PROJECT OVERVIEW

HEADER FILES USED

1. iostream.h
2. conio.h
3. math.h
4. process.h

FUNCTIONS: USER DEFINED

- VOID MAIN()
  Displays the Welcome Screen of MATHLAB.
- VOID WEL()
  Displays the Main Menu of MATHLAB.
- VOID TRIGO()
  Displays the Menu listing the important functions and identities used in Trigonometry.
- VOID ALGO()
  Displays the Menu listing the important operators and concepts used in Algebra.
- VOID COGEO()
  Displays the Menu listing the important concepts of Co-ordinate Geometry.
- VOID PERMS(INT,INT)
  Function to perform the calculations regarding Permutation.
- VOID COMBO(INT,INT)
  Function to perform the calculations regarding Combination.
- VOID DIVISION()
  Function to perform the calculations regarding Division.
- VOID REMAIN()
  Function to perform the calculations regarding Remainder.

- VOID SS()
  Function to perform calculations under further sub categories of Algebraic Progression and Geometric Progression.
- VOID AREA()
  Function to find out the area of different geometrical figures.
- VOID POINT()
  Function to perform calculations based on the concept of point.
- VOID LINE()
  Function to perform calculations based on the concept of line.
- VOID CIRCLE()
  Function to perform calculations based on the concept of circle.
- VOID PARABOLA()
  Function to perform calculations based on the concept of parabola.
- VOID ELLIPSE()
  Function to perform calculations based on the concept of ellipse.
- VOID HYPERBOLA()
  Function to perform calculations based on the concept of hyperbola.

FUNCTIONS: BUILT-IN

- CLRSCR() [CONIO.H] :
  Clears the current text window and places the cursor in the upper left-hand corner at position (1,1).
- GETCH() [CONIO.H] :
  Reads a single character directly from the keyboard.
- EXIT() [PROCESS.H] :
  Terminates the program.

- BREAK() [IOSTREAM.H] :

Causes the enclosing for, while, do-while loop or switch statement to terminate. Used when it is otherwise awkward to terminate the loop using the condition expression and conditional statements.

- COS () [MATH.H] :
  It returns the cosine of the argument. The value argument must be in radians.
- SIN () [MATH.H] :
  It returns the sine of the argument. The value argument must be in radians.
- TAN () [MATH.H] :
  It returns the tangent of the argument. The value argument must be in radians.
- POW () [MATH.H] :
  It returns base raised to exponent power i.e. base^exponent. A domain error occurs if base = 0, exp <= 0, base <0 or exponent is not integer.

STATEMENTS USED:

- SWITCH-CASE: Used to select from different options in all the menu based functions.
- IF-ELSE: It tests an expression and depending upon the defined condition executes one of the two sets-of-action.

