Program # 3: Currency Exchange .....	33
Program # 4: Arithmetic Operations .....	35
Program # 5: Game .....	36
Program # 6: Multiple Operations.....	40
<b>Chapter 4: Loops</b>	
Loops .....	43
Program # 1: Factorial.....	43
Program # 2: ASCII Table .....	44
Program # 3: Day of Date .....	45
Program # 4: Colorful Text .....	47
Program # 5: Exponent.....	48
Program # 6: Mathematics Series .....	49
Program # 7: Armstrong Number .....	50
Program # 8: The Word ALLAH .....	51
Program # 9: Prime Number .....	53
Program # 10: Rectangle.....	54
Program # 11: Mathematics Series .....	56
Nested Loop .....	57

---

---

Program # 1: Factors .....	57
Program # 2: Alphabetic Design.....	58
Program # 3: Diamond .....	59
Program # 4: Stop Watch .....	60
Program # 5: Numeric Design.....	61

## **Chapter 5: Structures**

Structures.....	63
Program # 1: Result Sheet.....	63
Program # 2: Area .....	66

## **Chapter 6: Arrays**

Arrays .....	68
Program # 1: Greater Number from List.....	68
Program # 2: Binary Number.....	69
Program # 3: Sorting Characters .....	70
Program # 4: Sequential Search .....	71
Program # 5: Case Conversion.....	72
Program # 6: Puzzle .....	73
Program # 7: Insertion Sort .....	78
Program # 8: Selection Sort .....	79
Program # 9: Game: Hidden Word .....	80
Program # 10: Matrix Addition.....	83
Program # 11: Matrix Multiplication .....	85

## **Chapter 7: Pointers**

Pointers.....	87
Program # 1: Memory Address .....	87
Program # 2: Pointed variable Access .....	88
Program # 3: Pointer Array .....	89

## **Chapter 8: Functions**

Functions .....	91
Program # 1: Square Root .....	91

---

Program # 2: Prime Numbers.....	92
Program # 3: Recursive Function.....	94
Program # 4: Fibonacci Series .....	95
Program # 5: Square .....	96
Program # 6: Standard Deviation.....	97
Program # 7: Character Counting .....	98
Program # 8: Comparing Strings.....	100
Program # 9: Smaller Number .....	102
Program # 10: Calendar .....	103

## **Chapter 9: Classes**

Classes .....	112
Program # 1: Multiplication .....	112
Program # 2: Constructor with Header File .....	113
Program # 3: Destructor .....	115
Program # 4: Object Argument.....	116
Program # 5: Friend Class .....	118

## **Chapter 10: Files**

Files .....	120
Program # 1: Create a File .....	120
Program # 2: Write/Read String.....	122
Program # 3: Counting Lines .....	124
Program # 4: Data Copy to another File .....	125
Program # 5: Counting Characters.....	126
Program # 6: Binary Mode Write.....	128
Program # 7: Binary Mode Record .....	130
Program # 8: Counting Record .....	132
Program # 9: Search Record .....	133
Program # 10: Search Name with Structure.....	135
Program # 11: Search Name with Class.....	137
Program # 12: Update the Record.....	140

---

---

Program # 13: DOS Shell.....	142
------------------------------	-----

## **Chapter 11: Polymorphism**

Polymorphism .....	144
Program # 1: Binary Operator (+) Overloading.....	144
Program # 2: Binary Operator [ ] Overloading .....	146
Program # 3: Binary Operators (+,-,*) Overloading.....	148
Program # 4: Inheritance .....	150
Program # 5: Derived Constructor .....	151
Program # 6: Function Overriding .....	153
Program # 7: Friend Function .....	154
Program # 8: Virtual Function .....	156
Program # 9: Virtual Function .....	158

## **Chapter 12: Graphics**

Graphics.....	162
Program # 1: Rectangle .....	162
Program # 2: Circles.....	163
Program # 3: Masjid Model .....	164
Program # 4: Analog Clock.....	171
Program # 5: Game: Moving Ball.....	175
Program # 6: Calculator .....	183
Program # 7: Mouse Handling .....	200
References .....	206

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# Learning Outcomes

This book consists of 100 programing examples of Object Oriented Programming C++. Starting from simple program and ending to graphics. This book covers almost all the features of C++. The objective of this book is to teach the students in an easy way. Students can not write a program in the beginning. It will help the students to create programing skills in C++. In the first step students try to run these programs and later on try to solve it by their own method. However, there are several methods to solve a problem. In these programs, a lot of code optimization space is available. Now students may learn to optimize the code of these programs.

# **Chapter 1** Introduction

### Brief History of C++

C++ is the extension of C language. The C language was evolved from B language by “Dennis Ritchie” at Bell Lab in 1972 to create early version of UNIX operating system [1]. C language is the subset of C++. Every single command of C language is executable in C++ but the reverse is not possible. C is a structured programming language but C++ is the Object Oriented Programming language [2].

In 1979, a Danish computer scientist “Bjarne Stroustrup” began his work on “C with Classes” [3]. In 1983, it was renamed from C with Classes to C++. New features were added along with classes.

In 1985, the first edition of the C++ programming language was released [4]. In 1989, the second edition of the C++ was released [5]. In 1991, updated second edition of the C++ with new features was released.

C++ is standardized language by an ISO working group. In 1998, after the second updated edition of C++ the ISO working group standardized C++ for the first time which is known as C++98 [6]. In 2003, it published a new version of the C++ standard called C++03 which fixed problems identified in C++98 [7].

In 2011, the new version of C++11 standard was released with adding numerous new features [8]. After a minor update in 2014, C++14 was released [9]. And various new additions are in pipeline for 2017.

### C++ Compiler

As we know that computer understands only binary language that consists of 0 and 1. It is also called machine language. And we write code in high level language that is much closer to human language. Computer does not understand human language. So we need a translator which translates the code into machine language and then translates the results to human language [10]. This translator sometimes works as compiler and sometimes as interpreter.

Compiler translates the code as whole and shows all the errors existing in the code while interpreter translates the code line by line and if any error is found in the code then it stops at that line. When program has compiled successfully by compiler; it creates an object file with file

## Introduction

extension “.obj”. Object file consists of a binary code and computer can easily read this file. After compilation, program could run and it shows output on the screen. Compiler translates and run the program as a whole so it creates another file that is called executable file with file extension “.exe” in the same folder. This file can be run directly. While interpreter translates and execute code line by line so it does not create any object file nor an executable file.

In C++ language, a compiler is used to translate the code. There are many different types of compiler available to test the code. There are minor differences between C++ compilers in its syntax. In this book, we are using “Turbo C++” compiler to test the code.

### **How to Run the Compiler**

Follow the instructions given below step by step to execute the “turbo C” compiler in Microsoft Windows platform.

#### **Step 1:**

Download the programming language “turbo C++” compatible for the windows vista or windows 7/8/8.1/10 from the following link or other.

<http://turboc7.blogspot.com/>

#### **Step 2:**

Install the downloaded file into your computer.

#### **Step 3:**

Now you can run the Turbo C in full screen just double click on desktop icon “TurboC 7” as shown in Fig. 1.0 below.



**Fig. 1.0 Turbo C**

### Step 4:

By default graphics library is disable in turbo C. First of all enable it by clicking the check box from “options” menu then “linker” and then “libraries” as shown in Fig. 1.1 below.



Fig. 1.1 Graphics Library

### Step 5:

Click the “Option” menu then select the “Directories” and make sure the directory setting is same as shown in the Fig. 1.2 below.



Fig. 1.2 Directories Setting

### How to Run the Program

Follow the instructions given below step by step to compile and run a program in turbo C++.

#### Step 1:

Program's code is available. You have to type the code in the editor or copy the text code of program and past it in notepad and save file with “.cpp” file extension in the “bin” folder.

#### Step 2:

Now open the file into the turbo C++ compiler and try to compile & run the code by pressing “Ctrl+F9” keys.

### How to Execute the Program

When a program is compiled then the compiler create an object file with same name. And when a program is run then the compiler generate executable file with same name and “.exe” file extension in the same directory. This file type is executed directly. But in Windows 7 or later version of operating system these file could not execute directly because operating system does not provide support.

So follow the instructions given below step by step to execute a program directly without compilation with the help of “DOS shell” of the compiler.

#### Step 1:

Open the file menu in turbo C++ compiler and then select “DOS shell” as shown in the Fig. 1.3 below.

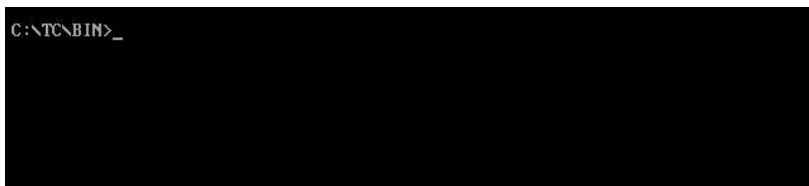


Fig. 1.3 DOS Shell

#### Step 2:

Now type the name of the “.exe” file which you want to execute directly.

### Program # 1: Simple Program

//Program to just print a message on screen.

```
#include <iostream.h>      //Preprocessor or header file for output statement
#include <conio.h>          //Header file for clear screen function

void main (void)           //Main function of the program
{
    clrscr();              //Built in function which is used to screen clear
    cout<<"Hello World of C++"; //Output statement
    getch();                //Built in function
}
```

### Output:

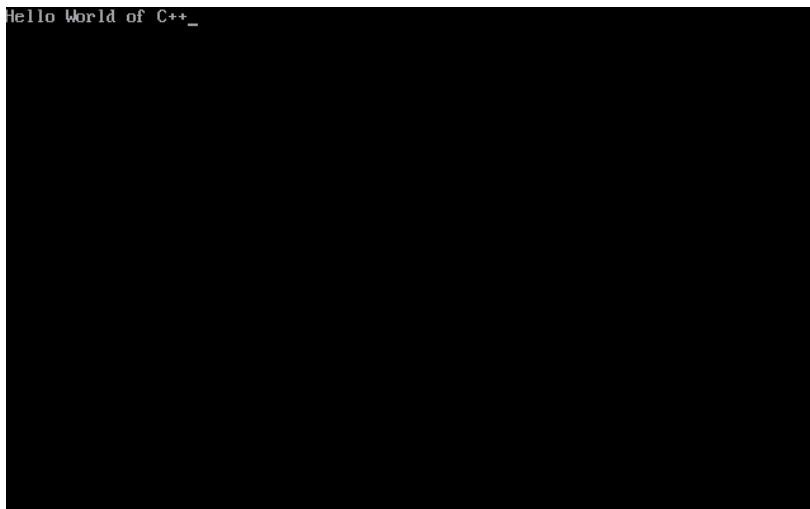


Fig. 1.4 Simple Program

### Program # 2: Swap the Numbers

//Program to swap the two numbers by using third variable

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int a,b,c;      //Declare Integer variables
    a = 10;
    b = 20;
    c = a;
    a = b;
    b = c;
    cout<<"The value of a is = "<<a<<endl;           //End line
    cout<<"The value of b is = "<<b;
    getch();
}
```

#### Output:

```
The value of a is = 20
The value of b is = 10
```



Fig. 1.5 Swap the Numbers

### Program # 3: Arithmetic Operation Sum

//Program to enter two numbers and shows their sum.

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int first,second;
    int sum;
    cout<<"Enter the value of first number = ";
    cin >> first;           //Input statement
    cout<<"Enter the value of second number = ";
    cin >> second;
    sum = first+second;      //Arithmetic Operation
    cout<<"The sum is = "<< sum;
    getch();
}
```

#### Output:

```
Enter the value of first number = 10
Enter the value of second number = 20
The sum is = 30
```

Fig. 1.6 Arithmetic Operations

### Program # 4: Temperature Conversion to Centigrade

//Program to convert the temperature in centigrade.

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    float ftemp,ctemp;           //Declare float variables
    cout<<"Enter the temperature in Fahrenheit = ";
    cin >> ftemp;
    ctemp = ((ftemp-32.0)*5.0/9.0);
    cout<<"The centigrade temperature is = "<<ctemp;
    getch ();
}
```

#### Output:

```
Enter the temperature in Fahrenheit = 98.6
The centigrade temperature is = 37_
```



Fig. 1.7 Temperature Conversion

### Program # 5: Find out the Symbol from ASCII

//Program to find out the symbol from ASCII character set

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int n,n1;
    char ch,ch1;      //Declare character variables
    cout<<"Enter any number = ";
    cin >> n;
    ch = n;
    cout<<"The character of given number is = "<<ch<<endl;
    cout<<"Press any character on the keyboard = ";
    cin >> ch1;
    n1 = ch1;
    cout<<"The numeric value of given character is = "<<n1;
    getch();
}
```

#### Output:

```
Enter any number = 65
The character of given number is = A
Press any character on the keyboard = g
The numeric value of given character is = 103
```

Fig. 1.8 ASCII Set

### Program # 6: Reverse Number

//Program to display the reverse of given number

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    unsigned y,u,t,h,th,res;
    cout<<"Enter the year = ";
    cin >> y;
    th = y/1000;
    res = y%1000;      // % is used for remainder
    h = res/100;
    res = res%100;
    t = res/10;
    res = res%10;
    u = res/1;
    cout<<"The reverse number is = "<<u<<t<<h<<th;
    getch();
}
```

### Output:

```
Enter the year = 2016
The reverse number is = 6102_
```

Fig. 1.9 Reverse Number

## **Chapter 2 Decisions**

**If, else if & nested if:****Program # 1: Given number is Odd or Even**

//Program to find out the given number is odd or even

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr ();
    int n;
    cout<<"Enter the number = ";
    cin >> n;
    if (n % 2 == 0)      // % is used to calculate the remainder
        cout<<"The number is even";
    else
        cout<<"The number is odd";
    getch ();
}
```

**Output:**A screenshot of a terminal window showing the execution of a C++ program. The program prompts the user to enter a number, reads the input, calculates whether it is odd or even using the modulo operator (%), and then prints the result.

```
Enter the number = 5
The number is odd
```

Fig. 2.1 Odd/Even

## Program # 2: Greater number from given Numbers

//Program to find out the greater number from given numbers

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int a,b,c,max;
    cout<<"Enter the value of a = ";
    cin >> a;
    cout<<"Enter the value of b = ";
    cin >> b;
    cout<<"Enter the value of c = ";
    cin >> c;
    if (a > b)
        max = a;
    else
        max = b;
    if (c > max)
        max = c;
    cout<<"The Greater number is = "<<max;
    getch ();
}
```

### Output:

```
Enter the value of a = 5
Enter the value of b = 8
Enter the value of c = 10
The Greater number is = 10
```

Fig. 2.2 Greater Number

### Program # 3: Find out the Grade

//Program to find out the grade of given marks

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr ();
    int marks;
    cout<<"Enter the marks = ";
    cin >> marks;
    if (marks >=85)
        cout<<"The Grade is A+";
    else if(marks >=80)
        cout<<"The Grade is A";
    else if(marks >=75)
        cout<<"The Grade is B+";
    else if(marks >=70)
        cout<<"The Grade is B";
    else if(marks >=60)
        cout<<"The Grade is C";
    else if(marks >=50)
        cout<<"The Grade is D";
    else
        cout<<"The Grade is F";
    getch ();
}
```

#### Output:

```
Enter the marks = 67
The Grade is C
```

Fig. 2.3 Grades

### Program # 4: Calculate the Salary of Servant

//Program to calculate the salary of the servant

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int hours, rate, overtime, pay, opay, total;
    cout<<"Enter the hours of servant = ";
    cin >> hours;
    cout<<"Enter the rate per hour = ";
    cin >> rate;
    if (hours > 40 )
    {
        overtime = hours-40;
        pay = 40*rate;                                //Block of Code in if
        opay = overtime*2*rate;
        total = pay+opay;
    }
    else
        total = hours*rate;
    cout<<"The total salary of the servant is = "<<total;
    getch ();
}
```

#### Output:

```
Enter the hours of servant = 45
Enter the rate per hour = 5
The total salary of the servant is = 250_
```

Fig. 2.4 Salary

### Program # 5: Find out the smaller Number

//Program to find out the smaller number from given numbers

```
#include <iostream.h>
#include <conio.h>

void main()
{
    clrscr();
    int a,b,c,min;
    cout<<"Enter the value of a = ";
    cin>>a;
    cout<<"Enter the value of b = ";
    cin>>b;
    cout<<"Enter the value of c = ";
    cin>>c;
    if (a<b)
        if (a<c)
            min = a;
    if (b<a)
        if(b<c)
            min = b;
    if (c<a)
        if(c<b)
            min = c;
    cout<<"The Smaller number is = "<<min;
    getch();
}
```

### Output:

```
Enter the value of a = 4
Enter the value of b = 3
Enter the value of c = 10
The Smaller number is = 3_
```

Fig. 2.5 Smaller Number

## Goto Statement

### Program # 1: Table of Number

//Program to display the table of given number

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int sum, counter , n;
    cout<<"Enter the number of table = ";
    cin >> n;
    counter=1;
    in:           //Label
    sum = n*counter;
    cout<<n<<" * "<<counter<<" = "<<sum<<endl;
    counter = counter+1;
    if (counter<=10)
        goto in;
    getch ();
}
```

### Output:

```
Enter the number of table = 2
2 * 1 = 2
2 * 2 = 4
2 * 3 = 6
2 * 4 = 8
2 * 5 = 10
2 * 6 = 12
2 * 7 = 14
2 * 8 = 16
2 * 9 = 18
2 * 10 = 20
```

Fig. 2.6 Table

## Program # 2: Game: Find out the Hidden Number

//Program to find out the number which computer has supposed randomly

```
#include <iostream.h>
#include <conio.h>
#include <stdlib.h>           //is used for Rand() function

void main ()
{
    clrscr();
    int n,k,c=0;
    k = rand()%100;      //Built in function generate random number
    cout<<"Computer has selected a number b/w 0 - 100 and save it in its
memory"<<endl;
    in:
    cout<<"Enter the number to find out the hidden number = ";
    cin >>n;
    c++;
    if (n>k)
        cout<<"Your number is greater"<<endl;
    if (n<k)
        cout<<"Your number is smaller"<<endl;
    if (n==k)
    {
        clrscr ();
        cout<<endl;
        cout<<"The number is found"<<endl;
        cout<<"The number is "<<k<<endl;
        cout<<"You find out the number after mistakes = "<<c<<endl;
        getch ();
        exit(0);      //Stop the working
    }
    goto in;
}
```

**Output:**

```
Computer has selected a number b/w 0 - 100 and save it in its memory
Enter the number to find out the hidden number = 50
Your number is smaller
Enter the number to find out the hidden number = 60
Your number is smaller
Enter the number to find out the hidden number = 70
Your number is smaller
Enter the number to find out the hidden number = 80
Your number is greater
Enter the number to find out the hidden number = 75
Your number is smaller
Enter the number to find out the hidden number = 78
Your number is smaller
Enter the number to find out the hidden number = 79

The number is found
The number is 79
You find out the number after mistakes = ?
```

Fig. 2.7 Game: Hidden Number

## Relational Operators

### Program # 1: Student Result

//Program to calculate the result of student's marks given by student

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int comp,phy,math,eng,stat,total;
    float avg;
    cout<<"Enter the marks of computer = ";
    cin>> comp;
    cout<<"Enter the marks of physics = ";
    cin>> phy;
    cout<<"Enter the marks of mathematics = ";
    cin>> math;
    cout<<"Enter the marks of english = ";
    cin>> eng;
    cout<<"Enter the marks of stat = ";
    cin>> stat;
    total = (comp+phy+math+eng+stat);
    avg = ((total/500.0)*100.0);
    cout<<"The total marks obtained by student = "<<total<<endl;
    cout<<"The average of total marks is = "<<avg<<endl;
    if (avg >= 85 )
        cout<<"The grade is A+";
    if (avg >= 75 && avg <= 84)
        cout<<"The grade is A";
    if (avg >= 60 && avg <= 74)
        cout<<"The grade is B";
    if (avg >= 50 && avg <= 59)
        cout<<"The grade is C";
    if (avg < 50)
        cout<<"Fail";
    getch();
}
```

**Output:**

```
Enter the marks of computer = 67
Enter the marks of physics = 64
Enter the marks of mathematics = 75
Enter the marks of english = 80
Enter the marks of stat = 82
The total marks obtained by student = 368
The average of total marks is = 73.599998
The grade is B_
```

Fig. 2.8 Result

## Program # 2: Electricity Bill

//Program to calculate the electricity bill of consumed units given by user

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int units,cunits,punits;
    float bill;
    cout<<"Enter the current reading = ";
    cin >> cunits;
    cout<<"Enter the previous reading = ";
    cin >> punits;
    units = cunits-punits;
    if (units < 300)
        bill = 3.0*units;
    if (units > 300 && units <=400)
        bill = ((3.5*units)+(units*0.5/100.0));
    if (units > 400 && units <=500)
        bill = ((4.5*units)+(units*0.7/100.0));
    if (units > 500)
        bill = ((5.0*units)+(units*0.9/100.0));
    cout<<"The electricity bill is = "<<bill;
    getch ();
}
```

### Output:

```
Enter the current reading = 600
Enter the previous reading = 295
The electricity bill is = 1069.025024
```

Fig. 2.9 Electricity Bill

### Program # 3: Upper & Lower Case

//Program to convert the letter upper case to lower & lower to upper

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int n;
    char ch;
    cout<<"Press any letter either upper or lower case = ";
    cin >> ch;
    n = ch;
    if (n>=65 && n<=90)
    {
        n = n+32;
        ch = n;
        cout<<"The lower case of your letter is = "<<ch;
    }
    else if (n>=96 && n<=122)
    {
        n = n-32;
        ch = n;
        cout<<"The upper case of your letter is = "<<ch;
    }
    else
        cout<<"You pressed wrong letter";
    getch ();
}
```

#### Output:

```
Press any letter upper or lower case = D
The lower case of your letter is = d_
```

Fig. 2.10 Upper/Lower Case

## Decisions

---

### Program # 4: Age

//Program to calculate the age of human by entering date of birth

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int dd,mm,yy,dd1,mm1,yy1;
    int d,m,y;
    int dd2,mm2,yy2;
    cout<<"Enter the current day = ";
    cin >>dd;
    cout<<"Enter the current month = ";
    cin >>mm;
    cout<<"Enter the current year = ";
    cin >>yy;
    cout<<"Enter the previous day = ";
    cin >>dd1;
    cout<<"Enter the previous month = ";
    cin >>mm1;
    cout<<"Enter the previous year = ";
    cin >>yy1;
    if (dd1<=dd && mm1<=mm || yy1<=yy)
    {
        d = dd-dd1;
        m = mm-mm1;
        y = yy-yy1;
    }

    if (dd1<=dd && mm1>mm && yy1<yy)
    {
        d = dd-dd1;
        mm2 = mm+12;
        m = mm2-mm1;
        y = yy-yy1-1;
    }

    if (dd1>dd && mm1<mm && yy1<yy)
    {
        if (mm==1 || mm==3 || mm==5 || mm==7 || mm==8 || mm==10 ||
            mm==12)
        {
    }
```

---

## Decisions

---

```
        dd2 = dd+31;
        d = dd2-dd1;
        m = mm-mm1-1;
        y = yy-yy1;
    }
    if (mm==2 && yy%4==0)
    {
        dd2 = dd+29;
        d = dd2-dd1;
        m = mm-mm1-1;
        y = yy-yy1;
    }
    if (mm==2 && yy%4 !=0)
    {
        dd2 = dd+28;
        d = dd2-dd1;
        m = mm-mm1-1;
        y = yy-yy1;
    }
    if (mm==4 || mm==6 || mm==9 || mm==11)
    {
        dd2 = dd+30;
        d = dd2-dd1;
        m = mm-mm1-1;
        y = yy-yy1;
    }
}
if (dd1>dd && mm1>=mm && yy1<yy)
{
    if (mm==1 || mm==3 || mm==5 || mm==7 || mm==8 || mm==10 ||
    mm==12)
    {
        dd2 = dd+31;
        d = dd2-dd1;
        mm2 = mm+12-1;
        m = mm2-mm1;
        y = yy-yy1-1;
    }
    if (mm==2 && yy%4==0)
    {
        dd2 = dd+29;
        d = dd2-dd1;
        mm2 = mm+12-1;
```

## Decisions

---

```
m = mm2-mm1;
y = yy-yy1-1;
}
if (mm==2 && yy%4 !=0)
{
    dd2 = dd+28;
    d = dd2-dd1;
    mm2 = mm+12-1;
    m = mm2-mm1;
    y = yy-yy1-1;
}
if (mm==4 || mm==6 || mm==9 || mm==11)
{
    dd2 = dd+30;
    d = dd2-dd1;
    mm2 = mm+12-1;
    m = mm2-mm1;
    y = yy-yy1-1;
}
cout<<"The days are = "<<d<<endl;
cout<<"The months are = "<<m<<endl;
cout<<"The years are = "<<y<<endl;
getch ();
}
```

### **Output:**

```
Enter the current day = ?
Enter the current month = 1
Enter the current year = 2016
Enter the previous day = ?
Enter the previous month = ?
Enter the previous year = 1982
The days are = 0
The months are = 6
The years are = 33
```

Fig. 2.11 Age

**Program # 5: Preprocessor Directives**

//Program example in which define some words against symbols

```
#include <iostream.h>
#include <conio.h>

#define AND &&    //Define AND
#define OR ||
#define NOT !

void main ()
{
    clrscr();
    int c,d,n;
    cout<<"Enter the value of n = ";
    cin >> n;
    cout<<"Enter the value of c = ";
    cin >> c;
    cout<<"Enter the value of d = ";
    cin >> d;
    if((n > c AND n > d) OR (d < n AND c!=d))
        cout<<"This is the example of preprocessors ";
    else
        cout<<"The above coding is wrong";
    getch ();
}
```

**Output:**

```
Enter the value of n = 10
Enter the value of c = 34
Enter the value of d = 23
The above coding is wrong
```

Fig. 2.12 Preprocessor Directives

## **Chapter 3** Switch-Case

## Switch-Case

### Program # 1: Vowel Character

//Program to find out the given character is vowel or not

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr ();
    char y;
    cout<<"Press any character = ";
    cin >> y;
    switch (y)
    {
        case 'a':
            cout<<"The given character is vowel";break ;
        case 'e':
            cout<<"The given character is vowel";break ;
        case 'i':
            cout<<"The given character is vowel";break ;
        case 'o':
            cout<<"The given character is vowel";break ;
        case 'u':
            cout<<"The given character is vowel";break ;
        default:
            cout<<"The given character is not vowel";
    }
    getch ();
}
```

### Output:

```
Press any character = e
The given character is vowel
```

Fig. 3.1 Vowel

## Program # 2: Roman Numbers

//Program to display the given number in roman numbers

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int y,h,t,u,res;
    cout<<"Enter any number b/w 1 - 999 = ";
    cin >> y;
    h = y/100;
    res = y%100;
    t = res/10;
    res = res%10;
    u = res/1;
    cout<<"Roman number is = ";
    switch (h)
    {
        case 1: cout<<"c";break;
        case 2: cout<<"cc";break;
        case 3: cout<<"ccc";break;
        case 4: cout<<"cccc";break;
        case 5: cout<<"d";break;
        case 6: cout<<"dc";break;
        case 7: cout<<"dcc";break;
        case 8: cout<<"dccc";break;
        case 9: cout<<"dcccc";break;
    }
    switch (t)
    {
        case 1: cout<<"x";break;
        case 2: cout<<"xx";break;
        case 3: cout<<"xxx";break;
        case 4: cout<<"xxxx";break;
        case 5: cout<<"l";break;
        case 6: cout<<"lx";break;
        case 7: cout<<"lxx";break;
        case 8: cout<<"lxx";break;
        case 9: cout<<"lxxx";break;
    }
    switch (u)
    {
```

## Switch-Case

---

```
case 1: cout<<"i";break;
case 2: cout<<"ii";break;
case 3: cout<<"iii";break;
case 4: cout<<"iv";break;
case 5: cout<<"v";break;
case 6: cout<<"vi";break;
case 7: cout<<"vii";break;
case 8: cout<<"viii";break;
case 9: cout<<"ix";break;
}
getch ();
}
```

### Output:

```
Enter any number b/w 1 - 999 = 364
Roman number is = ccclxiv_
```

Fig. 3.2 Roman Number

### Program # 3: Currency Exchange

//Program to convert the dollar into different currencies

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int n,d;
    float amount;
    cout<<"1. British Pounds"<<endl;
    cout<<"2. Euro "<<endl;
    cout<<"3. UAE Dirham"<<endl;
    cout<<"4. Japanese Yen"<<endl;
    cout<<"5. Pakistani Rupees"<<endl;
    cout<<"Enter the number from the above list = ";
    cin >>n;
    switch (n)
    {
        case 1:
        {
            cout<<"Enter the dollars = ";
            cin >>d;
            amount = 1/(1.45)*d;
            cout<<"The amount in British Pounds = "<<amount;
        }
        break;
        case 2:
        {
            cout<<"Enter the dollars = ";
            cin >>d;
            amount = 1/(1.08)*d;
            cout<<"The amount in Euro = "<<amount;
        }
        break;
        case 3:
        {
            cout<<"Enter the dollars = ";
            cin >>d;
            amount = 1/(0.27)*d;
            cout<<"The amount in UAE Dirham = "<<amount;
        }
        break;
    }
}
```

## Switch-Case

---

```
case 4:  
{  
    cout<<"Enter the dollars = ";  
    cin >>d;  
    amount = 1/(0.0085)*d;  
    cout<<"The amount in Japanese Yen = "<<amount;  
}  
break;  
case 5:  
{  
    cout<<"Enter the dollars = ";  
    cin >>d;  
    amount = 1/(0.0095)*d;  
    cout<<"The amount in Pakistani Rupees = "<<amount;  
}  
break;  
}  
getch();  
}
```

### Output:

```
1. British Pounds  
2. Euro  
3. UAE Dirham  
4. Japanese Yen  
5. Pakistani Rupees  
Enter the number from the above list = 1  
Enter the dollars = 5  
The amount in British Pounds = 3.448276
```

Fig. 3.3 Currency Exchange

### Program # 4: Arithmetic Operations

//Program to solve arithmetic operations

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int x,y,res;
    char z;
    cout<<"Enter the value of x = ";
    cin >>x;
    cout<<"Enter the value of y = ";
    cin >>y;
    cout<<"Enter the arithmetic operator like (+,-,* and /) = ";
    cin >>z;
    switch (z)
    {
        case '+': res = x+y;break;
        case '-': res = x-y;break;
        case '*': res = x*y;break;
        case '/': res = x/y;break;
        default: cout<<"You do not press any operator ";
    }
    cout<<"The result is = "<<res<<endl;
    getch ();
}
```

### Output:

```
Enter the value of x = 6
Enter the value of y = 8
Enter the arithmetic operator like (+,-,* and /) = +
The result is = 14
```

Fig. 3.4 Arithmetic Operations

### Program # 5: Game

//Program to generate random number in circles and find out the sum.

/\* Hint First of all you press button "i" on the keypad and in this response the computer generate a random number for it and add this number in its account (sum) and if you press again "i" button the computer shows the message that(invalid key). And then second you press the button "l" on the keypad and computer generate a random number for it and add in its account and then your press "k" button and "j" button as a sequence. When a circle is complete you can start next circle until any key's account is greater or equal to 20 then that key will win. You can stop this by press "n" key.\*/

```
#include <iostream.h>
#include <conio.h>
#include <iostream.h>
#include <conio.h>
#include <stdlib.h>

void main ()
{
    int k1 = 0, sum1 = 0, p = 0;
    int k2 = 0, sum2 = 0, q = 1;
    int k3 = 0, sum3 = 0, r = 1;
    int k4 = 0, sum4 = 0, s = 1;
    char ch,choice = 'y';
    clrscr ();
    while (choice != 'n')
    {
        clrscr ();
        cout << "Press i,l,k & j keys in circles" << endl;
        ch = getch ();
        switch (ch)
        {
            case 105:
            {
                if (p == 0)
                {
                    k1 = rand () % 10;
                    sum1 = k1 + sum1;
                    cout << "You press up arrow key" << endl;
                    cout << "The random number = " << k1 << endl;
                    p++;
                    q--;
                }
            }
        }
    }
}
```

---

### Switch-Case

---

```
else
    cout<<"Invalid key"<<endl;
}
break;

case 108:
{
    if (q==0)
    {
        k2 = rand()%10;
        sum2 = k2+sum2;
        cout<<"You press right arrow key"<<endl;
        cout<<"The random number = "<<k2<<endl;
        q++;
        r--;
    }
    else
        cout<<"Invalid key"<<endl;
}
break;

case 107:
{
    if (r==0)
    {
        k3 = rand()%10;
        sum3 = k3+sum3;
        cout<<"You press down arrow key"<<endl;
        cout<<"The random number = "<<k3<<endl;
        r++;
        s--;
    }
    else
        cout<<"Invalid key"<<endl;
}
break;

case 106:
{
    if (s==0)
    {
        k4 = rand()%10;
        sum4 = k4+sum4;
        cout<<"You press left arrow key"<<endl;
```

### Switch-Case

---

```
cout<<"The random number = "<<k4<<endl;
s++;
p--;
}
else
    cout<<"Invalid key"<<endl;
}
break;
default:
    cout<<"Invalid key"<<endl;
}
if (sum1>=20)
{
    clrscr();
    cout<<"The up key win"<<endl;
    getch ();
    exit(0);
}
if (sum2>=20)
{
    clrscr ();
    cout<<"The right key win"<<endl;
    getch ();
    exit(0);
}
if (sum3>=20)
{
    clrscr ();
    cout<<"The down key win"<<endl;
    getch ();
    exit(0);
}
if (sum4>=20)
{
    clrscr ();
    cout<<"The right key win"<<endl;
    getch ();
    exit(0);
}
cout<<"Do you continue (Y/N) = ";
choice = getche();
cout<<endl;
}
```

---

## Switch-Case

---

### Output:

```
Press i,l,k & j keys in circles  
You press up arrow key  
The random number = 5  
Do you continue (Y/N) =
```

```
The right key win
```

Fig. 3.5 Game: Random Number

## Program # 6: Multiple Operations

//Program to select an operation from list and display its results

```
#include <iostream.h>
#include <conio.h>
#include <complex.h>

void main ()
{
    clrscr();
    int i,n,x,p,b,res,count;
    cout<<"1. Factorial"<<endl;
    cout<<"2. Odd/Even "<<endl;
    cout<<"3. Prime"<<endl;
    cout<<"4. Raise to power"<<endl;
    cout<<"5. Square root"<<endl;
    cout<<"Press the number of your choice ";
    cin >> n;
    res = 1;
    count = 0;
    switch (n)
    {
        case 1:
            cout<<"Enter any number = ";
            cin >> n;
            for(i=1;i<=n;i++)
                res = res*i;
            cout<<"The factorial of given number is = "<<res<<endl;
            break;
        case 2:
            cout<<"Enter any number = ";
            cin >> n;
            if(n%2 == 0)
                cout<<"The number is even ";
            else
                cout<<"The number is odd ";
            break ;
        case 3:
            cout<<"Enter any number = ";
            cin >> n;
            for (i=1;i<=n;i++)
                if(n%i==0)
                    count= count+1;
            if(count==2)
```

## Switch-Case

---

```
cout<<"The number is prime ";
else
    cout<<"The number is not prime";
break;
case 4:
    cout<<"Enter the base of number = ";
    cin >> b;
    cout<<"Enter the power of number = ";
    cin >> p;
    for (i=1;i<=p;i++)
        res = res*b;
    cout<<"The raise to power of number = "<<res;
break;
case 5:
    cout<<"Enter any number = ";
    cin >> n;
    float res = sqrt(n);
    cout<<"The square root of the number is = "<<res;
break;
default:
    cout<<"Press the number in the above series";
}
getch ();
}
```

### **Output:**

```
1. Factorial
2. Odd/Even
3. Prime
4. Raise to power
5. Square root
Press the number of your choice 3
Enter any number = 6
The number is not prime_
```

**Fig. 3.6 Multiple Operation**

## **Chapter 4** Loops

## Loops

### Program # 1: Factorial

//Program to calculate the factorial of given number

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int i,n;
    double res;
    cout<<"Enter any number = ";
    cin >> n;
    res = 1;
    for (i=1;i<=n;i++)
        res = res*i;
    cout<<"The factorial of given number is = "<<res;
    getch();
}
```

### Output:

```
Enter any number = 6
The factorial of given number is = 720
```

Fig. 4.1 Factorial

## Program # 2: ASCII Table

//Program to display the ASCII table on screen

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    char ch;
    int i;
    for (i=255;i>=0;i--)
    {
        cout<<char(i);
    }

    getch ();
}
```

### Output:



Fig. 4.2 ASCII Table

### Program # 3: Day of Date

//Program to find out the day of given date starting from Jan. 2001

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int d,m,y;
    int n = 0;
    int ly = 0;
    int td,r,i,j,ny;
    cout<<"Enter the day dd(01)= ";
    cin >>d;
    cout<<"Ennter the month mm(01)= ";
    cin >>m;
    cout<<"Enter the year yy from (2001)= ";
    cin >>y;
    for (i=1;i<m;i++)
    {
        if (i==1 || i==3 || i==5 || i==7 || i==8 || i==10 || i==12)
            n = n+31;
        else if (i==2 && y % 4 !=0)
            n = n+28;
        else if (i==2 && y % 4 ==0)
            n = n+29;
        else if (i==4 || i==6 || i==9 || i==11)
            n = n+30;
    }
    for (j=2001;j<y;j++)
    {
        if (j%4==0)
            ly = ly+1;
    }
    ny = (y-2000)-1;
    td = ly+n+d+(ny*365);
    r =td%7;
    switch(r)
    {
        case 0: cout<<"The day is Sun";break;
        case 1: cout<<"The day is Mon";break;
        case 2: cout<<"The day is Tue";break;
        case 3: cout<<"The day is Wed";break;
```

## Loops

---

```
case 4: cout<<"The day is Thu";break;  
case 5: cout<<"The day is Fri";break;  
case 6: cout<<"The day is Sat";break;  
}  
getch ();  
}
```

### Output:

```
Enter the day dd(01)= 23  
Ennter the month mm(01)= 3  
Enter the year yy from (2001)= 2016  
The day is Wed_
```

Fig. 4.3 Day

**Program # 4: Colorful Text**

//Program to display the text in different colors

```
#include <iostream.h>
#include <conio.h>
#include <stdio.h>

void main ()
{
    clrscr();
    int i = 1;
    while (i<=16)
    {
        textcolor(i);           //Set color by number or name like (RED)
        cprintf("%d",i);        //Print colorful text
        i++;
    }
    getch();
}
```

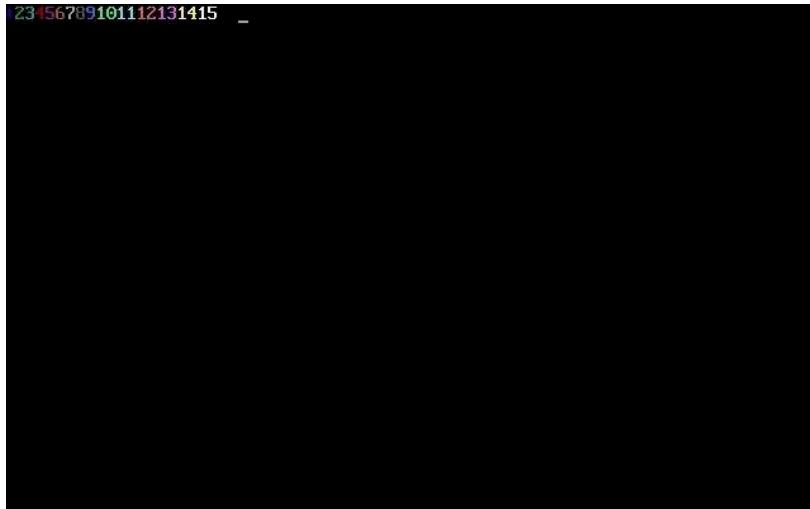
**Output:**

Fig. 4.4 Color Text

**Program # 5: Exponent**

//Program to find out the exponent of given number

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int i,b,p;
    double res;
    cout<<"Enter the base of the number = ";
    cin >> b;
    cout<<"Enter the power of the number = ";
    cin >> p;
    res = 1;
    for (i=1;i<=p;i++)
        res = res*b;
    cout<<"The result is = "<<res;
    getch ();
}
```

**Output:**

```
Enter the base of the number = 5
Enter the power of the number = 4
The result is = 625
```

Fig. 4.5 Exponent

**Program # 6: Mathematics Series**

//Program to find the nth terms of its factorial

```
#include <iostream.h>
#include <conio.h>

void main()
{
    int i,n;
    float long res,j,k;
    clrscr ();
    cout<<"Enter any number you want to series = ";
    cin >> n;
    res = 1;
    k = 0;
    for (i=1;i<=n;i++)
    {
        res = res*i;
        j = i/res;
        k = k+j;
    }
    cout<<"1/1! + 2/2! + 3/3! + 4/4! + .....+n/n! = "<<k;
    getch ();
}
```

**Output:**

```
Enter any number you want to series = 5
1/1! + 2/2! + 3/3! + 4/4! + .....+n/n! = 2.700333
```

Fig. 4.6 Mathematical Series

### Program # 7: Armstrong Number

//Program to find out the Armstrong numbers from 1 – 500.