PROJECT CODE

```
/*************************************************************************
                    HEADER FILES USED
*************************************************************************/

#include<iostream.h>
#include<conio.h>
#include<math.h>
#include<process.h>
double pi = 3.14159;   //GLOBAL VARIABLE

/*************************************************************************
                    FUNCTION DECLARATION
*************************************************************************/
void trigo();
void algo();
void cogeo();
void perms(int,int);
void combo(int,int);
void division();
void remain();
void ss();
void area();
void point();
void line();
void circle();
void parabola();
void ellipse();
void hyperbola();
```

```
/*************************************************************************
**********
            FUNCTION FOR MAIN MENU
*************************************************************************
*********/
void wel()
{
        clrscr();
        cout<<"\n\n\n";
        cout<<"\t\t WELCOME TO MATH LAB.....!! \n";
        cout<<"**********************************"
          <<"********************************************** \n";
        cout<<"\t\tMAIN MENU \n\n";
        cout<<"\t\t<1>TRIGONOMETRY \n\n";
        cout<<"\t\t<2>ALGEBRA \n\n";
        cout<<"\t\t<3>CO-ORDINATE GEOMETRY \n\n";
        cout<<"\t\t<4>EXIT \n\n";
        cout<<"\t\tENTER YOUR CHOICE : ";
        int x;
        cin>>x;
        switch(x)
        {
                case 1: trigo();
                        break;
                case 2: algo();
                        break;
                case 3: cogeo();
                        break;
                case 4: cout<<"\n\n \t\t THANK YOU FOR USING MATH LAB...!!";
                        getch();
                        exit(0);
        }
}
```

```
/*************************************************************************
**********
            FUNCTION FOR TRIGONOMETRY
*************************************************************************
*********/
void trigo()
{
        clrscr();
        cout<<"\n\n\n";
        cout<<"\t\t MAIN MENU FOR TRIGONOMETRY \n";
        cout<<"************************************"
          <<"********************************************** \n";
        cout<<"\t\tMENU \n\n";
        cout<<"\t\t<1>VALUE OF SINE \n";
        cout<<"\t\t<2>VALUE OF COSINE \n";
        cout<<"\t\t<3>VALUE OF TANGENT \n";
        cout<<"\t\t<4>VALUE OF COSECANT \n";
        cout<<"\t\t<5>VALUE OF SECANT \n";
        cout<<"\t\t<6>VALUE OF COTANGENT \n";
        cout<<"\t\t<7>SOME TRIGONOMETRIC IDENTITIES \n";
        cout<<"\t\t<8>RETURN TO MAIN MENU \n\n";
        cout<<"\t\tENTER YOUR CHOICE : ";
        int x;
        cin>>x;
        switch(x)
        {
                case 1 : clrscr();
                         double x,y;
                         cout<<"\n\n\n \t\t Enter the angle in degrees :";
                         cin>>x;
                         y = x * (pi/180);
                         cout<<"\n\n\n \t\t The value of sin("<<x<<") is :"<< sin(y);
                         break;
                case 2 : clrscr();
                         cout<<"\n\n\n \t\t Enter the angle in degrees :";
                         cin>>x;
                         y = x * (pi/180);
```

```
                cout<<"\n\n\n \t\t The value of cos("<<x<<") is :"<< cos(y);
                break;
        case 3 : clrscr();
                cout<<"\n\n\n \t\t Enter the angle in degrees :";
                cin>>x;
                y = x * (pi/180);
                cout<<"\n\n\n \t\t The value of tan("<<x<<") is :"<< tan(y);
                break;
        case 4 : clrscr();
                cout<<"\n\n\n \t\t Enter the angle in degrees :";
                cin>>x;
                y = x * (pi/180);
                cout<<"\n\n\n \t\t The value of cosec("<<x<<") is :"<<
1/(sin(y));
                break;
        case 5 : clrscr();
                cout<<"\n\n\n \t\t Enter the angle in degrees :";
                cin>>x;
                y = x * (pi/180);
                cout<<"\n\n\n \t\t The value of sec("<<x<<") is :"<< 1/(cos(y));
                break;
        case 6 : clrscr();
                cout<<"\n\n\n \t\t Enter the angle in degrees :";
                cin>>x;
                y = x * (pi/180);
                cout<<"\n\n\n \t\t The value of cot("<<x<<") is :"<< 1/(tan(y));
                break;
        case 7 : clrscr();
                cout<<"\n\n\n \t\t SOME GENEREAL IDENTITTIES OF
TRIGONOMETRY ARE : "<<endl;
                cout<<"\t\t<1> sinx.sinx + cosx.cosx = 1";
                cout<<"\n\t\t<2> 1 + cotx.cotx = cosecx.cosecx";
                cout<<"\n\t\t<3> 1 + tanx.tanx = cotx.cotx";
                cout<<"\n\t\t<4> sin(x + y) = sinx.cosy + siny.cosx";
                cout<<"\n\t\t<5> cos(x + y) = cosx.cosy + sinx.siny";
                cout<<"\n\t\t<6> tan(x + y) = (tanx + tan y)/(1 - tanx.tany)";
                cout<<"\n\t\t<7> sin(3x) = 3sinx - 4.sinx.sinx.sinx";
```

```
                cout<<"\n\t\t<8> cos(3x) = 4.cosx.cosx.cosx - 3.cosx";