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    int i,h,t,u,res,n,count;
    clrscr ();
    for (i=1;i<=500;i++)
    {
        h = i/100;
        res = i%100;
        t = res/10;
        u = res%10;
        count=((h*h*h)+(t*t*t)+(u*u*u));
        if(count==i)
            cout<<"The Armstrong number is = "<<i<<endl;
    }
    getch ();
}
```

### Output:

```
The Armstrong number is = 1
The Armstrong number is = 153
The Armstrong number is = 370
The Armstrong number is = 371
The Armstrong number is = 407
-
-
```

Fig. 4.7 Armstrong Number

### Program # 8: The Word ALLAH

//Program to display the word ALLAH on middle of the screen

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    int i;
    char ch,ch1;
    clrscr ();
    ch = 219;
    ch1 = 220;
    gotoxy(46,8);      //This statement is used to set the position
    cout<<ch;
    gotoxy(46,7);
    cout<<ch;
    gotoxy(30,8);
    cout<<ch;
    gotoxy(30,7);
    cout<<ch;
    gotoxy(38,7);
    cout<<ch;
    gotoxy(38,5);
    cout<<ch;
    for (i=1;i<=10;i++)
    {
        gotoxy(60,i+10);
        cout<<ch<<endl;
    }
    for (i=1;i<=10;i++)
    {
        gotoxy(50,i+10);
        cout<<ch<<endl;
    }
    for (i=1;i<=10;i++)
    {
        gotoxy(40,i+10);
        cout<<ch<<endl;
    }
    for (i=1;i<=5;i++)
    {
        gotoxy(30,i+15);
        cout<<ch<<endl;
```

## Loops

---

```
    }
    for (i=1;i<=5;i++)
    {
        gotoxy(20,i+15);
        cout<<ch<<endl;
    }
    for (i=1;i<=30;i++)
    {
        gotoxy(20+i,20);
        cout<<ch;
    }
    for (i=1;i<=11;i++)
    {
        gotoxy(i+19,15);
        cout<<ch1;
    }
    for (i=1;i<=15;i++)
    {
        gotoxy(i+30,8);
        cout<<ch;
    }
    getch ();
}
```

### Output:

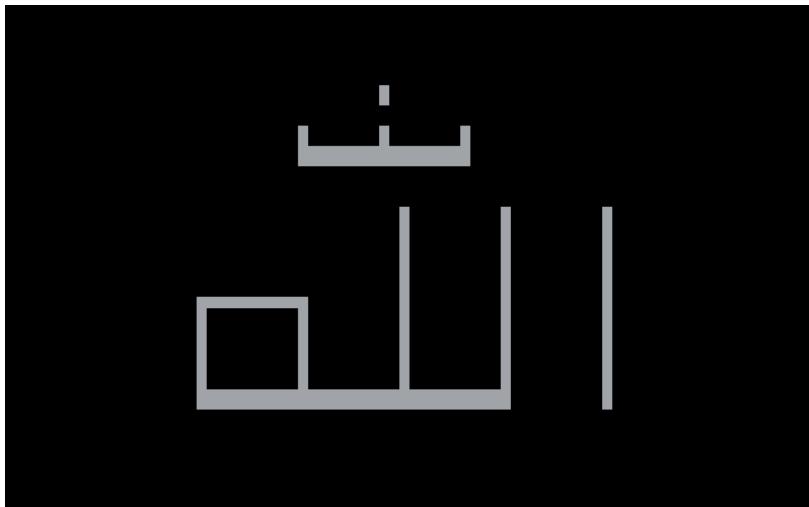


Fig. 4.8 ALLAH

### Program # 9: Prime Number

//Program to find out the given number is prime or not

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int i,n,count;
    cout<<"Enter any number = ";
    cin >> n;
    count = 0;
    i = 1;
    do
    {
        if(n%i==0)
            count = count+1;
        i++;
    }
    while (i<=n);
    if(count ==2)
        cout<<"The number is prime ";
    else
        cout<<"The number is not prime ";
    getch ();
}
```

#### Output:

```
Enter any number = ?
The number is prime
```

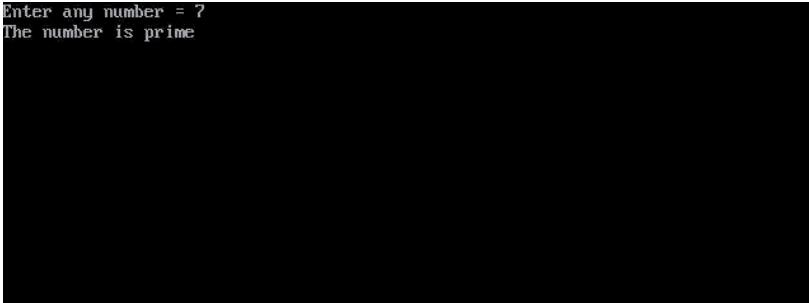


Fig. 4.9 Prime Number

**Program # 10: Rectangle**

//Program to display the rectangle on the screen

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int i,j;
    char ch,ch1,ch2,ch3,ch4,ch5;
    ch = 196;
    ch1 = 179;
    ch2 = 218;
    ch3 = 191;
    ch4 = 192;
    ch5 = 217;
    for (i=1;i<=20;i++)
    {
        gotoxy(i+10,5);
        cout<<ch;
    }
    for (i=1;i<=20;i++)
    {
        gotoxy(i+10,10);
        cout<<ch;
    }
    for (j=1;j<=4;j++)
    {
        gotoxy(11,j+5);
        cout<<ch1;
    }
    for (j=1;j<=4;j++)
    {
        gotoxy(30,j+5);
        cout<<ch1;
    }
    gotoxy(11,5);
    cout<<ch2;
    gotoxy(30,5);
    cout<<ch3;
    gotoxy(11,10);
    cout<<ch4;
    gotoxy(30,10);
```

```
cout<<ch5;  
getch ();  
}
```

**Output:**

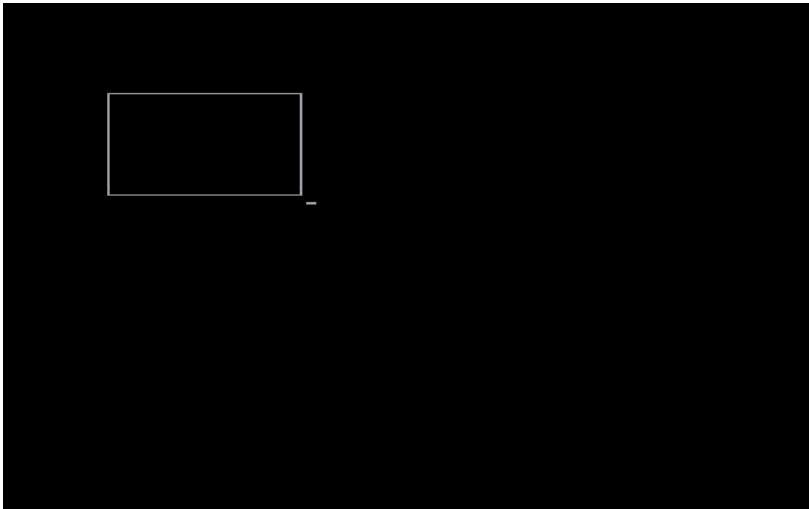


Fig. 4.10 Rectangle

**Program # 11: Mathematics Series**

//Program to display the sum of mathematic series

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    double i,res,p,b;
    float res2,n,n2;
    cout<<"Enter the base of any number = ";
    cin >> b;
    cout<<"Enter the power of number = ";
    cin >> p;
    res = 1;
    n = 0.0;
    cout<<"The Series 1";
    for (i=1;i<=p;i++)
    {
        res = res*b;
        cout<<"+"<<res;
        res2 = 1.0/res;
        n = n+res2;
    }
    n2 = 1+n;
    cout<<" = "<<n2<<endl;
    getch ();
}
```

**Output:**

```
Enter the base of any number = 4
Enter the power of number = 7
The Series 1+1/4+1/16+1/64+1/256+1/1024+1/4096+1/16384 = 1.333313
```

Fig. 4.11 Mathematic Series

## Nested Loop

### Program # 1: Factors

//Program to find out the factors of given number

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int n,i,j,res;
    cout<<"Enter any number = ";
    cin >> n;
    for(i=1;i<=20;i++)
        // Pre-defined no. of iteration. That's why while loop
        for(j=2;j<=i;j++)
            if(n%j==0)
            {
                cout<<j<<endl;
                n = n/j;
            }
    getch ();
}
```

### Output:

```
Enter any number = 18
2
3
3
-
```

Fig. 4.12 Factors

**Program # 2: Alphabetic Design**

//Program to display the alphabetic design on screen

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int i,j,n;
    char ch;
    cout<<"Enter the number (1-19) you want the alphabets display = ";
    cin >> n;
    for (i=65;i<=65+n;j++)
        for (j=1;j<=65+n-i;j++)
    {
        ch = i;
        gotoxy(i-64+i-64,j+5);
        cout<<ch<<endl;
    }
    for (i=65+n;j>=65;i--)
        for (j=i;j<=65+n-1;j++)
    {
        ch = i;
        gotoxy(65+n-i+65+n-i+(n+n-2),72-j+(n-2));
        cout<<ch<<endl;
    }
    getch ();
}
```

**Output:**

```
Enter the number (1-19) you want the alphabets display = 19
```

```

A B C D E F G H I J K L M N O P Q R S T Q P O N M L K J I H G F E D C B A
A B C D E F G H I J K L M N O P Q R R Q P O N M L K J I H G F E D C B A
A B C D E F G H I J K L M N O P Q Q P O N M L K J I H G F E D C B A
A B C D E F G H I J K L M N O P P O N M L K J I H G F E D C B A
A B C D E F G H I J K L M N O O N M L K J I H G F E D C B A
A B C D E F G H I J K L M N N M L K J I H G F E D C B A
A B C D E F G H I J K L M M L K J I H G F E D C B A
A B C D E F G H I J K L M L K J I H G F E D C B A
A B C D E F G H I J K L L K J I H G F E D C B A
A B C D E F G H I J K K K J I H G F E D C B A
A B C D E F G H I J K J K J I H G F E D C B A
A B C D E F G H I J K I J I H G F E D C B A
A B C D E F G H I J I H G F E D C B A
A B C D E F G H I H I H G F E D C B A
A B C D E F G H G G F E D C B A
A B C D E F G F F E D C B A
A B C D E F E E D C B A
A B C D E D E C B A
A B C D C D C B A
A B C D B C B A
A B C D B A
A

```

**Fig. 4.13 Design**

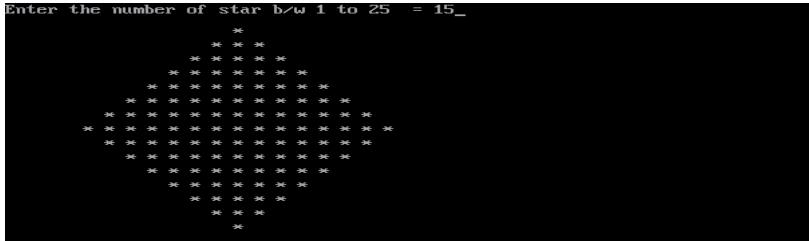
### Program # 3: Diamond

//Program to display the diamond design on screen with star

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int i,j,k,l,n;
    cout<<"Enter the number of star b/w 1 to 25 = ";
    cin >> n;
    clrscr();
    if(n<=25)
    {
        for (i=1;i<=n;i++)
            for (j=(n+1)-i;j<=i;j++)
            {
                gotoxy(i+i-n,j);
                cout<<"*";
            }
        for (k=n;k>=1;k--)
            for (l=k;l<=(n+1)-k;l++)
            {
                gotoxy(k+k+(n-2),l);
                cout<<"*";
            }
    }
    else
        cout<<"The number you enter is greater than 25 ";
    getch ();
}
```

### Output:



---

Fig. 4.14 Diamond

---

**Program # 4: Stop Watch**

//Program to display a stop watch on screen for 2 minutes

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int i,j,k,res,min,sec;
    char ch;
    min = 0;
    for (k = 0;k<2;k++)
    {
        sec = 0;
        for (j=0;j<=59;j++)
            for (i=0;i<=5850;i++)
            {
                gotoxy(20,15);
                if (i==5850)
                    sec = sec+1;
                if (sec==60)
                    min = min+1;
                cout<<min<<"*****"<<sec<<"*****"<<i;
            }
        }
    getch ();
}
```

**Output:**

Fig. 4.15 Stop Watch

**Program # 5: Numeric Design**

//Program to display a design of numbers

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int i,j,n,k,l;
    cout<<"Enter the value of number b/w 1 to 9 = ";
    cin >> n;
    if(n<=9)
    {
        for (i=1;i<=n;i++)
            for (j=1;j<=(n+1)-i;j++)
            {
                gotoxy(i+j,j+2);
                cout<<i<<endl;
            }
        for (k=n;k>=1;k--)
            for (l=k;l<=n;l++)
            {
                gotoxy(l+(n-n+2),k+2);
                cout<<(n+1)-l<<endl;
            }
    }
    else
        cout<<"The number is greater than 9 ";
    getch ();
}
```

**Output:**

```
Enter the value of number b/w 1 to 9 = 9
1 2 3 4 5 6 7 8 9 8 7 6 5 4 3 2 1
1 2 3 4 5 6 7 8   8 7 6 5 4 3 2 1
1 2 3 4 5 6       7 6 5 4 3 2 1
1 2 3 4 5         6 5 4 3 2 1
1 2 3 4           5 4 3 2 1
1 2 3             4 3 2 1
1 2               3 2 1
1                 2 1
1
```

Fig. 4.16 Numeric Design

# **Chapter 5** Structures

## Structures

### Program # 1: Result Sheet

//Program to display the student result on screen

```
#include <iostream.h>
#include <conio.h>

struct res
{
    int rn;
    char name[30];
    int math;
    int phy;
    int c;
};

struct res a[5];

void main ()
{
    clrscr();
    int i;
    int total;
    int avg;
    for (i=0;i<=4;i++)
    {
        cout<<"name= ";
        cin >> a[i].name;
        cout<<"rolno= ";
        cin >> a[i].rn;
        cout<<"math= ";
        cin >> a[i].math;
        cout<<"phy= ";
        cin >> a[i].phy;
        cout<<"c= ";
        cin >> a[i].c;
    }
    for (i=0;i<=4;i++)
    {
        total = a[i].math+a[i].phy+a[i].c;
        avg = total/3.0;
        gotoxy(20,5+i);
        cout<<a[i].name<<endl;
        gotoxy(30,5+i);}
```

---

## Structures

---

```
cout<<a[i].rn<<endl;
gotoxy(37,5+i);
cout<<a[i].math<<endl;
gotoxy(44,5+i);
cout<<a[i].phy<<endl;
gotoxy(51,5+i);
cout<<a[i].c<<endl;
gotoxy(58,5+i);
cout<<total<<endl;
gotoxy(65,5+i);
cout<<avg<<endl;
if (avg >= 80)
{
    gotoxy(73,5+i);
    cout<<"A"<<endl;
}
else if (avg >= 70 && avg <= 79)
{
    gotoxy(73,5+i);
    cout<<"B"<<endl;
}
else if (avg >= 60 && avg <= 69)
{
    gotoxy(73,5+i);
    cout<<"C"<<endl;
}
else if (avg >= 50 && avg <=59)
{
    gotoxy(73,5+i);
    cout<<"C"<<endl;
}
else
{
    gotoxy(73,5+i);
    cout<<"Fail"<<endl;
}
}
gotoxy(20,4);
cout<<"Name"<<endl;
gotoxy(30,4);
cout<<"Roll"<<endl;
gotoxy(37,4);
cout<<"Math"<<endl;
gotoxy(44,4);
```

```
cout<<"Phy"<<endl;
gotoxy(51,4);
cout<<"C++"<<endl;
gotoxy(58,4);
cout<<"Total"<<endl;
gotoxy(65,4);
cout<<"Aver"<<endl;
gotoxy(73,4);
cout<<"Grad"<<endl;
getch ();
}
```

**Output:**

```
rolno= 1
math= 55
phy= 57
c= 52
name= DEF
rolno= 2
math= 60
phy= 67
c= 65
name= GHI
rolno= 3
math= 76
phy= 54
c= 85
name= JKL
rolno= 4
math= 45
phy= 40
c= 30
name= MNO
rolno= 5
math= 85
phy= 87
c= 90
```

Name	Roll	Math	Phy	C++	Total	Aver	Grad
ABC	1	55	57	52	164	54	C
DEF	2	60	67	65	192	64	C
GHI	3	76	54	85	215	71	B
JKL	4	45	40	30	115	38	Fail
MNO	5	85	87	90	262	87	A

Fig. 5.1 Result Sheet

### Program # 2: Area

```
//Program to calculate the area of a room

#include <iostream.h>
#include <conio.h>

struct distance
{
    int feet;
    float inches;
};

struct room
{
    distance wid;
    distance len;
};

void main()
{
    clrscr();
    float l,w,area;
    room din;
    din.wid.feet = 10;
    din.wid.inches = 5.5;
    din.len.feet = 12;
    din.len.inches = 6.5;
    l = din.wid.feet + din.wid.inches /12;
    w = din.len.feet + din.len.inches /12;
    area = l*w;
    cout<<"The area of dining hall is ="<<area;
    getch();
}
```

### Output:

```
The area of dining hall is = 131.164932
```

Fig. 5.2 Area

# **Chapter 6** Arrays

## Arrays

### Program # 1: Greater Number from List

//Program to find out the greater number from list

```
#include <iostream.h>
#include <conio.h>
#include <stdlib.h>

void main ()
{
    clrscr();
    int a[10],max,i;
    max = 0;
    for (i=0;i<=9;i++)
        a[i] = rand()%100;
    for (i=0;i<=9;i++)
    {
        if(a[i]>max)
            max = a[i];
    }
    cout<<"The maximum number is = "<<max<<endl;
    for (i=0;i<=9;i++)
        cout<<a[i]<<"\t";
    getch ();
}
```

### Output:



```
The maximum number is = 95
46      30      82      90      56      17      95      15      48      26
```

Fig. 6.1 Greater Number

**Program # 2: Binary Number**

//Program to convert the decimal number into binary number

```
#include <iostream.h>
#include <conio.h>

void main()
{
    clrscr();
    int a[50],i,n,r;
    i = 0;
    cout<<"Enter any number = ";
    cin >> n;
    while (n>=1)
    {
        r = n%2;
        n = n-r;
        n = n/2;
        a[i] = r;
        i++;
    }
    i--;
    while(i>=0)
    {
        cout<<a[i];
        i--;
    }
    getch ();
}
```

**Output:**

```
Enter any number = 65
1000001_
```

Fig. 6.2 Binary Number

### Program # 3: Sorting Characters

//Program to sort characters in ascending order by using bubble sort

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int i,temp,j,n;
    char a[]={ "zeeshan"};
    for (j=0;j<=7;j++)
        for (i=0;i<=7-j;i++)
        {
            if (a[i] > a[i+1])
            {
                temp = a[i];
                a[i] = a[i+1];
                a[i+1] = temp;
            }
        }
    for (i=0;i<=7;i++)
        cout<<a[i]<<"\t";
    getch ();
}
```

#### Output:

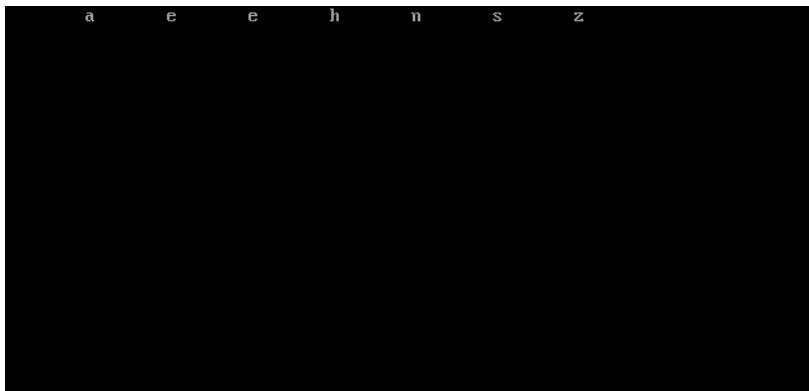


Fig. 6.3 Bubble Sort

**Program # 4: Sequential Search**

//Program to search a number from list by sequential search

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    int n,i,a[10];
    int ch = 'n';
    cout<<"Enter any number you want to search = ";
    cin >> n;
    for (i=0;i<=9;i++)
        a[i] = rand()%100;
        //cin >> a[i];
    for (i=0;i<=9;i++)
    {
        if (n == a[i])
            ch = 'y';
    }
    if ch == 'y';
        cout<<"The number is found"<<endl;
    else
        cout<<"The number is not found"<<endl;
    for (i=0;i<=9;i++)
        cout<<a[i]<<"\t";
    getch ();
}
```

**Output:**

```
Enter any number you want to search = 56
The number is found
46      30      82      90      56      17      95      15      48      26
-
```

Fig. 6.4 Sequential Search

**Program # 5: Case Conversion**

//Program to convert the small case letters to upper case letters

```
#include <iostream.h>
#include <conio.h>
#include <string.h>

void main ()
{
    clrscr();
    char ch;
    char arr[5];
    int i=1,j=1,c=1;
    arr[i] = getch();
    while (arr[i]!=27)
    {
        gotoxy(j,c);
        cout<<arr[i];
        i++;
        arr[i] = arr[i-1];
        int k = arr[i]-32;
        i--;
        arr[i] = getch ();
        gotoxy(j,c);
        cout<<char(k);
        j++;
        if (j==80)
        {
            j = 1;
            c = c+1;
        }
    }
}
```

**Output:**

THIS IS THE EXAMPLE \_



Fig. 6.5 Case Conversion

**Program # 6: Puzzle**

//Program to rearrange the hexadecimal number in puzzle

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    char a[17] = {' ','c','a','9','1','2','7','b','4','e','5','d','8','f','3','6'};
    int i,j,k,l,temp;
    char ch,ch1,ch2,ch3,ch4,ch5,ch6,ch7,ch8,ch9,ch10;
    char cho = 15;
    clrscr ();
    a[16] = 255;
    clrscr ();
    ch = 179;
    ch1 = 196;
    ch2 = 197;
    ch3 = 194;
    ch4 = 193;
    ch5 = 218;
    ch6 = 191;
    ch7 = 192;
    ch8 = 217;
    ch9 = 195;
    ch10 = 180;
    gotoxy(2,1);
    cout<<ch5;
    gotoxy(30,1);
    cout<<ch6;
    gotoxy(2,9);
    cout<<ch7;
    gotoxy(30,9);
    cout<<ch8;
    for (i=2;i<=30;i+=7)
        for (j=2;j<=8;j++)
    {
        gotoxy(i,j);
        cout<<ch;
    }
    for (k=1;k<=27;k+=1)
        for (l=1;l<=9;l+=2)
    {
        gotoxy(k+2,l);
    }
}
```

---

## Arrays

---

```
        cout<<ch1;
    }
    for (i=2;i<=21;i+=7)
        for (j=1;j<=7;j+=2)
    {
        gotoxy(i+7,j+2);
        cout<<ch2;
    }
    for(i=2;i<=22;i+=7)
    {
        gotoxy(i+7,1);
        cout<<ch3;
    }
    for(i=2;i<=21;i+=7)
    {
        gotoxy(i+7,9);
        cout<<ch4;
    }
    for (i=2;i<=7;i+=2)
    {
        gotoxy(2,i+1);
        cout<<ch9;
    }
    for (i=2;i<=7;i+=2)
    {
        gotoxy(30,i+1);
        cout<<ch10;
    }
    gotoxy(20,14);
    cout<<"Sort the hexadecimal number in ascending order"<<endl;
    gotoxy(35,17);
    cout<<"CONTROLLER"<<endl;
    gotoxy(20,19);
    cout<<"Press Right arrow to move next box in the same row"<<endl;
    gotoxy(20,20);
    cout<<"Press Left arrow to move previous box in the same row"<<endl;
    gotoxy(20,21);
    cout<<"Press Up arrow to move next box in the same col"<<endl;
    gotoxy(20,22);
    cout<<"Press Down arrow to move previous box in the same col"<<endl;
    gotoxy(20,24);
    cout<<"Press E button for exit"<<endl;
    int p = 1;
    for (i=1;i<=28;i+=7)
```

---

## Arrays

---

```
{  
    gotoxy(5+i,2);  
    cout<<a[p];  
    p++;  
}  
for (i=1;i<28;i+=7)  
{  
    gotoxy(5+i,4);  
    cout<<a[p];  
    p++;  
}  
for (i=1;i<28;i+=7)  
{  
    gotoxy(5+i,6);  
    cout<<a[p];  
    p++;  
}  
for (i=1;i<21;i+=7)  
{  
    gotoxy(5+i,8);  
    cout<<a[p];  
    p++;  
}  
  
i = 27;  
j = 8;  
while (cho!=101)  
{  
    if (cho=='M')  
    {  
        if (i>21)  
            i = i+0;  
        else  
        {  
            i = i+7;  
            temp = a[p];  
            a[p]= a[p+1];  
            a[p+1] =temp;  
            gotoxy(i,j);  
            cout<<a[p+1];  
            gotoxy(i-7,j);  
            cout<<a[p];  
            p++;  
        }  
    }  
}
```

---

## Arrays

---

```
    }
    gotoxy(i,j);
    if (cho=='K')
    {
        if (i<7)
            i = i-0;
        else
        {
            i = i-7;
            temp = a[p];
            a[p]= a[p-1];
            a[p-1] =temp;
            gotoxy(i+7,j);
            cout<<a[p];
            gotoxy(i,j);
            cout<<a[p-1];
            p--;
        }
    }
    if (cho=='H')
    {
        if (j<3)
            j = j-0;
        else
        {
            j = j-2;
            temp = a[p];
            a[p]= a[p-4];
            a[p-4] =temp;
            gotoxy(i,j+2);
            cout<<a[p];
            gotoxy(i,j);
            cout<<a[p-4];
            p-=4;
        }
    }
    if (cho=='P')
    {
        if (j>6)
            j = j+0;
        else
        {
            j = j+2;
            temp = a[p];
```

---

## Arrays

---

```
a[p]= a[p+4];
a[p+4] =temp;
gotoxy(i,j-2);
cout<<a[p];
gotoxy(i,j);
cout<<a[p+4];
p+=4;
}
}
cho = getch ();
}
}
```

### Output:

c	a	9	1
z	7	b	4
e	5	d	8
f	3	6	-

Sort the hexadecimal number in ascending order

#### CONTROLLER

Press Right arrow to move next box in the same row  
Press Left arrow to move previous box in the same row  
Press Up arrow to move next box in the same col  
Press Down arrow to move previous box in the same col

Press E button for exit

Fig. 6.6 Puzzle

**Program # 7: Insertion Sort**

//Program to sort the numbers by using insertion sort

```
#include <iostream.h>
#include <conio.h>
#include <stdlib.h>

void main ()
{
    clrscr();
    int a[10];
    int i,min,temp,ptr;
    a[0]=-32678;
    for (i = 1;i<=9;i++)
        a[i] = rand()%100;
    for (i=1;i<=9;i++)
        cout<<a[i]<<"\t";
    cout<<endl<<"The list after sorting"<<endl;
    for (i=1;i<=9;i++)
    {
        temp = a[i];
        ptr = i-1;
        while(temp<a[ptr])
        {
            a[ptr+1]=a[ptr];
            ptr = ptr-1;
        }
        a[ptr+1]=temp;
    }
    for (i=1;i<=9;i++)
        cout<<a[i]<<"\t";
    getch ();
}
```

**Output:**

```
46      30      82      90      56      17      95      15      48
The list after sorting
15      17      30      46      48      56      82      90      95
```

Fig. 6.7 Insertion Sort

**Program # 8: Selection Sort**

//Program to sort the numbers by using selection sort

```
#include <iostream.h>
#include <conio.h>
#include <stdlib.h>

void main ()
{
    clrscr();
    int a[10];
    int i,j,min,temp,pos;
    for (i = 0;i<=9;i++)
        a[i] = rand()%100;
    for (i=0;i<=9;i++)
        cout<<a[i]<<"\t";
    cout<<endl<<"The list after sorting"<<endl;
    for (j=0;j<=9;j++)
    {
        min = a[j];
        pos = j;
        for(i=j+1;i<=9;i++)
            if (a[i] < min)
        {
            min = a[i];
            pos = i;
        }
        temp = a[j];
        a[j] = a[pos];
        a[pos]=temp;
    }
    for (i=0;i<=9;i++)
        cout<<a[i]<<"\t";
    getch ();
}
```

**Output:**

```
46      30      82      90      56      17      95      15      48      26
The list after sorting
15      17      26      30      46      48      56      82      90      95
```

---

Fig. 6.8 Selection Sort

**Program # 9: Game: Hidden Word**

//Program try to complete the hidden word by guess

```
#include <iostream.h>
#include <conio.h>

void main ()
{
    clrscr();
    char a[10],b[10];
    int i,n,j,k,p,no;
    cout<<"Enter the word of maximum ten characters = ";
    cin >>a;
    clrscr ();
    k=0;
    while(a[k]!='\0')
    {
        gotoxy(40+k,3);
        cout<<"_";
        k++;
    }
    no = k*2;
    gotoxy(70,1);
    cout<<no;
    p = 0;
    for (int m=1;m<=2;m++)
    {
        i=0;
        while(a[i]!='\0')
        {
            gotoxy(1,1);
            cout<<"Enter any character = ";
            b[i] = getch ();
            if (b[i] ==a[0])
            {
                gotoxy(40,3);
                cout<<b[i]<<endl;
                p++;
            }
            if (b[i]==a[1])
            {
                gotoxy(41,3);
                cout<<b[i]<<endl;
                p++;
            }
        }
    }
}
```

---

## Arrays

---

```
    }
    if (b[i]==a[2])
    {
        gotoxy(42,3);
        cout<<b[i]<<endl;
        p++;
    }
    if (b[i]==a[3])
    {
        gotoxy(43,3);
        cout<<b[i]<<endl;
        p++;
    }
    if (b[i]==a[4])
    {
        gotoxy(44,3);
        cout<<b[i]<<endl;
        p++;
    }
    if (b[i]==a[5])
    {
        gotoxy(45,3);
        cout<<b[i]<<endl;
        p++;
    }
    if (b[i]==a[6])
    {
        gotoxy(46,3);
        cout<<b[i]<<endl;
        p++;
    }
    if (b[i]==a[7])
    {
        gotoxy(47,3);
        cout<<b[i]<<endl;
        p++;
    }
    if (b[i]==a[8])
    {
        gotoxy(48,3);
        cout<<b[i]<<endl;
        p++;
    }
    if (b[i]==a[9])
```

---

```
{  
    gotoxy(49,3);  
    cout<<b[i]<<endl;  
    p++;  
}  
no--;  
gotoxy(70,1);  
cout<<no;  
i++;  
gotoxy(1,1);  
}  
}  
cout<<"Your correct sentence = "<<a;  
getch ();  
}
```

**Output:**

```
charater word of maximum ten characters = computer
```

```
Enter any character =
```

```
50
```

```
c-m-t-
```

**Fig. 6.9 Game: Hidden Word**

**Program # 10: Matrix Addition**

//Program to sum of two matrix

```
#include <iostream.h>
#include <conio.h>
#include <stdlib.h>
#include <stdio.h>

void main ()
{
    int a[3][3],b[3][3],i,j,res;
    clrscr ();
    for (i=0;i<=2;i++)
        for (j=0;j<=2;j++)
            a[i][j] = rand()%9;
    for (i=0;i<=2;i++)
        for (j=0;j<=2;j++)
            b[i][j] = rand()%9;
    for (i=0;i<=2;i++)
        for (j=0;j<=2;j++)
    {
        gotoxy(j+j+j+10,i+5);
        cout<<a[i][j];
        gotoxy(j+j+j+20,i+5);
        cout<<b[i][j];
        res = a[i][j]+b[i][j];
        gotoxy(j+j+j+j+10,i+10);
        cout<<res;
    }
    gotoxy(13,4);
    textcolor(4);
    cprintf("A");
    gotoxy(23,4);
    textcolor(5);
    cprintf("B");
    gotoxy(13,9);
    textcolor(6);
    cprintf("A+b");
    getch ();
}
```

**Output:**

```
          A           B
4  4  2   4  4  5
1  1  7   7  1  6
0  ?  ?   1  3  0

          A+b
8  8  7
8  2  13
1  10  7
```

Fig. 6.10 Matrix Addition

**Program # 11: Matrix Multiplication**

//Program to multiply of two matrices

```
void main()
{
    clrscr();
    int a[3][3] = {{1,2,3},{4,5,6},{7,8,9}};
    int b[3][3];
    int i,j,k;
    for(i=0;i<3;i++)
    {
        for(j=0;j<3;j++)
        {
            b[i][j]=0;
            for(k=0;k<3;k++)
            {
                b[i][j]+=a[i][k]*a[k][j];
            }
        }
    }
    for(i=0;i<3;i++)
    {
        for(j=0;j<3;j++)
        {
            cout<<"\t"<<b[j][i];
        }
        cout<<"\n";
    }
    getch();
}
```

**Output:**

30	66	102
36	81	126
42	96	150

Fig. 6.11 Matrix Multiplication

# **Chapter 7** Pointers

## Pointers

### Program # 1: Memory Address

//Program to display the memory address of a variable

```
#include <iostream.h>
#include <conio.h>

void main()
{
    clrscr();
    int a;
    int *p;
    a = 5;
    p = &a;
    cout<<"The value of a = "<<a<<endl;
    cout<<"The memory address of a = "<<p;
    getch();
}
```

#### Output:

```
The value of a = 5
The memory address of a = 0x8f82ffff4
```

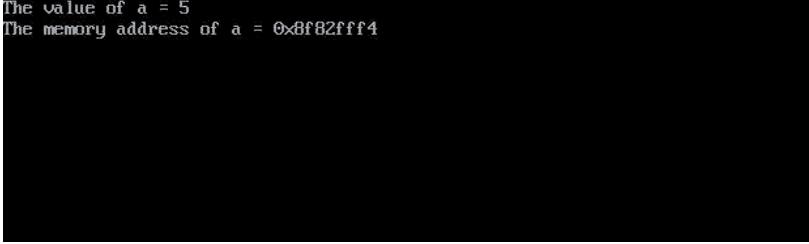


Fig. 7.1 Memory Address

### Program # 2: Pointed variable Access

//Program to access the variable to be pointed

```
#include <iostream.h>
#include <conio.h>

void main()
{
    clrscr();
    int a;
    int *p;
    a = 5;
    p = &a;
    cout<<"The value of a = "<<*p<<endl;
    getch();
}
```

#### Output:



The value of a = 5

Fig. 7.2 Pointed Access

### Program # 3: Pointer Array

//Program to print the values of pointer character array

```
#include <iostream.h>
#include <conio.h>

void main()
{
    clrscr();
    char *a[5] = {"Apple", "Banana", "Orange", "Coconut", "Mellon"};
    cout<<a[0]<<endl;
    cout<<a[1]<<endl;
    cout<<a[2]<<endl;
    cout<<a[3]<<endl;
    cout<<a[4]<<endl;
    getch();
}
```

#### Output:

```
Apple
Banana
Orange
Lychi
Mellon
```

Fig. 7.3 Pointer Array

# **Chapter 8** Functions

## Functions

### Program # 1: Square Root

//Program to calculate the square root of given number

```
#include <iostream.h>
#include <conio.h>
#include <math.h>

void main ()
{
    clrscr();
    int n;
    float res;
    cout<<"Enter any number = ";
    cin >> n;
    res = sqrt (n);
    cout<<"The square root of number is = " <<res<<endl;
    getch ();
}
```

### Output:

```
Enter any number = 64
The square root of number is = 8
```

Fig. 8.1 Square Root

## Program # 2: Prime Numbers

//Program to find out the prime numbers from a given range

```
#include <iostream.h>
#include <conio.h>

prime(int,int);
void main()
{
    clrscr();
    int st,en;
    cout<<"Enter the start value = ";
    cin >> st;
    cout<<"Enter the end value = ";
    cin >> en;
    prime(st,en);
    getch ();
}

prime(int st, int en)
{
    int i,j,count;
    for (i=st;i<=en;i++)
    {
        count = 0;
        for (j=1;j<=i;j++)
        {
            if(i%j==0)
                count = count+1;
        }
        if(count ==2)
            cout<<i<<endl;
    }
}
```

**Output:**

```
Enter the start value = 100
Enter the end value = 199
101
103
107
109
113
127
131
137
139
149
151
157
163
167
173
179
181
191
193
197
199
```

Fig. 8.2 Prime Numbers

### Program # 3: Recursive Function

//Program to find out the raise to power of given number by recursion

```
#include <iostream.h>
#include <conio.h>
#include <process.h>

int fun(int,int);
void main ()
{
    clrscr();
    int a,b,res;
    cout<<"Enter the base of number = ";
    cin >>a;
    cout<<"Enter the power of base = ";
    cin >>b;
    res = fun(a,b);
    cout<<"The raise to power is = "<<res;
    getch ();
}

fun(int a, int b)
{
    int res;
    if (b==0)
    {
        return (1);
        exit(0);
    }
    else
    {
        res = a*fun(a,(b-1));
        return (res);
    }
}
```

#### Output:

```
Enter the base of number = 4
Enter the power of base = 5
The raise to power is = 1024
```

Fig. 8.3 Recursion

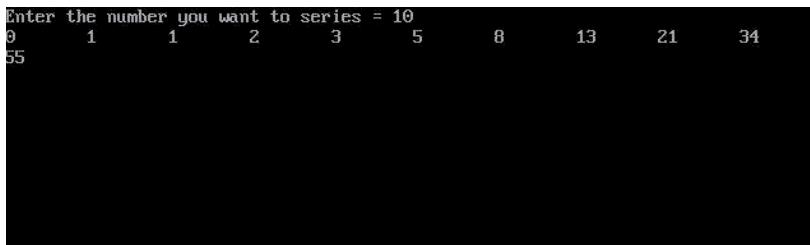
**Program # 4: Fibonacci Series**

//Program to display the Fibonacci series

```
#include <iostream.h>
#include <conio.h>

fib(int);
void main ()
{
    clrscr();
    int n;
    cout<<"Enter the number you want to series ";
    cin >> n;
    cout<<"0"<<"\t";
    fib(n);
    getch ();
}

fib(int n)
{
    double c,d,i,e;
    c = 1;
    d = 0;
    for (i=1;i<=n;i++)
    {
        e = c+d;
        c = d;
        d = e;
        cout<<e<<"\t";
    }
}
```

**Output:**

```
Enter the number you want to series = 10
0      1      1      2      3      5      8      13     21     34
```

Fig. 8.4 Fibonacci Series

**Program # 5: Square**

//Program to display the square with wide distance

```
#include <iostream.h>
#include <conio.h>
#include <iomanip.h>

void main ()
{
    clrscr();
    int i,res;
    for (i=1;i<=10;i++)
    {
        res = i*i;
        cout<<i<<setw(6)<<res<<endl;           //set width
    }
    getch ();
}
```

**Output:**

```
1    1
2    4
3    9
4    16
5    25
6    36
7    49
8    64
9    81
10   100
```

Fig. 8.5 Square

**Program # 6: Standard Deviation**

//Program to calculate the standard deviation of given range

```
#include <iostream.h>
#include <conio.h>
#include <math.h>

void main ()
{
    clrscr();
    int i,j,a[10] = {1,2,3,4,5,6,7,8,9,10};
    float sd,sum,pr,res,sum1,count,div,res1;
    sum = 0;
    res = 0;
    count=0;
    for (j=1;j<=9;j++)
    {
        sum = sum+a[j];
        pr = a[j]*a[j];
        count = count+pr;
        res = res+pr;
        div = count/10;
        sum1 = (sum*sum)/(10*10);
        res1 = div-sum1;
        sd = sqrt(res1);
        cout<<a[j]<<"\t"<<pr<<"\t"<<pr-a[j]<<endl;
    }
    cout<<"The standard deviation of series = "<<sd;
    getch ();
}
```

**Output:**

```
2      4      2
3      9      6
4     16     12
5     25     20
6     36     30
7     49     42
8     64     56
9     81     72
10    100    90
The standard deviation of series = 3.039737
```

---

Fig. 8.6 Standard Deviation

### Program # 7: Character Counting

//Program to calculate the no of characters in the given string

```
#include <iostream.h>
#include <conio.h>
#include <stdio.h>
#include <string.h>

void main ()
{
    clrscr();
    char str[100];
    int i,j,n,k,o;
    i = 0;
    j = 0;
    k = 0;
    o = 0;
    puts("Enter any sentence ");
    gets(str);
    n = strlen(str);
    while(str[i]!='\0')
    {
        if ((str[i]>=65) && (str[i]<97))
        {
            j++;
        }
        if ((str[i]>=97) && (str[i]<=122))
        {
            k++;
        }
        if (str[i]==' ')
        {
            o++;
        }
        i++;
    }
    cout<<"The total number of letters = "<<n<<endl;
    cout<<"The upper case letters = "<<j<<endl;
    cout<<"The lower case letters = "<<k<<endl;
    cout<<"The white spaces = "<<o<<endl;
    getch ();
}
```

**Output:**

```
Enter any sentence
This program is the example of FUNCTION.
The total number of letters = 40
The upper case letters = 9
The lower case letters = 24
The white spaces = 6
```

Fig. 8.7 Character Counting

## Program # 8: Comparing Strings

//Program to compare two string

```
#include <iostream.h>
#include <conio.h>
#include <stdio.h>
#include <string.h>
#include <process.h>

int strcom(char*,char*);
void main ()
{
    clrscr();
    char s1[100],s2[100];
    int f;
    cout<<"Enter the first string = ";
    gets(s1);
    cout<<"Enter the second string = ";
    gets(s2);
    f = strcom(s1,s2);
    cout<<f;
    getch ();
}

int strcom(char *str1, char *str2)
{
    int i;
    int m = 0;
    int n = 0;
    for (i=0;i<strlen(str1);i++)
    {
        if (str1[i]==str2[i])
            m = m+1;
        if (m==strlen(str1))
        {
            cout<<"Both string are equal"<<endl;
            return (0);
            exit(0);
        }
    }

    for (i=0;i<strlen(str1);i++)
    {
        n = ((str1[i]-str2[i]));
    }
}
```

---

## Functions

---

```
if (n<0)
{
    cout<<"String one first "<<endl;
    return (-1);
    exit(0);
}
else if (n>0)
{
    cout<<"String two first "<<endl;
    return (1);
    exit(0);
}
}
```

**Output:**

```
Enter the first string = this is a string
Enter the second string = this is a string
Both string are equal
0_-
```

[Fig. 8.8 Comparing String](#)

### Program # 9: Smaller Number

//Program to find out the smaller number from the given numbers

```
#include <iostream.h>
#include <conio.h>

void minint(int* ,int);

void main ()
{
    clrscr ();
    int arr[10] = {15,2,3,4,5,10,9,8,7,6};
    minint(arr,10);
    getch ();
}

void minint(int *arr,int m)
{
    int temp;
    temp = arr[0];
    for (int i=0;i<m;i++)
        if (arr[i]<temp)
            temp = arr[i];
    cout<<"The smallest value is = "<<temp;
}
```

### Output:

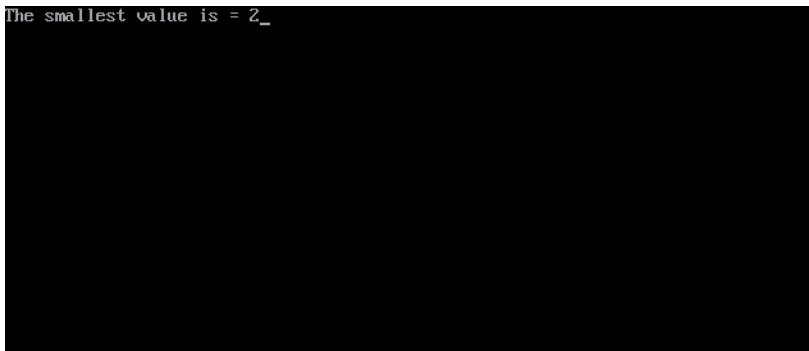


Fig. 8.9 Smaller Number

**Program # 10: Calendar**

//Program to display the calendar of the current month

```
#include <iostream.h>
#include <conio.h>
#include <process.h>
#include <dos.h>

void main ()
{
    clrscr();
    long int i,j,k,l,day,month,year,mm;
    char ch,ch1,ch2,ch3,ch4,ch5,ch6,ch7,ch8,ch9,ch10;
    char choice;
    struct dosdate_t d;
    _dos_getdate(&d);           //Get current system date
    day = d.day;
    month = d.month;
    year = d.year;
    while (choice!=27)
    {
        ch = 179;
        ch1 = 196;
        ch2 = 197;
        ch3 = 194;
        ch4 = 193;
        ch5 = 218;
        ch6 = 191;
        ch7 = 192;
        ch8 = 217;
        ch9 = 195;
        ch10 = 180;
        gotoxy(2,1);
        cout<<ch5;
        gotoxy(51,1);
        cout<<ch6;
        gotoxy(2,13);
        cout<<ch7;
        gotoxy(51,13);
        cout<<ch8;
        for (i=2;i<=55;i+=7)
            for (j=2;j<=12;j++)
            {
                gotoxy(i,j);
```

---

## Functions

---

```
cout<<ch;
}
for (k=1;k<=48;k+=1)
    for (l=1;l<=14;l+=2)
    {
        gotoxy(k+2,l);
        cout<<ch1;
    }
for (i=2;i<=40;i+=7)
    for (j=1;j<=10;j+=2)
    {
        gotoxy(i+7,j+2);
        cout<<ch2;
    }
for(i=2;i<=40;i+=7)
{
    gotoxy(i+7,1);
    cout<<ch3;
}
for(i=2;i<=40;i+=7)
{
    gotoxy(i+7,13);
    cout<<ch4;
}
for (i=2;i<=10;i+=2)
{
    gotoxy(2,i+1);
    cout<<ch9;
}
for (i=2;i<=10;i+=2)
{
    gotoxy(51,i+1);
    cout<<ch10;
}
gotoxy(35,16);
cout<<"Control"<<endl;
gotoxy(30,18);
cout<<"Press Right arrow to move next month same year"<<endl;
gotoxy(30,19);
cout<<"Press Left arrow to move previous month same
year"<<endl;
gotoxy(30,20);
cout<<"Press Up arrow to move next year same month"<<endl;
gotoxy(30,21);
```

---

## Functions

---