                cout<<"\n\t\t<9> tan(3x) = (3.tanx - tanx.tanx.tanx)/(1 -
3.tanx.tanx)";
                cout<<"\n\t\t<10> sinx.sin(60 - x).sin(60 + x) = (sin3x)/4";
                cout<<"\n\t\t<11> cosnx.cos(60 - x).cos(60 + x) = (cos3x)/4";
                cout<<"\n\t\t<12> tanx.tan(60 - x).tan(60 + x) = tan3x";
                break;
        case 8 : wel();
                break;
    }
    cout<<"\n\n\n \t\tDo you want to continue(y/n)?";
    char cont;
    cin>>cont;
    if((cont=='y') || (cont=='Y'))
        trigo();
    else
        wel();
}

/**************************************************************************
**********
        FUNCTION FOR ALGEBRA
**************************************************************************
*********/
void algo()
{
    clrscr();
    cout<<"\n\n\n";
    cout<<"\t\t MAIN MENU FOR ALGEBRA \n";
    cout<<"************************************"
      <<"********************************************* \n";
    cout<<"\t\tMENU \n\n";
    cout<<"\t\t<1>ADDITION \n";
    cout<<"\t\t<2>SUBTRACTION \n";
    cout<<"\t\t<3>MULTIPLICATION \n";
    cout<<"\t\t<4>DIVISION \n";
    cout<<"\t\t<5>REMAINDER \n";
```

```
        cout<<"\t\t<6>PERMUTATIONS \n";
        cout<<"\t\t<7>COMBINATIONS \n";
        cout<<"\t\t<8>FACTORIAL \n";
        cout<<"\t\t<9>SEQUENCE AND SERIES \n";
        cout<<"\t\t<10>RETURN TO MAIN MENU \n\n";
        cout<<"\t\tENTER YOUR CHOICE : ";
        int x;
        cin>>x;
        switch(x)
        {
                case 1 : clrscr();
                        double x,y,z;
                        cout<<"\n\n\n \t\t ADDITION";
                        cout<<"\n\n\n \t\t Form : A + B";
                        cout<<"\n\n\n \t\t Enter the first number :";
                        cin>>x;
                        cout<<"\n\n\n \t\t Enter the second number :";
                        cin>>y;
                        z = x+y;
                        cout<<"\n\n\n \t\t The sum of "<<x<<" and "<<y<<" is : "<<z;
                        break;
                case 2 : clrscr();
                        cout<<"\n\n\n \t\t SUBTRACTION";
                        cout<<"\n\n\n \t\t Form : A - B";
                        cout<<"\n\n\n \t\t Enter the first number :";
                        cin>>x;
                        cout<<"\n\n\n \t\t Enter the second number :";
                        cin>>y;
                        z = x-y;
                        cout<<"\n\n\n \t\t The difference between "<<x<<" and
"<<y<<" is : "<<z;
                        break;
                case 3 : clrscr();
                        cout<<"\n\n\n \t\t MULTIPLICATION";
                        cout<<"\n\n\n \t\t Form : A x B";
                        cout<<"\n\n\n \t\t Enter the first number :";
                        cin>>x;
```

```
                cout<<"\n\n\n \t\t Enter the second number :";
                cin>>y;
                z = x*y;
                cout<<"\n\n\n \t\t The product of "<<x<<" and "<<y<<" is :
"<<z;
                break;
        case 4 : division();
                break;
        case 5 : remain();
                break;
        case 6 : clrscr();
                cout<<"\n\n\n \t\t PERMUTATION ";
                cout<<"\n\tEnter Total Number of objects : ";
                cin>>x;
                cout<<"\n\tObject are to be arranged in how many places? : ";
                cin>>y;
                perms(x,y);
                getch();
                break;
        case 7 : clrscr();
                cout<<"\n\n\n \t\t COMBINATION";
                cout<<"\n\tEnter Total Number of objects : ";
                cin>>x;
                cout<<"\n\tHow many objects are to be selected? : ";
                cin>>y;
                combo(x,y);
                getch();
                break;
        case 8 : clrscr();
                cout<<"\n\n\n \t\t FACTORIAL";
                cout<<"\n\n\n \t\t Form : n!";
                cout<<"\n\n\n \t\t Enter the value of n :";
                cin>>x;
                y=1;
                for(int i=x; i>0; --i)
                        y=y*i;
                cout<<"\n\n\n \t\t The value of "<<x<<"! is : "<<y;
```

```
                break;
        case 9 : ss();
                break;
        case 10 : wel();
                break;
    }
    cout<<"\n\n\n \t\t Do you want to continue(y/n)?";
    char cont;
    cin>>cont;
    if((cont=='y') || (cont=='Y'))
        algo();
    else
        wel();
}

/*************************************************************************
**********
        FUNCTION FOR CO-ORDINATE GEOMETRY
*************************************************************************
*********/
void cogeo()
{
    clrscr();
    cout<<"\n\n\n";
    cout<<"\t\t MAIN MENU FOR CO-ORDONATE GEOMETRY \n";
    cout<<"**********************************"
      <<"********************************************** \n";
    cout<<"\t\tMENU \n\n";
    cout<<"\t\t<1>AREA \n";
    cout<<"\t\t<2>POINT \n";
    cout<<"\t\t<3>STRAIGHT LINES \n";
    cout<<"\t\t<4>CIRCLE \n";
    cout<<"\t\t<5>PARABOLA \n";