```
cout<<"Press Down arrow to move previous year same  
month"<<endl;  
gotoxy(30,23);  
cout<<"Press Esc button for Exit"<<endl;  
gotoxy(i-7,2);  
cout<<"Mon";  
gotoxy(i,2);  
cout<<"Tue";  
gotoxy(i+7,2);  
cout<<"Wed";  
gotoxy(i+14,2);  
cout<<"Thu";  
gotoxy(i+21,2);  
textcolor(2);  
cprintf("Fri");  
gotoxy(i+28,2);  
cout<<"Sat";  
gotoxy(i+35,2);  
textcolor(RED);  
cprintf("Sun");  
if (choice=='M')  
    month = month+1;  
if (choice=='K')  
    month = month-1;  
if (choice=='H')  
    year = year+1;  
if (choice=='P')  
    year = year-1;  
if (choice==51)  
    year = year+100;  
if (choice ==57)  
    year= year-100;  
if (month>12)  
{  
    year = year+1;  
    month = 1;  
}  
if (month==0)  
{  
    year = year-1;  
    month = 12;  
}  
if (choice==53)  
    exit(0);
```

---

## Functions

---

```
long int days = 0;
for (int z=1;z<month;z++)
{
    if (z==1 || z==3 || z==5 || z==7 || z==8 || z==10 || z==12)
        days = days+31;
    if (z==2&&year%4==0)
        days = days+29;
    if (z==2&&year%4!=0)
        days =days+28;
    if (z==4 || z==6 || z==9 || z==11)
        days = days+30;
}
long int leapy = 0;
int count = 0;
for (z=1900;z<year;z++)
{
    if (z%4==0)
        leapy = leapy+1;
}
count = (year-1900);
long int coun = count/100;
long int yy = (year-1900);
if (year>=1900 && year<=1999)
    days = days-1;
days = days+(yy*365)+leapy-coun+1;
long int totald = (days%7);
if (month==1 || month==3 || month==5 || month==7 ||
month==8 || month==10 || month==12)
    mm = 31;
if (month==4 || month==6 || month==9 || month==11)
    mm = 30;
if (year%4==0 && month==2)
    mm = 29;
if (year%4!=0 && month==2)
    mm = 28;
int p=totald;
if (p==0)
    p = p+7;
if (p==6)
    mm = mm;
if (p==7)
    mm = mm-1;
for (i=p;i<=7;i++)
{
```

---

## Functions

---

```
gotoxy((i*7)-1,4);
int l = (i-(p-1));
if (i==7)
{
    textcolor(RED);
    cprintf("%d",l);
}
else if (i==5)
{
    textcolor(2);
    cprintf("%d",l);
}
else
    cout<<l;

}
for (i=8;i<=14;i++)
{
    gotoxy((i*7)-50,6);
    l = (i-(p-1));
    if (i==14)
    {
        textcolor(RED);
        cprintf("%d",l);
    }
    else if (i==12)
    {
        textcolor(2);
        cprintf("%d",l);
    }
    else
        cout<<l;
}
for (i=15;i<=21;i++)
{
    gotoxy((i*7)-100,8);
    l = (i-(p-1));
    if (i==21)
    {
        textcolor(RED);
        cprintf("%d",l);
    }
    else if (i==19)
    {
```

---

## Functions

---

```
    textcolor(2);
    cprintf("%d",l);
}
else
    cout<<l;
}
for (i=22;i<=28;i++)
{
    gotoxy((i*7)-149,10);
    l = (i-(p-1));
    if (i==28)
    {
        textcolor(RED);
        cprintf("%d",l);
    }
    else if (i==26)
    {
        textcolor(2);
        cprintf("%d",l);
    }
    else
        cout<<l;
}
for (i=29;i<=mm+(p-1);i++)
{
    gotoxy((i*7)-198,12);
    l = (i-(p-1));
    if (i==35)
    {
        textcolor(RED);
        cprintf("%d",l);
    }
    else if (i==33)
    {
        textcolor(2);
        cprintf("%d",l);
    }
    else
        cout<<l;
}
if (p==7 && year%4==0)
{
    gotoxy((35*7)-198,12);
    cout<<"29";
}
```

---

---

## Functions

---

```
    }
    gotoxy((36*7)-198,12);
    textcolor(BLACK);
    cprintf("30");
    if (p==7)
        if (i<mm+p+1)
    {
        for (i=30;i<=mm+1;i++)
        {
            gotoxy((i*7)-205,4);
            cout<<i;
        }
    }
    if (p==6)
        if (i<mm+p+1)
    {
        for (i=31;i<=mm;i++)
        {
            gotoxy((i*7)-212,4);
            cout<<i;
        }
    }
switch(month)
{
    case 1:gotoxy(65,5);cout<<"January";break;
    case 2: gotoxy(65,5);cout<<"February";break;
    case 3: gotoxy(65,5);cout<<"March";break;
    case 4: gotoxy(65,5);cout<<"April";break;
    case 5: gotoxy(65,5);cout<<"May";break;
    case 6: gotoxy(65,5);cout<<"June";break;
    case 7: gotoxy(65,5);cout<<"July";break;
    case 8: gotoxy(65,5);cout<<"August";break;
    case 9: gotoxy(65,5);cout<<"September";break;
    case 10: gotoxy(65,5);cout<<"October";break;
    case 11: gotoxy(65,5);cout<<"November";break;
    case 12: gotoxy(65,5);cout<<"December";break;
}
gotoxy(73,7);
textcolor(10);
cprintf("Year");
gotoxy(63,7);
textcolor(10);
cprintf("Month");
gotoxy(55,7);
```

## Functions

```
textcolor(10);
cprintf("Day");
gotoxy(73,8);
textcolor(7);
cprintf("%d",year);
gotoxy(64,8);
textcolor(7);
cprintf("%d",month);
gotoxy(56,8);
textcolor(7);
cprintf("%d",day);
gotoxy(1,20);
cout<<"Enter your coice = ";
choice = getch();
clrscr ();
}
}
```

### Output:



Fig. 8.10 Calendar

# **Chapter 9** Classes

## Classes

### Program # 1: Multiplication

//Program to calculate the multiplication of two number without \* symbol

```
#include <iostream.h>
#include <conio.h>

class myclass
{
private:
    int a,b,i,res;
public:
    void input()
    {
        cout<<"Enter the value of a = ";
        cin >> a;
        cout<<"Enter the value of b = ";
        cin >> b;
    }

    void mul()
    {
        res = 0;
        for (i=1;i<=b;i++)
            res = res+a;
        cout<<"The multiplication of two numbers = "<<res;
    }
};

void main ()
{
    clrscr ();
    myclass c1;
    c1.input();
    c1.mul();
    getch ();
}
```

### Output:

```
Enter the value of a = 5
Enter the value of b = 6
The multiplication of two numbers = 30
```

Fig. 9.1 Multiplication

## Program # 2: Constructor with Header File

//Program to display attributes of employee with constructor in header file

/\*Hint: In this program, students can learn how to create user define header file. Copy the code start from header file to end head file in note pad and then save the file with name “myheader.h” in include folder. And then add the name in main file as header file\*/

//Header File

```
#ifndef myheader      //Start of header file
#define myheader

class employee
{
    private:
        int age;
        int yearofs;
        float salary;
    public:
        employee()      //Constructor
        {
            age = 0;
            yearofs = 0;
            salary = 0;
        }
        void input()
        {
            cout<<"Enter the age of employee = ";
            cin >>age;
            cout<<"Enter the year of service = ";
            cin >>yearofs;
            cout<<"Enter the salary of employee = ";
            cin >>salary;
        }
        void dis()
        {
            cout<<"Age = "<<age<<endl;
            cout<<"Year of service = "<<yearofs<<endl;
            cout<<"Salary = "<<salary;
        }
};

#endif                //End of header file
```

---

```
//Programming File

#include <iostream.h>
#include <conio.h>
#include <myheader.h> //User define header file in “include” folder

void main ()
{
    clrscr ();
    employee emp;
    emp.input();
    emp.dis();
    getch ();
}
```

**Output:**

```
Enter the age of employee = 65
Enter the year of service = 30
Enter the salary of employee = 50000
Age = 65
Year of service = 30
Salary = 50000
```

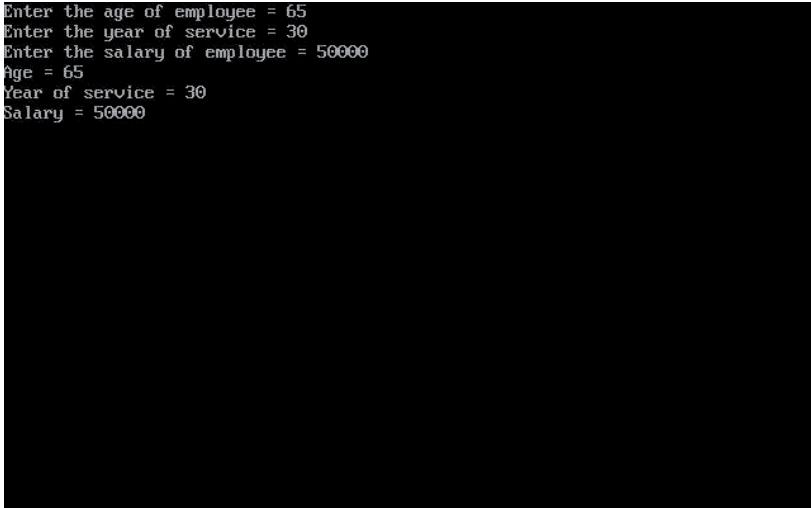


Fig. 9.2 Constructor

**Program # 3: Destructor**

//Program to display the message with destructor

```
#include <iostream.h>
#include <conio.h>

class circle
{
private:
    int radius;
public:
    circle()
    {
        radius = 0;
    }
    ~circle()           //Destructor
    {
    }
    circle(int m)
    {
        radius = m;
    }
    dis()
    {
        cout<<"The radius is = "<<radius;
    }
};

void main ()
{
    clrscr ();
    int n;
    cout<<"Enter the radius = ";
    cin >>n;
    circle clr(n);
    circle clr1(clr);
    clr1.dis();
    getch ();
}
```

**Output:**

```
Enter the radius = 6
The radius is = 6_
```

**Program # 4: Object Argument**

//Program to display the distance in feet and inches

```
#include <iostream.h>
#include <conio.h>

class distance
{
private:
    int feet;
    float inches;
public:
    distance()
    {
        feet = 0;
        inches = 0.0;
    }
    distance (int ft,float in)
    {
        feet = ft;
        inches = in;
    }
    void input()
    {
        cout<<"Enter the feet = ";
        cin >>feet;
        cout<<"Enter the inches = ";
        cin >>inches;
    }
    void show()
    {
        cout<<feet<<"\t"<<inches<<endl;
    }
    distance adddis(distance d2);
};

void main ()
{
    clrscr ();
    distance dis1,dis3;
    distance dis2(11,6.5);
    dis1.input();
    dis3 = dis1.adddis(dis2);
    cout<<"distance one = ";
```

## Classes

---

```
dis1.show();
cout<<"distance two = ";
dis2.show();
cout<<"distance three = ";
dis3.show();
getch ();
}

distance distance::adddis(distance d2)
{
    distance temp;
    temp.inches = inches+d2.inches;
    temp.feet = feet+d2.feet;
    return (temp);
}
```

### Output:

```
Enter the feet = 5
Enter the inches = 2.8
distance one = 5      2.8
distance two = 11     6.5
distance three = 16    9.3
```

Fig. 9.4 Object Argument

**Program # 5: Friend Class**

//Program to display the message with friend class

```
#include <iostream.h>
#include <conio.h>

class one
{
private:
    int i;
public:
    one()
    {
        i = 10;
    }
    friend two;
};

class two
{
public:
    fun(one a)
    {
        cout<<a.i<<endl;
    }
};

void main ()
{
    clrscr ();
    one a;
    two b;
    b.fun(a);
    getch();
}
```

**Output:**

10

Fig. 9.5 Friend Class

## **Chapter 10 Files**

---

## Files

### Program # 1: Create a File

```
//Program to create a file in text mode and write then read data from file

#include <iostream.h>
#include <conio.h>
#include <fstream.h>      //Files Handling
#include <process.h>

void main ()
{
    clrscr ();
    char ch = 'a';
    float a = 25.5;
    int b = 50;
    ofstream add("Test.txt"); //Create new file in text mode
    if (!add)
    {
        cout<<"File opening error";
        getch();
        exit(0);
    }
    add<<ch;
    add<<a;
    add<<b;
    add.close();
    ifstream ss("test.txt"); //Read file
    if (!ss)
    {
        cout<<"File opening error";
        getch();
        exit(0);
    }
    ss>>ch;
    ss>>a;
    ss>>b;
    cout<<ch<<endl;
    cout<<a<<endl;
    cout<<b<<endl;
    getch();
}
```

**Output:**

```
a  
25.549999  
50
```

---

Fig. 10.1 Create a File

## Program # 2: Write/Read String

//Program to copy string into file and then read it and display on screen

```
#include <iostream.h>
#include <conio.h>
#include <fstream.h>
#include <process.h>
#include <string.h>

void main ()
{
    clrscr ();
    char ch;
    char str[] = "If you want to accomplish your dream then wake up";
    ofstream add("Text.txt");
    if (!add)
    {
        cout<<"File opening error";
        getch();
        exit(0);
    }
    int m = strlen(str);
    for (int j=0;j<m;j++)
    {
        add.put(str[j]);
    }
    add.close();
    ifstream ss("text.txt");
    if (!ss)
    {
        cout<<"File opening error";
        getch();
        exit(0);
    }
    while(ss)
    {
        ss.get(ch);
        cout<<ch;
    }
    getch();
}
```

**Output:**

If you want to accomplish your dream then wake up \_

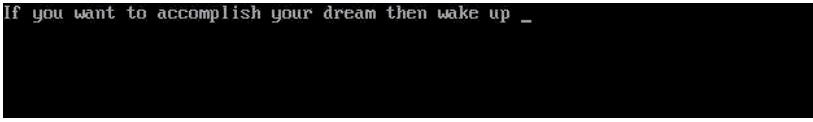


Fig. 10.2 Read/Write

### Program # 3: Counting Lines

//Program to count the number of lines in a file

```
#include <iostream.h>
#include <conio.h>
#include <fstream.h>

void main ()
{
    clrscr();
    int l=0;
    ofstream a("sample.txt",ios::out);
    a<<"If you think education is expensive then try ignorance" << endl;
    a<<"Might is Sight" << endl;
    a<<"Pakistan Movement" << endl;
    a<<"Pakistan Zindabad";
    a.close();
    char str[150];
    ifstream b("sample.txt",ios::in);
    while(!b.eof())
    {
        l++;
        b.getline(str,150);
    }
    cout << "The number of lines in file = " << l;
    getch();
}
```

#### Output:

A black terminal window with white text. The text displays the output of the C++ program. It starts with the command 'The number of lines in file = 4'. Below this, there is a large black rectangular area, likely representing a blank or redacted portion of the terminal window.

```
The number of lines in file = 4
```

Fig. 10.3 Counting Lines

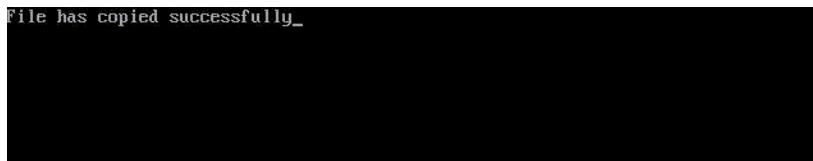
#### Program # 4: Data Copy to another File

//Program to copy data from one file to another file

```
#include <iostream.h>
#include <conio.h>
#include <fstream.h>
#include <process.h>

void main ()
{
    clrscr ();
    char ch;
    ifstream add("Sample.txt");
    ofstream sec("Example.txt");
    if(!add)
    {
        cout<<"File opening error";
        getch();
        exit(0);
    }
    while(add)
    {
        add.get(ch);
        sec.put(ch);
    }
    cout<<"File has copied successfully";
    getch ();
}
```

#### Output:



```
File has copied successfully_
```

Fig. 10.4 Copy Data

## Program # 5: Counting Characters

//Program to count the characters, tab, vowels etc in a line from file

```
#include <iostream.h>
#include <conio.h>
#include <process.h>
#include <fstream.h>
#include <string.h>

void main ()
{
    clrscr();
    int p= 0;
    int k = 0;
    int l = 0;
    int spccount = 0;
    int tabcount = 0;
    char ch;
    char arr[150];
    char str[] = "IF YOU WANT TO      ACCOMPLISH YOUR DREAM THEN
WAKE UP";
    ofstream a("example.txt");
    int m = strlen(str);
    for (int j=0;j<m;j++)
    {
        a.put(str[j]);
    }
    a.close();
    ifstream b("example.txt");
    while(b)
    {
        b.get(ch);
        if (ch==' ')
        {
            p++;
        }
        if (ch=='a' || ch=='e' || ch=='i' || ch=='o' || ch=='u' || ch=='A' ||
            ch=='E' || ch=='I' || ch=='O' || ch=='U')
        {
            k++;
        }
        if (ch==' ')
        {
            spccount++;
        }
    }
}
```

```
        }
        if (ch=='\t')
        {
            tabcount++;
        }
        cout<<ch;
    }
    cout<<"\n NO of spaces = "<<spcount;
    cout<<"\n NO of characters = "<<m;
    cout<<"\n NO of vowels = "<<k;
    cout<<"\n NO of tabs = "<<tabcount;
    getch();
}
```

**Output:**

```
IF YOU WANT TO ACCOMPLISH YOUR DREAM THEN WAKE UP
NO of spaces = 9
NO of characters = 50
NO of vowels = 16
NO of tabs = 1
```

Fig. 10.5 Characters Counting

**Program # 6: Binary Mode Write**

//Program to create a file in binary mode & then put data in that file

```
#include <iostream.h>
#include <conio.h>
#include <process.h>
#include <fstream.h>

class rec
{
private:
    int roll;
    int long phon;
    char name[100];
public:
    input()
    {
        cout<<"Enter the name = ";
        cin >>name;
        cout<<"Enter the roll # = ";
        cin >>roll;
        cout<<"Enter the phone # = ";
        cin >>phon;
    }
};

void main ()
{
    clrscr ();
    char na[100];
    char ch;
    ch = 'y';
    rec r;
    cout<<"Enter the file name = ";
    cin >>na;
    ofstream add(na,ios::binary|ios::app); //Binary Mode
    while (ch!='n')
    {
        r.input();
        add.write((char *)&r,sizeof(r));
        cout<<"Do you enter new record (Y/N) = ";
        cin >>ch;
    }
    getch ();
}
```

**Output:**

```
Enter the file name = temp.bin
Enter the name = ABC
Enter the roll # = 1
Enter the phone # = 12345
Do you enter new record (Y/N) = y
Enter the name = XYZ
Enter the roll # = 2
Enter the phone # = 54321
Do you enter new record (Y/N) = n
```

---

Fig. 10.6 Binary Mode Write

**Program # 7: Binary Mode Record**

//Program to open a file in binary mode & then get data in that file

```
#include <iostream.h>
#include <conio.h>
#include <fstream.h>
#include <process.h>

class rec
{
private:
    int roll;
    int long phon;
    char name[100];
public:
    dis()
    {
        cout<<name<<"\t"<<roll<<"\t"<<phon<<endl;
    }
};

void main ()
{
    clrscr ();
    char na[100];
    rec r;
    cout<<"Enter the file name = ";
    cin >>na;
    ifstream sec(na,ios::binary);
    if (! sec)
    {
        cout<<"File opening error"<<endl;
        getch();
        exit(0);
    }
    sec.read((char *)&r,sizeof(r));
    while (sec)
    {
        r.dis();
        sec.read((char *)&r,sizeof(r));
    }
    getch ();
}
```

**Output:**

```
Enter the file name = temp.bin
ABC      1      12345
XYZ      2      54321
```

Fig. 10.7 Binary Mode Read

**Program # 8: Counting Record**

//Program to open a file in binary mode & count the total records

```
#include <iostream.h>
#include <conio.h>
#include <process.h>
#include <fstream.h>

class rec
{
protected:
    int roll;
    int long phon;
    char name[100];
};

void main ()
{
    int n;
    rec r;
    clrscr ();
    ifstream first ("temp.bin",ios::binary|ios::in);
    if(!first)
    {
        cout<<"File opening error"<<endl;
        getch();
        exit(0);
    }
    first.seekg(0,ios::end);
    int endpos = first.tellg();
    n = endpos/sizeof(r);
    cout<<"The number of records = "<<n;
    getch();
}
```

**Output:**

The number of records = 2\_

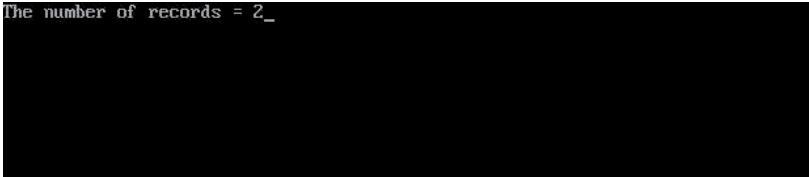


Fig. 10.8 Record Counting

**Program # 9: Search Record**

//Program to search a record from binary file

```
#include <iostream.h>
#include <conio.h>
#include <process.h>
#include <fstream.h>

class rec
{
protected:
    int roll;
    int long phon;
    char name[100];
public:
    dis()
    {
        cout<<name<<"\t"<<roll<<"\t"<<phon<<endl;
    }
};

void main ()
{
    int n;
    rec r;
    clrscr ();
    ifstream first ("temp.bin",ios::binary|ios::in);
    if(!first)
    {
        cout<<"File opening error"<<endl;
        getch();
        exit(0);
    }
    first.seekg(0);
    cout<<"Enter the number of record = ";
    cin >>n;
    long int pos = (n-1)*sizeof(r);
    first.seekg(pos);
    first.read((char *)&r,sizeof(r));
    r.dis();
    getch ();
}
```

**Output:**

```
Enter the number of record = 2  
XYZ      2      54321
```

---

Fig. 10.9 Search Record

**Program # 10: Search Name with Structure**

//Program to search a record from file

```
#include <iostream.h>
#include <conio.h>
#include <fstream.h>
#include <process.h>
#include <string.h>

struct record
{
    char name[15];
};

void main ()
{
    char ch = 'y';
    char fname[15];
    int t = 0;
    int rn = 0;
    clrscr ();
    record rec;
    ofstream fil("abc.rec",ios::binary);
    if (!fil)
    {
        cerr<<"File opening error";
        getch();
        exit(0);
    }
    while (ch != 'n')
    {
        cout<<"Enter the name = ";
        cin >> rec.name;
        fil.write((char*)&rec,sizeof(rec));
        cout<<"Do you want to enter more recored (Y/N) = ";
        cin >> ch;
    }
    fil.close();
    ifstream sec("abc.rec",ios::binary);
    if(!sec)
    {
        cerr<<"File opening error";
        getch();
        exit(0);
    }
```

---

## Files

---

```
    }
    cout<<endl;
    cout<<"Enter the name you want to search = ";
    cin >>fname;
    while (sec.read((char*)&rec,sizeof(rec)))
    {
        if(strcmp(fname,rec.name)==0)
        {
            rn = ((rn-1)*sizeof(rec));
            sec.seekg(rn);
            cout<<rec.name<<endl;
            sec.close();
            t = 1;
        }
        rn++;
    }
    if (t==0)
        cout<<"Name does not exist"<<endl;
    getch ();
}
```

### Output:

```
Enter the name = ABC
Do you want to enter more record (Y/N) = y
Enter the name = XYZ
Do you want to enter more record (Y/N) = n
```

```
Enter the name you want to search = ABC
Given name is found = ABC
```

**Fig. 10.10 Name Search with Structure**

**Program # 11: Search Name with Class**

//Program to search the record in binary file

```
#include <iostream.h>
#include <conio.h>
#include <fstream.h>
#include <process.h>
#include <string.h>
#include <iomanip.h>
#include <stdio.h>

class rec
{
    private:
        char name[100];
    public:
        char roll[100];
        void input()
        {
            cout<<"Enter the full name = ";
            gets(name);
            cout<<"Enter the roll = ";
            gets(roll);
        }
        void dis()
        {
            clrscr();
            puts(name);
            puts(roll);
        }
};
void main ()
{
    char froll[100];
    int t = 0;
    long int rn = 0;
    char ch = 'y';
    rec r;
    clrscr ();
    ifstream fir("abc.rec",ios::binary);
    if (!fir)
    {
        cerr<<"File opening error";
        getch();
    }
```

```
    exit(0);
}
cout<<"Enter the names in file"<<endl;
while (ch!='n')
{
    r.input();
    fir.write((char *)&r,sizeof(r));
    cout<<"Do you want to enter new record (Y/N) = ";
    cin >>ch;
}
fir.close();
ifstream sec("abc.rec",ios::binary);
if (!sec)
{
    cerr<<"File opening error";
    getch();
    exit(0);
}
cout<<endl;
cout<<"Enter the roll number = ";
cin >>froll;
while (sec.read((char*)&r,sizeof(r)))
{
    if (strcmp(froll,r.roll)==0)
    {
        rn = (rn-1)*sizeof(r);
        sec.seekg(rn);
        r.dis();
        sec.close();
        t = 1;
    }
    rn++;
}
if(t==0)
cout<<"Name does not exist";
getch ();
}
```

**Output:**

```
Enter the names in file
Enter the full name = ABC
Enter the roll = 1
Do you want to enter new record (Y/N) = y
Enter the full name = XYZ
Enter the roll = 2
Do you want to enter new record (Y/N) = n

Enter the roll number = 2

XYZ
2
-
```

Fig. 10.11 Name Search with Class

**Program # 12: Update the Record**

//Program to update the record in binary mode

```
#include <iostream.h>
#include <conio.h>
#include <fstream.h>
#include <process.h>

class rec
{
protected:
    int roll;
    int long phon;
    char name[20];
public:
    input()
    {
        cout<<"Enter the name = ";
        cin >>name;
        cout<<"Enter the roll # = ";
        cin >>roll;
        cout<<"Enter the phone # = ";
        cin >>phon;
    }
    dis()
    {
        cout<<name<<"\t"<<roll<<"\t"<<phon<<endl;
    }
};
void main ()
{
    clrscr ();
    int recn,n;
    rec r;
    fstream fir("temp.bin",ios::binary|ios::in|ios::out);
    if (!fir)
    {
        cout<<"File opening error"<<endl;
        getch();
        exit(0);
    }
    fir.seekg(0,ios::end);
    int endp = fir.tellg();
    n = endp/sizeof(r);
```

### Files

---

```
cout<<"No of records in file = "<<n<<endl;
cout<<"Enter any key "<<endl;
getch ();
cout<<"Enter record No. you want to update = ";
cin >>recn;
long int pos = (recn-1)*sizeof(r);
fir.seekg(pos);
cout<<"You are modify the record "<<endl;
fir.read((char*)&r,sizeof(r));
r.dis();
cout<<"Now enter new entry"<<endl;
fir.seekg(pos);
r.input();
fir.write((char*)&r,sizeof(r));
cout<<"Record has updated successfully";
getch();
}
```

### Output:

```
No of records in file = 2
Enter any key
Enter record No. you want to update = 1
You are modify the record
ABC      1      12345
Now enter new entry
Enter the name = A
Enter the roll # = 1
Enter the phone # = 12345
Record has updated successfully_
```

Fig. 10.12 Record Update

**Program # 13: DOS Shell**

//Program to display the file by using command line of compiler

```
#include <iostream.h>
#include <conio.h>
#include <process.h>
#include <fstream.h>

void main (int a,char*b[])
{
    clrscr ();
    char ch;
    ifstream add(b[1]);
    if (!add)
    {
        cout<<"File opening error"<<endl;
        getch();
        exit(0);
    }
    if (a!=2)
    {
        cout<<"Syntax error"<<endl;
        getch();
        exit(0);
    }
    while (add)
    {
        add.get(ch);
        cout<<ch;
    }
    getch ();
}
```

**Output:**

```
C:\TC\BIN>cout example.txt
If you think education is expensive then try ignorance
Might is Sight
Pakistan Movement
Pakistan Zindabad
```

---

Fig. 10.13 DOS Shell

# **Chapter 11 Polymorphism**

### Polymorphism

#### Program # 1: Binary Operator (+) Overloading

//Program to overload binary operator (+)

```
#include <iostream.h>
#include <conio.h>

class distance
{
private:
    int feet;
    float inches;
public:
    distance()
    {
        feet = 0;
        inches = 0.0;
    }
    distance (int ft, float in)
    {
        feet = ft;
        inches = in;
    }
    void input()
    {
        cout<<"Enter the feet = ";
        cin >>feet;
        cout<<"Enter the inches = ";
        cin >>inches;
    }
    void dis()
    {
        cout<<feet<<"\t"<<inches<<endl;
    }
    distance operator +(distance);
};

void main ()
{
    clrscr();
    distance dis1,dis3;
    dis1.input();
    distance dis2(11,6.5);
```

## Polymorphism

---

```
dis3 = dis1+dis2;
cout<<"Distances"<<endl;
dis1.dis();
dis2.dis();
dis3.dis();
getch ();
}

distance distance :: operator + (distance d2)
{
    distance temp;
    temp.feet = feet+d2.feet;
    temp.inches = inches+d2.inches;
    return (temp);
}
```

### Output:

```
Enter the feet = 2
Enter the inches = 5.9
Distances
2      5.9
11     6.5
13     12.4
```

Fig. 11.1 Operator Overload (+)

## Polymorphism

---

### Program # 2: Binary Operator [ ] Overloading

//Program to overload binary operator [ ]

```
#include <iostream.h>
#include <conio.h>
#include <process.h>

const int limt = 10;
class array
{
    private:
        int arr[limt];
    public:
        int& operator [](int n)
        {
            if (n<0 | |n>=limt)
            {
                cout<<"Index out of bound";
                getch();
                exit(1);
            }
            return arr[n];
        }
};

void main ()
{
    clrscr ();
    array sal;
    for (int j=0;j<limt;j++)
        sal[j]=j*10;
    for (j=0;j<limt;j++)
    {
        int temp = sal[j];
        cout<<"Elements "<<j<<"is"<<temp<<endl;
    }
    getch ();
}
```

## Polymorphism

---

### Output:

```
Elements 0 is 0
Elements 1 is 10
Elements 2 is 20
Elements 3 is 30
Elements 4 is 40
Elements 5 is 50
Elements 6 is 60
Elements 7 is 70
Elements 8 is 80
Elements 9 is 90
```

Fig. 11.2 Operator Overload ( [ ] )

## Polymorphism

---

### Program # 3: Binary Operators (+,-,\*) Overloading

//Program to overload binary operators

```
#include <iostream.h>
#include <conio.h>

class weight
{
private:
    int kg,g,mg;
public:
    weight()
    {
        kg = 0;
        g = 0;
        mg = 0;
    }
    weight(int a,int b, int c)
    {
        kg = a;
        g = b;
        mg = c;
    }
    getdata()
    {
        cout<<"Enter the Kg = ";
        cin >>kg;
        cout<<"Enter the g = ";
        cin >>g;
        cout<<"Enter the mg = ";
        cin >>mg;
    }
    showdata()
    {
        cout<<"The wieght is = "<<kg<<"  "<<g<<"  "<<mg<<endl;
    }
    weight operator + (weight w5)
    {
        int i=kg+w5.kg;
        int j=g+w5.g;
        int k=mg+w5.mg;
        return weight(i,j,k);
    }
    weight operator - (weight w5)
```

## Polymorphism

---

```
{  
    int i = kg-w5.kg;  
    int j = g-w5.g;  
    int k = mg-w5.mg;  
    return weight(i,j,k);  
}  
weight operator * (weight w5)  
{  
    double i = 5*w5.kg;  
    double j = 5*w5.g;  
    double k = 5*w5.mg;  
    return weight (i,j,k);  
}  
};  
  
void main ()  
{  
    clrscr ();  
    weight w1,w3,w4,w6;  
    w1.getdata();  
    weight w2(15,100,150);  
    w3 = w1+w2;  
    w4 = w1-w2;  
    w6 = w2*w1;  
    w3.showdata();  
    w4.showdata();  
    w6.showdata();  
    getch ();  
}
```

### Output:

```
Enter the Kg = 100  
Enter the g = 900  
Enter the mg = 500  
The wieght is = 115    1000    650  
The wieght is = 85     800     350  
The wieght is = 500    4500    2500
```

Fig. 11.3 Binary Operator Overload

### Program # 4: Inheritance

//Program to inherit the class

```
#include <iostream.h>
#include <conio.h>

class base
{
public:
    void display()
    {
        cout<<"It is base class";
    }
};

class derived:public base
{
public:
    void dis()
    {
        cout<<"\nIt is a derived class";
    }
};

void main ()
{
    clrscr ();
    derived d;
    d.display ();
    d.dis();
    getch ();
}
```

### Output:

```
It is base class
It is a derived class
```

**Fig. 11.4 Inheritance**

## Polymorphism

---

### Program # 5: Derived Constructor

//Program to inherit derived constructor

```
#include <iostream.h>
#include <conio.h>

class base
{
private:
    int m;
public:
    base()
    {
        m = 0;
    }
    base (int c)
    {
        m = c;
        cout<<"The count is = "<<m<<endl;
        cout<<"It is base class"<<endl;
    }
};

class derived:public base
{
private:
    int q;
public:
    derived():base()
    {
        q = 0;
    }
    derived(int p):base(p)
    {
        q = p;
        cout<<"The count = "<<q<<endl;
        cout<<"It is derived class"<<endl;
    }
};

void main ()
{
    clrscr ();
    derived d;
```

## Polymorphism

---

```
derived d1(10);  
getch();  
}
```

### Output:

```
The count is = 10  
It is base class  
The count = 10  
It is derived class
```

Fig. 11.5 Derived Constructor

## Polymorphism

---

### Program # 6: Function Overriding

//Program to override a function

```
#include <iostream.h>
#include <conio.h>

class base
{
public:
    void fun()
    {
        cout<<"Pakistan Zindabad";
        cout<<"\nIt is a base class";
    }
};

class derived:public base
{
public:
    void fun()
    {
        cout<<"\n Higher Education"<<endl;
        cout<<"It is a derived class";
    }
};

void main ()
{
    clrscr ();
    derived d;
    d.fun();
    getch ();
}
```

#### Output:

```
Higher Education
It is a derived class
```

**Fig. 11.6 Function Overriding**

### Program # 7: Friend Function

//Program to multiply of three number by using friend function

```
#include <iostream.h>
#include <conio.h>

class y;
class z;
class x
{
    private:
        int data;
    public:
        x()
        {
            data = 3;
        }
        friend int fun(x,y,z);
};

class y
{
    private:
        int data;
    public:
        y()
        {
            data=2;
        }
        friend int fun(x,y,z);
};

class z
{
    private:
        int data;
    public:
        z()
        {
            data = 5;
        }
        friend int fun(x,y,z);
};

int fun(x a, y b, z c)
{
    return (a.data*b.data*c.data);
```

---

```
}

void main ()
{
    clrscr();
    x a;
    y b;
    z c;
    cout<<"The result is = "<<fun(a,b,c);
    getch();
}
```

**Output:**

```
The result is = 30_
```

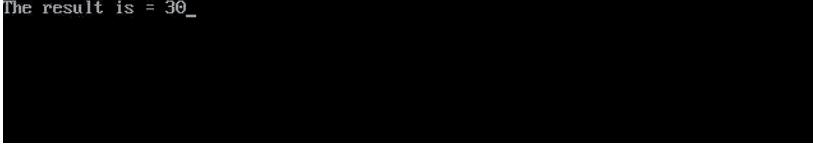


Fig. 11.7 Friend Function

### Program # 8: Virtual Function

```
//Program to display a message by using virtual function

#include <iostream.h>
#include <conio.h>

class base
{
private:
    int data;
public:
    virtual fun()
    {
        cout<<"It is the base class"<<endl;
        cout<<"virtual function"<<endl;
    }
};

class derived:public base
{
public:
    fun()
    {
        cout<<"it is the derived class"<<endl;
        cout<<"virtual class"<<endl;
    }
};

class der:public base
{
public:
    fun()
    {
        cout<<"it is the derived two class"<<endl;
        cout<<"virtual class";
    }
};

void main ()
{
    clrscr ();
    base *b;
    derived d;
    der d1;
    b =&d;
    b->fun();
```

## Polymorphism

---

```
b = &d1;  
b->fun();  
getch();  
}
```

### Output:

```
It is the derived class  
Virtual Class  
It is the derived two class  
Virtual class
```

Fig. 11.8 Virtual Function

## Polymorphism

---

### Program # 9: Virtual Function

//Program to display a message by using virtual function

```
#include <iostream.h>
#include <conio.h>

class nspunjab
{
public:
    virtual sial()
    {
        cout<<"In sialkot of nspunjab" << endl;
    }
    virtual mul()
    {
        cout<<"In multan of nspunjab" << endl;
    }
    void veh()
    {
        cout<<"In vehari of nspunjab" << endl;
    }
};

class nspunjab2:public nspunjab
{
public:
    sial()
    {
        cout<<"In sialkot of nspunjab2" << endl;
    }
    mul()
    {
        cout<<"In multan of nspunjab2" << endl;
    }
};

class nspunjab3:public nspunjab
{
public:
    sial()
    {
        cout<<"In sialkot of nspunjab3" << endl;
    }
    mul()
```

---

## Polymorphism

---

```
{           cout<<"In multan of nspunjab3" << endl;
}
veh()
{
    cout<<"In verari of nspunjab3" << endl;
}
};

class nspunjab4:public nspunjab
{
public:
    sial()
    {
        cout<<"In sialkot of nspunjab4" << endl;
    }
    mul()
    {
        cout<<"In multan of nspunjab4" << endl;
    }
};

void main ()
{
    clrscr();
    nspunjab *ptr1;
    nspunjab ns;
    ptr1 = &ns;
    ptr1->sial();
    ptr1->mul();
    ptr1->veh();
    nspunjab *ptr2,*ptr3,*ptr4;
    nspunjab2 cloth;
    nspunjab3 sports;
    nspunjab4 surgical;
    ptr2=&cloth;
    ptr3=&sports;
    ptr4=&surgical;
    ptr2->sial();
    ptr2->mul();
    ptr3->sial();
    ptr3->mul();
    ptr4->sial();
    ptr4->mul();
}
```

## Polymorphism

---

```
ptr2->veh();  
ptr3->veh();  
getch();  
}
```

### Output:

```
In sialkot of nspunjab  
In multan of nspunjab  
In vehari of nspunjab  
In sialkot of nspunjab2  
In multan of nspunjab2  
In sialkot of nspunjab3  
In multan of nspunjab3  
In sialkot of nspunjab4  
In multan of nspunjab4  
In vehari of nspunjab  
In vehari of nspunjab
```

Fig. 11.9 Virtual Function

## **Chapter 12** Graphics

## Graphics

### Program # 1: Rectangle

//Program to draw a rectangle using graphics

```
#include <iostream.h>
#include <conio.h>
#include <graphics.h>      //Graphics Head File
#include <stdlib.h>

void main ()
{
    int d,m;
    d = DETECT; //Detect graphics
    initgraph(&d,&m,"c:\\tc\\bgi"); //Load the graphics from given path
    rectangle(0,0,200,300);      //Rectangle
    getch ();
}
```

### Output:



Fig. 12.1 Rectangle

### Program # 2: Circles

//Program to draw circles on the screen

```
#include <iostream.h>
#include <conio.h>
#include <graphics.h>

void main ()
{
    int d,m,c;
    d = DETECT;
    initgraph (&d,&m,"C:\\tc\\bgi");
    cleardevice();
    for (c=1;c<=15;c++)
    {
        setcolor(c);
        circle(300,200,c*10);
    }
    getch ();
}
```

### Output:

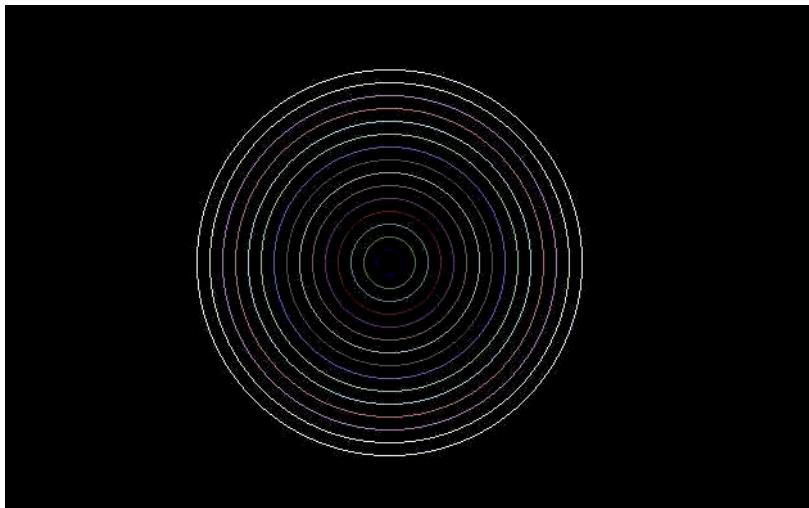


Fig. 12.2 Circles

### Program # 3: Masjid Model

//Program to draw a masjid model on the screen

```
#include <iostream.h>
#include <conio.h>
#include <graphics.h>
#include <stdio.h>
#include <dos.h>
#include <stdlib.h>
#include <string.h>
#include <process.h>

class mosque
{
    private:
        int d,m;
        int x1,x2,stan,enan,rx,ry;
    public:
        void frame();
        void tower();
        void rectang();
        void name();
};

void main()
{
    mosque m;
    m.frame();
    m.tower();
    m.rectang();
    m.name();
    getch();
    closegraph();
}
void mosque::frame()
{
    d = DETECT;
    x1 = 280;
    x2 = 320;
    stan = 0;
    enan = 180;
    rx = 170;
    ry = 200;
    initgraph(&d,&m,"C:\\tc\\bgi");
```

## Graphics

---

```
ellipse(x1,x2,stan,enan,rx,ry);
ellipse(280,120,0,180,10,70);
setfillstyle(SOLID_FILL,8);
filleepse(280,120,10,70);
setfillstyle(SOLID_FILL,8);
filleepse(530,60,5,50);
setfillstyle(SOLID_FILL,5);
filleepse(530,90,30,30);
setfillstyle(SOLID_FILL,GREEN);
filleepse(280,320,170,200);
setfillstyle(SOLID_FILL,BLACK);
bar(100,320,450,479);
rectangle(0,0,639,479);
rectangle(60,320,560,400);
int c = 0;
for (int i=1;i<=3;i++)
{
    ellipse(200+c,320,0,180,40,66);
    c = c+80;
}
ellipse(440,320,90,180,40,66);
ellipse(120,320,0,90,40,66);
c = 0;
for (i=1;i<=2;i++)
{
    ellipse(240+c,254,0,180,40,66);
    c = c+80;
}
ellipse(400,254,80,180,40,66);
ellipse(160,254,0,100,40,66);
ellipse(280,188,0,180,40,66);
ellipse(360,188,122,180,40,66);
ellipse(200,188,0,57,40,66);
x1 = 280;
x2 = 320;
stan = 0;
enan = 180;
rx = 1;
ry = 0;
}
void mosque::tower()
{
    setcolor(WHITE);
    line(560,215,560,320);
```

---

## Graphics

---

```
line(500,215,500,400);
rectangle(480,200,580,215);
line(560,150,560,200);
line(500,150,500,200);
rectangle(470,130,590,140);
line(480,150,580,150);
line(480,140,480,150);
line(580,140,580,150);
line(560,90,560,130);
line(500,90,500,130);
arc(530,90,0,180,30);
ellipse(530,60,0,180,5,50);
//fill color in the tower.
setfillstyle(SOLID_FILL,5);
bar(501,216,559,319);
bar(501,151,559,199);
bar(501,321,559,399);
bar(501,86,559,129);
setfillstyle(SOLID_FILL,BLUE);
bar(471,131,589,139);
bar(481,141,579,149);
bar(481,201,579,214);
}
void mosque::rectang()
{
    setfillstyle(SOLID_FILL,1);
    rectangle(60,320,500,400);
    floodfill(62,322,WHITE);
    int x1 = 420; // line 1\
    int y1 = 320;
    setcolor(WHITE);
    for (int i=1;i<=7;i++)
    {
        outtextxy(x1,y1,"*");
        x1 = x1+12;
        y1 = y1+12;
    }
    x1 = 348; // line 2\
    y1 = 320;
    for (i=1;i<=7;i++)
    {
        outtextxy(x1,y1,"*");
        x1 = x1+12;
        y1 = y1+12;
    }
}
```

---

## Graphics

---

```
    }
    x1 = 276;      // line 3\
    y1 = 320;
    for (i=1;i<=7;i++)
    {
        outtextxy(x1,y1,"*");
        x1 = x1+12;
        y1 = y1+12;
    }
    x1 = 204;      // line 4\
    y1 = 320;
    for (i=1;i<=7;i++)
    {
        outtextxy(x1,y1,"*");
        x1 = x1+12;
        y1 = y1+12;
    }
    x1 = 132;      // line 5\
    y1 = 320;
    for (i=1;i<=7;i++)
    {
        outtextxy(x1,y1,"*");
        x1 = x1+12;
        y1 = y1+12;
    }
    x1 = 60;       // line 6\
    y1 = 320;
    for (i=1;i<=7;i++)
    {
        outtextxy(x1,y1,"*");
        x1 = x1+12;
        y1 = y1+12;
    }
    x1 = 492;      // line 1/
    y1 = 320;
    for (i=1;i<=7;i++)
    {
        outtextxy(x1,y1,"*");
        x1 = x1-12;
        y1 = y1+12;
    }
    x1 = 420;      // line 2/
    y1 = 320;
    for (i=1;i<=7;i++)
```

---

## Graphics

---

```
{  
    outtextxy(x1,y1,"*");  
    x1 = x1-12;  
    y1 = y1+12;  
}  
x1 = 348;      // line 3/  
y1 = 320;  
for (i=1;i<=7;i++)  
{  
    outtextxy(x1,y1,"*");  
    x1 = x1-12;  
    y1 = y1+12;  
}  
x1 = 276;      // line 4/  
y1 = 320;  
for (i=1;i<=7;i++)  
{  
    outtextxy(x1,y1,"*");  
    x1 = x1-12;  
    y1 = y1+12;  
}  
x1 = 204;      // line 5/  
y1 = 320;  
for (i=1;i<=7;i++)  
{  
    outtextxy(x1,y1,"*");  
    x1 = x1-12;  
    y1 = y1+12;  
}  
x1 = 132;      // line 6/  
y1 = 320;  
for (i=1;i<=7;i++)  
{  
    outtextxy(x1,y1,"*");  
    x1 = x1-12;  
    y1 = y1+12;  
}  
}  
void mosque::name()  
{  
    setcolor(WHITE);  
    line(50,50,125,50);  
    line(200,450,450,450);  
    int midx = 390;
```

---

---

## Graphics

---

```
int midy = 60;
int xradius = 0;
int yradius = 45;
int j = 0;
setcolor(BLACK);
setfillstyle(SOLID_FILL,RED);
while(!kbhit())
{
    int i = 1;
    xradius = 0;
    while(i!=45)
    {
        setcolor(BLACK);
        fillellipse(midx, midy, xradius+i, yradius);
        i++;
        delay(13);
    }
    i = 1;
    xradius = 45;
    while(i!=45)
    {
        setcolor(BLACK);
        fillellipse(midx, midy, xradius-i, yradius);
        i++;
        delay(13);
    }
    setcolor(j);
    settextstyle(7,0,1);
    outtextxy(50,30,"MASJID");
    outtextxy(200,430,"Design by: Zeeshan Ashraf");
    settextstyle(0,0,0);
    j++;
}
}
```

**Output:**



**Fig. 12.4 Masjid**

**Program # 4: Analog Clock**

//Program to draw clock on the screen

```
#include <iostream.h>
#include <conio.h>
#include <graphics.h>
#include <process.h>
#include <dos.h>
#include <math.h>
#include <stdio.h>

class watch
{
public:
    void picture();
    void frame();
    void watch_dis();
};

void main()
{
    watch w;
    w.frame();
    w.watch_dis();
    getch();
    closegraph();
}

void watch::picture()
{
    int d = DETECT;
    int i, x, y,g;
    FILE *inn;
    initgraph(&d,&g,"c:\\tc\\bgi");
    if(inn == NULL)
    {
        cout<<"Can't open file.";
        getch();
        exit(0);
    }
    setbkcolor(0);
    for(y = 0; y <= 1078; y++)
        fgetc(inn);
    int flag = 0;
```

## Graphics

---

```
for(y = 440; y > 50 ; y--)
    for(x = 0; x < 640; x++)
    {
        char c = fgetc(inn);
        for(int k = 0; k < 16; k++)
        {
            putpixel(x, y, c-k);
        }
        if(flag == 0)
        {
            cout << c;
            flag = 1;
        }
    }
}
void watch::frame()
{
    int d,g;
    d = DETECT;
    initgraph(&d,&g,"c:\\tc\\bgi");
    setfillstyle(SOLID_FILL,1);
    rectangle(0,0,639,479);
    floodfill(2,2,WHITE);
}
void watch::watch_dis()
{
    int sec,min,hor;
    int d,m,yy;
    int count = 0;
    struct dosdate_t dd;
    _dos_getdate(&dd);
    d = dd.day;
    m = dd.month;
    yy = dd.year;
    char *no[12] = {"12","1","2","3","4","5","6","7","8","9","10","11"};
    setfillstyle(SOLID_FILL,BLACK);
    circle(318,235,190);
    floodfill(218,235,WHITE);
    setfillstyle(SOLID_FILL,BLACK);
    fillellipse(318,235,150,150);
    fillellipse(318,235,135,135);
    setfillstyle(SOLID_FILL,BLACK);
    fillellipse(318,235,135,135);
    setfillstyle(SOLID_FILL,BLACK);
```

---

## Graphics

---

```
filellipse(318,235,0,0);
setcolor(WHITE);
settextstyle(7,0,3);
outtextxy(30,30,"Analog CLOCK");
outtextxy(178,435,"Designed by: Zeeshan Ashraf");
settextstyle(0,0,0);
int i = 0,x,y;
x = 315;
y = 230;
settextstyle(0,0,1);
setcolor(WHITE);
while(i!=60)
{
    outtextxy(x+180*sin(i*M_PI/30),y-180*cos(i*M_PI/30),".");
    i++;
}
setcolor(WHITE);
for (i=0;i<12;i++)
    outtextxy(x+180*sin(i*M_PI/6),y-180*cos(i*M_PI/6),no[i]);
x = 318,y = 235,i = 0;
struct dostime_t t;
while(!kbhit())
{
    _dos_gettime(&t);
    if (t.hour>12)
        t.hour = t.hour-12;
    sec = t.second;
    min = t.minute;
    count = min/12;
    hor = t.hour*5+count;
    setlinestyle(SOLID_LINE,0,2);
    setcolor(RED);
    line(x,y,x+170*sin(sec*M_PI/30),y-170*cos(sec*M_PI/30));
    line(x,y,x-15*sin(sec*M_PI/30),y+15*cos(sec*M_PI/30));
    setcolor(BLACK);
    line(x,y,x+170*sin((sec-1)*M_PI/30),y-170*cos((sec-1)*M_PI/30));
    line(x,y,x-15*sin((sec-1)*M_PI/30),y+15*cos((sec-1)*M_PI/30));
    setcolor(9);
    line(x,y,x+146*sin(min*M_PI/30),y-146*cos(min*M_PI/30));
    if (sec==0)
    {
        setcolor(BLACK);
        line(x,y,x+146*sin((min-1)*M_PI/30),y-146*cos((min-1)*M_PI/30));
```

## Graphics

---

```
    }
    setcolor(GREEN);
    line(x,y,x+132*sin(hor*M_PI/30),y-132*cos(hor*M_PI/30));
    if (min%12==0)
    {
        setcolor(BLACK);
        line(x,y,x+132*sin((hor-1)*M_PI/30),y-132*cos((hor-1)*M_PI/30));
    }
    delay(200);
}
}
```

### Output:

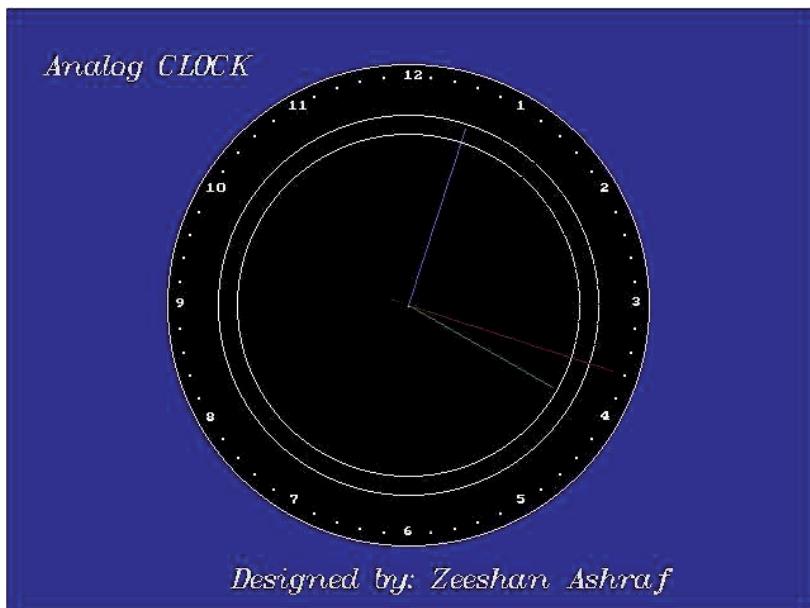


Fig. 12.5 Analog Clock

**Program # 5: Game: Moving Ball**

//Program to draw a game

```
#include <iostream.h>
#include <conio.h>
#include <alloc.h>
#include <graphics.h>
#include <dos.h>

void main ()
{
    int d = DETECT,m,x = 190,y = 373,ch,xdirn = 1, ydirn = 1;
    int count = 0;
    int x4 = 180,y4 = 395;
    int x5 = 260,y5 = 415;
    int x7 = 540,x8 = 560;
    int y7 = 420,y8 = 450;
    unsigned area;
    int maxx,maxy;
    void *buff;
    initgraph(&d,&m,"C:\\tc\\bgi");
    setcolor(WHITE);
    circle(200,383,10);
    circle(550,435,10);
    circle(580,435,10);
    circle(610,435,10);
    int x2 = 10,x3 = 90;
    int y2 = 20, y3 = 45;
    int i = 0;
    setfillstyle(SOLID_FILL,BLUE);
    while(i<=28)
    {
        bar(x2,y2,x3,y3);
        i++;
        x2 = x3+10,x3 = x2+80;
        if (i==7 || i==14 || i==21)
        {
            x2 = 10,x3 = 90;
            y2 = y3+10,y3 = y2+25;
        }
    }

    int a[28] = {0};
    rectangle(x4,y4,x5,y5);
```

---

## Graphics

---

```
maxx = getmaxx();
maxy = getmaxy();
rectangle(0,10,maxx,maxy-60);
getch();
area = imagesize(190,373,210,393);
buff = malloc(area);
getImage(190,373,210,393,buff);
while(1)
{
    if (kbhit())
    {
        ch = getch();
        if (ch==27)
        {
            break;
        }
        if (ch=='M')
        {
            x4 = x4+15;
            x5 = x5+15;
            if (x5>=635)
            {
                x5 = 635;
                x4 = 555;
            }
            setfillstyle(SOLID_FILL,BLACK);
            bar(1,395,638,417);
            rectangle(x4,y4,x5,y5);
        }
        if (ch=='K')
        {
            x4 = x4-15;
            x5 = x5-15;
            if (x4<=0)
            {
                x4 = 2;
                x5 = 82;
            }
            setfillstyle(SOLID_FILL,BLACK);
            bar(1,395,638,417);
            rectangle(x4,y4,x5,y5);
        }
    }
    delay(15);
```

## Graphics

---

```
putimage(x,y,buff,XOR_PUT);
delay(0);
x = x-(xdirn*5);
y = y-(ydirn*2);
putimage(x,y,buff,XOR_PUT);
if (x>maxx-20 || x<5)
    xdirn *= -1;
if (y<20)
    ydirn *= -1;
if (y>=maxy-110 && x>=x4 && x<=x5)
    ydirn *= -1;
if (y>=maxy-82 && x<x4 || y>=maxy-82 && x>x5)
{
    setfillstyle(SOLID_FILL,BLACK);
    bar(x7,y7,x8,y8);
    x7 = x7+30,x8 = x8+30;
    x4 = 180;
    x5 = 260;
    setfillstyle(SOLID_FILL,BLACK);
    bar(1,390,638,417);
    rectangle(x4,y4,x5,y5);
    setcolor(WHITE);
    circle(200,383,10);
    x = 190;
    y = 373;
    ydirn *=-1;
    getch();
}
if (x8>=630)
{
    setfillstyle(SOLID_FILL,BLACK);
    settextstyle(3,0,5);
    outtextxy(200,200,"Game Over");
    getch();
    break;
}
setfillstyle(SOLID_FILL,BLACK);
if (x>=5 && x<=90 && y>=105 && y<=153 && a[0]==0)
{
    bar(10,125,90,150);
    ydirn *=-1;
    a[0] = 1;
    count++;
}
```

## Graphics

---

```
if (x>=95 && x<=180 && y>=105 && y<=153&&a[1]==0)
{
    bar(100,125,180,150);
    ydirn *=-1;
    a[1] = 1;
    count++;
}
if (x>=185 && x<=270 && y>=105 && y<=153&&a[2]==0)
{
    bar(190,125,270,150);
    ydirn *=-1;
    a[2] = 1;
    count++;
}
if (x>=275 && x<=360 && y>=105 && y<=153&&a[3]==0)
{
    bar(280,125,360,150);
    ydirn *=-1;
    a[3] = 1;
    count++;
}
if (x>=365 && x<=450 && y>=105 && y<=153&&a[4]==0)
{
    bar(370,125,450,150);
    ydirn *=-1;
    a[4] = 1;
    count++;
}
if (x>=455 && x<=540 && y>=105 && y<=153&&a[5]==0)
{
    bar(460,125,540,150);
    ydirn *=-1;
    a[5] = 1;
    count++;
}
if (x>=545 && x<=630 && y>=105 && y<=153&&a[6]==0)
{
    bar(550,125,630,150);
    ydirn *=-1;
    a[6] = 1;
    count++;
}
if (x>=5 && x<=90 && y>=69 && y<=117&&a[7]==0)
{
```

---

## Graphics

---

```
bar(10,90,90,115);
ydirn *=-1;
a[7] = 1;
count++;
}
if (x>=95 && x<=180 && y>=69 && y<=117&&a[8]==0)
{
    bar(100,90,180,115);
    ydirn *=-1;
    a[8] = 1;
    count++;
}
if (x>=185 && x<=270 && y>=69 && y<=117&&a[9]==0)
{
    bar(190,90,270,115);
    ydirn *=-1;
    a[9] = 1;
    count++;
}
if (x>=275 && x<=360 && y>=69 && y<=117&&a[10]==0)
{
    bar(280,90,360,115);
    ydirn *=-1;
    a[10] = 1;
    count++;
}
if (x>=365 && x<=450 && y>=69 && y<=117&&a[11]==0)
{
    bar(370,90,450,115);
    ydirn *=-1;
    a[11] = 1;
    count++;
}
if (x>=455 && x<=540 && y>=69 && y<=117&&a[12]==0)
{
    bar(460,90,540,115);
    ydirn *=-1;
    a[12] = 1;
    count++;
}
if (x>=545 && x<=630 && y>=69 && y<=117&&a[13]==0)
{
    bar(550,90,630,115);
    ydirn *=-1;
```

---

## Graphics

---

```
a[13] = 1;
count++;
}
if (x>=5 && x<=90 && y>=33 && y<=81&&a[14]==0)
{
    bar(10,55,90,80);
    ydirn *=-1;
    a[14] = 1;
    count++;
}
if (x>=95 && x<=180 && y>=33 && y<=81&&a[15]==0)
{
    bar(100,55,180,81);
    ydirn *=-1;
    a[15] = 1;
    count++;
}
if (x>=185 && x<=270 && y>=33 && y<=81&&a[16]==0)
{
    bar(190,55,270,80);
    ydirn *=-1;
    a[16] = 1;
    count++;
}
if (x>=275 && x<=360 && y>=33 && y<=81&&a[17]==0)
{
    bar(280,55,360,80);
    ydirn *=-1;
    a[17] = 1;
    count++;
}
if (x>=365 && x<=450 && y>=33 && y<=81&&a[18]==0)
{
    bar(370,55,450,80);
    ydirn *=-1;
    a[18] = 1;
    count++;
}
if (x>=455 && x<=540 && y>=33 && y<=81&&a[19]==0)
{
    bar(460,55,540,80);
    ydirn *=-1;
    a[19] = 1;
    count++;
```

---

## Graphics

---

```
    }
    if (x>=545 && x<=630 && y>=33 && y<=81&&a[20]==0)
    {
        bar(550,55,630,80);
        ydirn *=-1;
        a[20] = 1;
        count++;
    }
    if (x>=5 && x<=90 && y>=10 && y<=47&&a[21]==0)
    {
        bar(10,20,90,45);
        ydirn *=-1;
        a[21] = 1;
        count++;
    }
    if (x>=95 && x<=180 && y>=10 && y<=47&&a[22]==0)
    {
        bar(100,20,180,45);
        ydirn *=-1;
        a[22] = 1;
        count++;
    }
    if (x>=185 && x<=270 && y>=10 && y<=47&&a[23]==0)
    {
        bar(190,20,270,45);
        ydirn *=-1;
        a[23] = 1;
        count++;
    }
    if (x>=275 && x<=360 && y>=10 && y<=47&&a[24]==0)
    {
        bar(280,20,360,45);
        ydirn *=-1;
        a[24] = 1;
        count++;
    }
    if (x>=365 && x<=450 && y>=10 && y<=47&&a[25]==0)
    {
        bar(370,20,450,45);
        ydirn *=-1;
        a[25] = 1;
        count++;
    }
    if (x>=455 && x<=540 && y>=10 && y<=47&&a[26]==0)
```

---

## Graphics

---

```
{  
    bar(460,20,540,45);  
    ydirn *=-1;  
    a[26] = 1;  
    count++;  
}  
if (x>=545 && x<=630 && y>=10 && y<=47&&a[27]==0)  
{  
    bar(550,20,630,45);  
    ydirn *=-1;  
    a[27] = 1;  
    count++;  
}  
if (count==28)  
{  
    setfillstyle(SOLID_FILL,BLACK);  
    settextstyle(3,0,5);  
    outtextxy(200,200,"You Win");  
    getch();  
    break;  
}  
}  
closegraph();  
}
```

### Output:

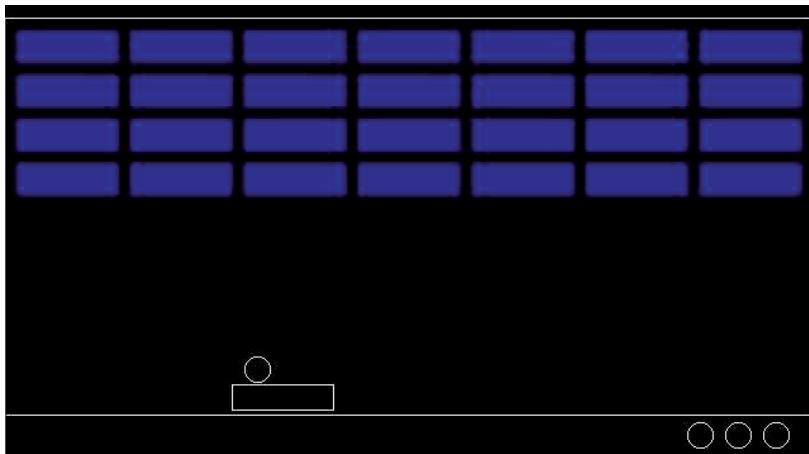


Fig. 12.6 Game: Moving Ball

### Program # 6: Calculator

```
//Program to draw a calculator which is performed only integer's numbers

#include <iostream.h>
#include <conio.h>
#include <process.h>
#include <stdio.h>
#include <graphics.h>
#include <dos.h>
#include <string.h>
#include <stdlib.h>
#include <string.h>

char res[15];           //Global variables
char *cap[29] = {"7","8","9","/","sqr","4","5","6","*","%","1","2","3",
"-","1/x","0","+/-",".","+","=","MC","MR","MS","M+","Back","CE","C"};
long int var1 = 0;
long int var2 = 0;
int sel = 0;
int no = 0;

class calculator
{
    private:
        int d,m;
        int x1,y1,x2,y2;
        int p,len;
        int cpos,i,dot,z;
        char ch;
        char n[8];
    public:
        void frame();
        void display();
        void buttons(int,int,int,int);
        void change(int,int,int,int);
};

void main()
{
    int x,xx,y,yy;
    int ii = 0;
    x = 245, xx = 275;
    y = 210, yy = 230;
    calculator c;
```

---

## Graphics

---

```
c.frame();
while(ii!=27)
{
    c.buttons(x,y,xx,yy);
    if (ii==4 | ii==14 | ii==16)
        x = x-5;
    if (ii==24)
        x = x+5;
    if (ii==25)
        x = x+10;
    if (ii==26)
        x = x+12;
    if (ii==3 | ii==8 | ii==13 | ii==18 | ii==19 | ii==20 | ii==21 | ii==22
        | ii==23 | ii==24 | ii==25 | ii==26)
        setcolor(RED);
    else
        setcolor(BLUE);
    outtextxy(x+10,y+7,cap[ii]);
    ii++;
    if (ii<20)
    {
        x = xx+5;
        xx = xx+35;
    }
    if (ii==5 | ii==10 | ii==15)
    {
        x = 245;
        xx = 275;
        y = yy+5;
        yy = yy+25;
    }
    if (ii==20)
    {
        setcolor(RED);
        x = 200;
        xx = 230;
        y = 195;
        yy = 205;
    }
    if (ii>19)
    {
        y = yy+5;
        yy = yy+25;
    }
}
```

---

## Graphics

---

```
if (ii==24)
{
    x = 245, xx = 300;
    y = 180, yy = 200;
}
if (ii==25)
{
    x = 305, xx = 360;
    y = 180, yy = 200;
}
if (ii==26)
{
    x = 365, xx = 415;
    y = 180, yy = 200;
}
if (ii==27)
{
    x = 203, xx = 228;
    y = 183, yy = 200;
    setcolor(BLACK);
    line(x,y,xx,y);
    line(x,y,x,yy);
    setcolor(WHITE);
    line(x,yy,xx,yy);
    line(xx,y,xx,yy);
}
c.display();
getch();
closegraph();
}
void calculator::frame()
{
    d = DETECT;
    initgraph(&d,&m,"c:\\tc\\bgi");
    setfillstyle(SOLID_FILL,1);
    rectangle(0,0,639,479);
    floodfill(2,2,WHITE);
    setcolor(WHITE);
    settextstyle(7,0,3);
    outtextxy(240,30,"Calculator");
    outtextxy(178,440,"Designed by: Zeeshan Ashraf");
    line(240,60,360,60);
    settextstyle(0,0,0);
```

---

## Graphics

---

```
setcolor(WHITE);
rectangle(180,115,435,325);
setfillstyle(SOLID_FILL,LIGHTGRAY);
floodfill(182,117,WHITE);
setcolor(WHITE);
rectangle(190,125,425,315);
setcolor(BLACK);
rectangle(185,120,430,320);
setcolor(BLACK);
line(200,150,415,150);
line(200,150,200,170);
setcolor(WHITE);
line(201,170,415,170);
line(415,151,415,170);
setfillstyle(SOLID_FILL,WHITE);
bar(201,151,414,169);
setcolor(BLACK);
outtextxy(400,157,"0.");
}

void calculator :: buttons(int x,int y,int xx, int yy)
{
    int x1,y1,x2,y2;
    x1 = x, x2 = xx;
    y1 = y, y2 = yy;
    setcolor(WHITE);
    line(x1,y1,x2,y1);
    line(x1,y1,x1,y2);
    setcolor(BLACK);
    line(x1,y2,x2,y2);
    line(x2,y1,x2,y2);
}
void calculator::display()
{
    int x1,x2,y1,y2;
    ch = 'y';
    p = 0;
    int dot = 0;
    int i = 0;
    while(ch!=27)
    {
        ch = getch();
        if (ch==48)
        {
            x1 = 245, x2 = 275;
```

---

## Graphics

---

```
y1 = 285, y2 = 305;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i==0)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[0] = '0';
    n[1] = '.';
    n[2] = NULL;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(416,157,n);
}
else if (i<=7)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '0';
    n[i+1] = NULL;
    i++;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(408,157,n);
}
}
if (ch==49)
{
    //button 1
    x1 = 245, x2 = 275;
    y1 = 260, y2 = 280;
    calculator::change(x1,x2,y1,y2);
    if (dot==1)
    {
        dot = 0;
        i = 0;
    }
    if (i<=7)
    {
        setfillstyle(SOLID_FILL,WHITE);
        bar(340,155,412,165);
        n[i] = '1';
    }
}
```

---

---

## Graphics

---

```
n[i+1] = NULL;
i++;
settextjustify(RIGHT_TEXT,RIGHT_TEXT);
outtextxy(408,157,n);
}
}
if (ch==50)
{
//button 2
x1 = 280, x2 = 310;
y1 = 260, y2 = 280;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i<=7)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '2';
    n[i+1] = NULL;
    i++;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(408,157,n);
}
}
if (ch==51)
{
//button 3
x1 = 315, x2 = 345;
y1 = 260, y2 = 280;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i<=7)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '3';
}
```

---

---

## Graphics

---

```
n[i+1] = NULL;
i++;
settextjustify(RIGHT_TEXT,RIGHT_TEXT);
outtextxy(408,157,n);
}
}
if (ch==52)
{
//button 4
x1 = 245, x2 = 275;
y1 = 235, y2 = 255;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i<=7)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '4';
    n[i+1] = NULL;
    i++;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(408,157,n);
}
}
if (ch==53)
{
//button 5
x1 = 280, x2 = 310;
y1 = 235, y2 = 255;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i<=7)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '5';
}
```

---

---

### Graphics

---

```
n[i+1] = NULL;
i++;
settextjustify(RIGHT_TEXT,RIGHT_TEXT);
outtextxy(408,157,n);
}
}
if (ch==54)
{
//button 6
x1 = 315, x2 = 345;
y1 = 235, y2 = 255;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i<=7)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '6';
    n[i+1] = NULL;
    i++;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(408,157,n);
}
}
if (ch==55)
{
//button 7
x1 = 245, x2 = 275;
y1 = 210, y2 = 230;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i<=7)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '7';
}
```

---

---

### Graphics

---

```
n[i+1] = NULL;
i++;
settextjustify(RIGHT_TEXT,RIGHT_TEXT);
outtextxy(408,157,n);
}
}
if (ch==56)
{
//button 8
x1 = 280, x2 = 310;
y1 = 210, y2 = 230;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i<=7)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '8';
    n[i+1] = NULL;
    i++;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(408,157,n);
}
}
if (ch==57)
{
//button 9
x1 = 315, x2 = 345;
y1 = 210, y2 = 230;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i<=7)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '9';
}
```

---

---

### Graphics

---

```
n[i+1] = NULL;
i++;
settextjustify(RIGHT_TEXT,RIGHT_TEXT);
outtextxy(408,157,n);
}
}
if (ch==46)
{
//button .
x1 = 315, x2 = 345;
y1 = 285, y2 = 305;
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i==0)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[0] = '0';
    n[1] = '.';
    n[2] = NULL;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(416,157,n);
}
else if (i<=7&&p==0)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i] = '!';
    n[i+1] = NULL;
    i++;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(408,157,n);
    p = 1;
}
}
if (ch==8)
{
//button Backspace
x1 = 245, x2 = 300;
y1 = 180, y2 = 200;
```

---

## Graphics

---

```
calculator::change(x1,x2,y1,y2);
if (dot==1)
{
    dot = 0;
    i = 0;
}
if (i==0)
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[0] = '0';
    n[1] = '.';
    n[2] = NULL;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(416,157,n);
}
else
{
    setfillstyle(SOLID_FILL,WHITE);
    bar(340,155,412,165);
    n[i-1] = NULL;
    i--;
    settextjustify(RIGHT_TEXT,RIGHT_TEXT);
    outtextxy(408,157,n);
    if (i==0)
    {
        setfillstyle(SOLID_FILL,WHITE);
        bar(340,155,412,165);
        outtextxy(416,157,"0.");
        p = 0;
    }
}
}

if (ch==47)
{
    //button /
    x1 = 350, x2 = 380;
    y1 = 210, y2 = 230;
    calculator::change(x1,x2,y1,y2);
    sel = 1;
    len = strlen(n);
    if (len==1)
        no = 1;
```

---

## Graphics

---

```
else if (len==2)
    no = 10;
else if (len==3)
    no = 100;
else if (len==4)
    no = 1000;
else if (len==5)
    no = 10000;
else if (len==6)
    no = 100000;
else if (len==7)
    no = 1000000;
else if (len==8)
    no = 10000000;
i = 0;
while(i<len)
{
    int con = n[i]-48;
    var1 = var1+con*no;
    no = no/10;
    i++;
}
ltoa(var1,res,10);
dot = 1;
p = 0;
}
if (ch==42)
{
    //button *
    x1 = 350, x2 = 380;
    y1 = 235, y2 = 255;
    calculator::change(x1,x2,y1,y2);
    sel = 2;
    len = strlen(n);
    if (len==1)
        no = 1;
    else if (len==2)
        no = 10;
    else if (len==3)
        no = 100;
    else if (len==4)
        no = 1000;
    else if (len==5)
        no = 10000;
```

---

---

## Graphics

---

```
else if (len==6)
    no = 100000;
else if (len==7)
    no = 1000000;
else if (len==8)
    no = 10000000;
i = 0;
while(i<len)
{
    int con = n[i]-48;
    var1 = var1+con*no;
    no = no/10;
    i++;
}
ltoa(var1,res,10);
dot = 1;
p = 0;
}
if (ch==43)
{
    //button +
    x1 = 350, x2 = 380;
    y1 = 285, y2 = 305;
    calculator::change(x1,x2,y1,y2);
    sel = 4;
    len = strlen(n);
    if (len==1)
        no = 1;
    else if (len==2)
        no = 10;
    else if (len==3)
        no = 100;
    else if (len==4)
        no = 1000;
    else if (len==5)
        no = 10000;
    else if (len==6)
        no = 100000;
    else if (len==7)
        no = 1000000;
    else if (len==8)
        no = 10000000;
    i = 0;
    while(i<len)
```

---

## Graphics

---

```
{  
    int con = n[i]-48;  
    var1 = var1+con*no;  
    no = no/10;  
    i++;  
}  
ltoa(var1,res,10);  
dot = 1;  
p = 0;  
}  
if (ch==45)  
{  
    //button -  
    x1 = 350, x2 = 380;  
    y1 = 260, y2 = 280;  
    calculator::change(x1,x2,y1,y2);  
    sel = 3;  
    len = strlen(n);  
    if (len==1)  
        no = 1;  
    else if (len==2)  
        no = 10;  
    else if (len==3)  
        no = 100;  
    else if (len==4)  
        no = 1000;  
    else if (len==5)  
        no = 10000;  
    else if (len==6)  
        no = 100000;  
    else if (len==7)  
        no = 1000000;  
    else if (len==8)  
        no = 10000000;  
    i = 0;  
    while(i<len)  
    {  
        int con = n[i]-48;  
        var1 = var1+con*no;  
        no = no/10;  
        i++;  
    }  
    ltoa(var1,res,10);  
    dot = 1;
```

---

```
p = 0;  
}  
if (ch==13)  
{  
    //button Enter  
    x1 = 385, x2 = 415;  
    y1 = 285, y2 = 305;  
    calculator::change(x1,x2,y1,y2);  
    len = strlen(n);  
    if (len==1)  
        no = 1;  
    else if (len==2)  
        no = 10;  
    else if (len==3)  
        no = 100;  
    else if (len==4)  
        no = 1000;  
    else if (len==5)  
        no = 10000;  
    else if (len==6)  
        no = 100000;  
    else if (len==7)  
        no = 1000000;  
    else if (len==8)  
        no = 10000000;  
    i = 0;  
    while(i<len)  
    {  
        int con = n[i]-48;  
        var2 = var2+con*no;  
        no = no/10;  
        i++;  
    }  
    if (sel==1)  
        var1 = var1/var2;  
    else if (sel==2)  
        var1 = var1*var2;  
    else if (sel==3)  
        var1 = var1-var2;  
    else if (sel==4)  
        var1 = var1+var2;  
    ltoa(var1,res,10);  
    var1 = 0;  
    var2 = 0;
```

---

## Graphics

---

```
setfillstyle(SOLID_FILL,WHITE);
bar(340,155,412,165);
settextjustify(RIGHT_TEXT,RIGHT_TEXT);
setcolor(BLACK);
outtextxy(408,157,res);
dot = 1;
p = 0;
}
}
}
void calculator::change(int x,int xx,int y, int yy)
{
    x1 = x, x2 = xx;
    y1 = y, y2 = yy;
    setcolor(BLACK);
    line(x1,y1,x2,y1);
    line(x1,y1,x1,y2);
    setcolor(WHITE);
    line(x1,y2,x2,y2);
    line(x2,y1,x2,y2);
    delay(75);
    setcolor(WHITE);
    line(x1,y1,x2,y1);
    line(x1,y1,x1,y2);
    setcolor(BLACK);
    line(x1,y2,x2,y2);
    line(x2,y1,x2,y2);
}
```

**Output:**

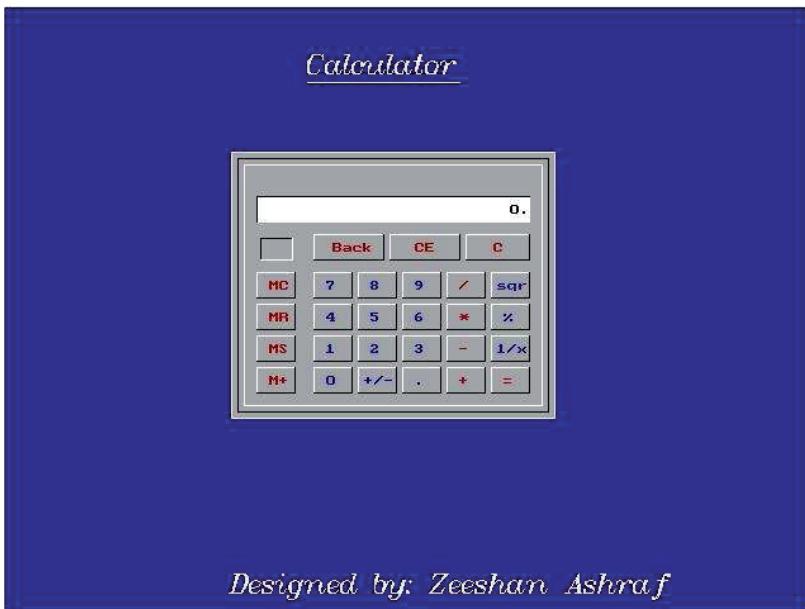


Fig. 12.7 Calculator

## Program # 7: Mouse Handling

//Program to display a mouse pointer on screen and click functions

```
#include <iostream.h>
#include <conio.h>
#include <graphics.h>
#include <process.h>
#include <dos.h>

union REGS ii,oo;
initmouse();
char choice = 'y';

class mouse
{
    private:
        int button,x,y;
    public:
        void showmouseptr();
        void hidemouseptr();
        void getmousepos(int*,int*,int*);
};

class test:public mouse
{
    private:
        int d,m;
        int x1,x2,y1,y2;
    public:
        void load();
        void m_menu();
        void change();
        void red();
        void blue();
};

void main()
{
    int button,x,y;
    test t;
    t.load();
    t.m_menu();
    if (initmouse() == 0)
    {
```

## Graphics

---

```
closegraph();
cout<<"Mouse driver not loaded";
getch();
exit(0);
}
while(1)
{
    t.showmouseptr();
    t.getmousepos(&button,&x,&y);
    if ((button & 1)==1)
    {
        if (x>=100 && x<=200 && y>=160 && y<=185)
        {
            t.hidemouseptr();
            choice = 'a';
            t.change();
            t.red();
        }
        else if (x>=100 && x<=200 && y>=195 && y<=220)
        {
            t.hidemouseptr();
            choice = 'b';
            t.change();
            t.blue();
        }
        else if (x>=100 && x<=200 && y>=405 && y<=430)
        {
            t.hidemouseptr();
            choice = 'e';
            t.change();
            closegraph();
            exit(0);
        }
    }
}
void test::load()
{
    d = DETECT;
    initgraph(&d,&m,"c:\\tc\\bgi");
}
void test::m_menu()
{
    settextstyle(0,0,0);
```

## Graphics

---

```
setfillstyle(SOLID_FILL,LIGHTGRAY);
bar(0,0,639,479);
setfillstyle(SOLID_FILL,3);
bar(7,7,630,472);

x1 = 100,x2 = 200;

y1 = 160,y2 = 185;
line(x1,y1,x2,y1);
line(x1,y1,x1,y2);
setcolor(BLACK);
outtextxy(x1+30,y1+10,"Red");
outtextxy(x1-40,y1+10,"1.");
line(x2,y1,x2,y2);
line(x1,y2,x2,y2);

y1 = 195,y2 = 220;
setcolor(WHITE);
line(x1,y1,x2,y1);
line(x1,y1,x1,y2);
setcolor(BLACK);
outtextxy(x1+30,y1+10,"Blue");
outtextxy(x1-40,y1+10,"2.");
line(x2,y1,x2,y2);
line(x1,y2,x2,y2);

y1 = 405,y2 = 430;
setcolor(WHITE);
line(x1,y1,x2,y1);
line(x1,y1,x1,y2);
setcolor(BLACK);
outtextxy(x1+30,y1+10,"Exit");
outtextxy(x1-40,y1+10,"3.");
line(x2,y1,x2,y2);
line(x1,y2,x2,y2);

}

void test::change()
{
    if (choice=='a')
    {
        x1 = 100,x2 = 200;
        y1 = 160,y2 = 185;
        setcolor(BLACK);
        line(x1,y1,x2,y1);
```

## Graphics

---

```
line(x1,y1,x1,y2);
setcolor(WHITE);
line(x2,y1,x2,y2);
line(x1,y2,x2,y2);
delay(75);
setcolor(WHITE);
line(x1,y1,x2,y1);
line(x1,y1,x1,y2);
setcolor(BLACK);
line(x2,y1,x2,y2);
line(x1,y2,x2,y2);

}
if (choice=='b')
{
    x1 = 100,x2 = 200;
    y1 = 195,y2 = 220;
    setcolor(BLACK);
    line(x1,y1,x2,y1);
    line(x1,y1,x1,y2);
    setcolor(WHITE);
    line(x2,y1,x2,y2);
    line(x1,y2,x2,y2);
    delay(75);
    setcolor(WHITE);
    line(x1,y1,x2,y1);
    line(x1,y1,x1,y2);
    setcolor(BLACK);
    line(x2,y1,x2,y2);
    line(x1,y2,x2,y2);
}

if (choice=='e')
{
    x1 = 100,x2 = 200;
    y1 = 405,y2 = 430;
    setcolor(BLACK);
    line(x1,y1,x2,y1);
    line(x1,y1,x1,y2);
    setcolor(WHITE);
    line(x2,y1,x2,y2);
    line(x1,y2,x2,y2);
    delay(75);
    setcolor(WHITE);
    line(x1,y1,x2,y1);
```

---

## Graphics

---

```
line(x1,y1,x1,y2);
setcolor(BLACK);
line(x2,y1,x2,y2);
line(x1,y2,x2,y2);
}
}

void test::red()
{
    x1 = 300,x2 = 400;
    y1 = 160,y2 = 185;
    setfillstyle(SOLID_FILL,RED);
    bar(x1,y1,x2,y2);
}

void test::blue()
{
    x1 = 300,x2 = 400;
    y1 = 160,y2 = 185;
    setfillstyle(SOLID_FILL,BLUE);
    bar(x1,y1,x2,y2);
}

initmouse()
{
    ii.x.ax = 0;
    int86(0x33,&ii,&oo);
    return (oo.x.ax);
}

void mouse::showmouseptr()
{
    ii.x.ax = 1;
    int86(0x33,&ii,&oo);
}

void mouse::hidemouseptr()
{
    ii.x.ax = 2;
    int86(0x33,&ii,&oo);
}

void restrictmouseptr(int x1, int y1, int x2, int y2)
{
    ii.x.ax = 7;
    ii.x.cx = x1;
    ii.x.dx = x2;
    int86(0x33,&ii,&oo);
    ii.x.ax = 8;
    ii.x.cx = y1;
```

## Graphics

---

```
ii.x.dx = y2;
int86(0x33,&ii,&oo);
}
void mouse::getmousepos(int *button, int *x, int *y)
{
    ii.x.ax = 3;
    int86(0x33,&ii,&oo);
    *button = oo.x.bx;
    *x = oo.x.cx;
    *y = oo.x.dx;
}
```

### Output:

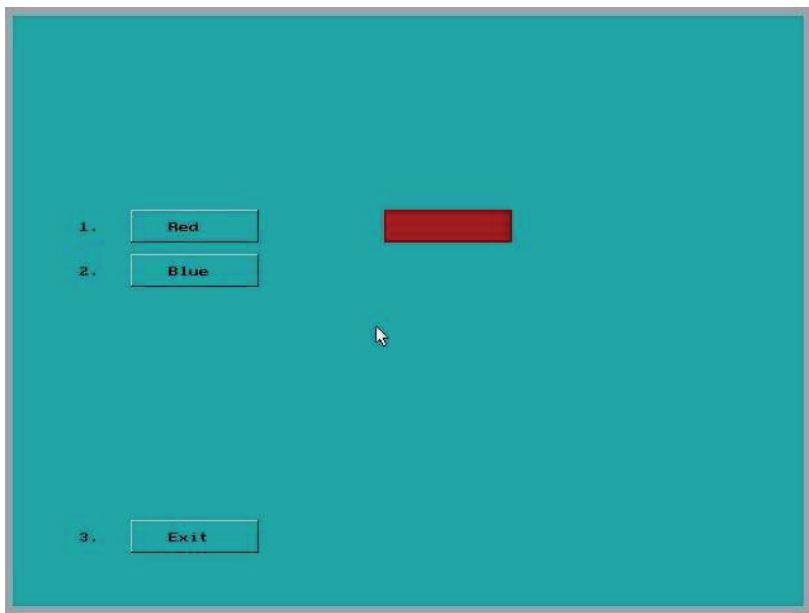


Fig. 12.8 Mouse Handling

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