    cout<<"\t\t<6>ELLIPSE \n";
    cout<<"\t\t<7>HYPERBOLA \n";
    cout<<"\t\t<8>RETURN TO MAIN MENU \n\n";
    cout<<"\t\tENTER YOUR CHOICE : ";
```

```
        int x;
        cin>>x;
        switch(x)
        {
                case 1: area();
                        break;
                case 2: point();
                        break;
                case 3: line();
                        break;
                case 4: circle();
                        break;
                case 5: parabola();
                        break;
                case 6: ellipse();
                        break;
                case 7: hyperbola();
                        break;
                case 8: wel();
                        break;
                }
        cout<<"\n\n\n \t\t Do you want to continue(y/n)?";
        char cont;
        cin>>cont;
        if((cont=='y') || (cont=='Y'))
                cogeo();
        else
                wel();
}
```

```
/*************************************************************************
**********
            FUNCTION FOR WELCOME SCREEN
*************************************************************************
*********/
void main()

{
        clrscr();
        cout<<"\n\n\n\n";
        cout<<"  \t  \t  \t    MAHARAJA AGRASEN VIDYALYA";
        cout<<"\n\n\n";
        cout<<"\t \t \t \tWELCOME TO MATH LAB";
        cout<<"\n\n\n\n";
        cout<<"Math Lab will change your experience with mathematics in a "
        <<"unique way with the help of Turbo C++. With Math Lab you can "
        <<"get answers to various problems of algebra, co-ordinate geometry "
        <<"and trigonometry. Enjoy....!!";
        cout<<"\n\n Solve this simple problem to Enter MATH LAB : ";
        cout<<"\n 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = ";
        int x;
        cin>>x;
        if(x==55)
                wel();
        else
        {
                cout<<"\n\n \t  Sorry! Wrong answer! Try again!";
                getch();
                main();
        }
        getch();
}
```

```
/*************************************************************************
**********
            FUNCTIONS USED IN THE PROGRAM
*************************************************************************
*********/

void perms(int c,int d)     //For Permutation
{
        double x=1,y=1,z;
        if(c<d)
        {
                cout<<"\n\tPlaces can not be greater than total objects.";
                getch();
                exit(0);
        }
        for(int t=c;t>0;--t)
                x=x*t;
        for(int r=c-d;r>0;--r)
                y=y*r;
        if(c==d)
        {
                z=x;
                cout<<"\n\tThe objects can be arranged in "<<z<<" ways..!!!";
        }
        else
        {
                z=x/y;
                cout<<"\n"<<"\t"<<c<<" objects can be arranged in "<<d<<" places
in these many ways: "<<z;
        }
}


void combo(int c,int d)       // For Combination
{
        double x=1,y=1,z=1,f;
```

```
	if(c<d)
	{
		cout<<"\n\tSelection can not be greater than total objects.";
		getch();
		exit(0);
	}
	for(int t=c;t>0;--t)
		x=x*t;
	for(int r=c-d;r>0;--r)
		y=y*r;
	for(int s=d;s>0;--s)
		z=z*s;
	if(c==d)
	{
		cout<<"\n\tThe object can be selected in 1 way..!!!";
	}
	else
	{
		f=x/(y*z);
		cout<<"\n"<<"\t"<<d<<" objects can be selected from "<<c<<"
objects in these many ways: "<<f;
	}
}

void division()		// For Division
{
	clrscr();
	double x,y,z;
	cout<<"\n\n\n \t\t DIVISION";
	cout<<"\n\n\n \t\t Form : A / B";
	cout<<"\n\n\n \t\t Enter the first number :";
	cin>>x;
	cout<<"\n\n\n \t\t Enter the second number :";
	cin>>y;
	if(y==0)
	{
		cout<<"\n\n\n \t\t Divisor (ie. B) can not be zero...!!";
```

```
            cout<<"\n\n\n \t\t Try Again...!!";
            getch();
            division();
        }
        else
        {
            z = x/y;
            cout<<"\n\n\n \t\t The quoteint of "<<x<<" and "<<y<<" is : "<<z;
        }
}

void remain()           // For Remainder
{
        clrscr();
        int x,y,z;
        cout<<"\n\n\n \t\t REMAINDER";
        cout<<"\n\n\n \t\t Form : A / B";
        cout<<"\n\n\n \t\t Enter the first number :";
        cin>>x;
        cout<<"\n\n\n \t\t Enter the second number :";
        cin>>y;
        if(y==0)
        {
            cout<<"\n\n\n \t\t Divisor (ie. B) can not be zero...!!";
            cout<<"\n\n\n \t\t Try Again...!!";
            getch();
            remain();
        }
        else
        {
            z = x%y;
            cout<<"\n\n\n \t\t The remainder of "<<x<<" and "<<y<<" is : "<<z;
        }
}

void ss()           // For Sequence and Series
{
```

```
clrscr();
int n;
cout<<"\n\n\n \t\t SEQUENCE AND SERIES";
cout<<endl<<endl;
cout<<"\n\n\n \t\t SELECT YOUR CHOICE FROM BELOW MENU";
cout<<"\n \t\t <1> ARITHMETIC PROGRESSION";
cout<<"\n \t\t <2> GEOMETRIC PROGRESSION";
cout<<"\n\n \t\t ENTER YOUR CHOICE :";
cin>>n;
switch(n)
{
        case 1 : clrscr();
                 double w,x,y,z;
                 cout<<"\n\n\n \t\t ARITHMETIC PROGRESSION";
                 cout<<"\n\n\n \t\t FINDING THE SUM OF AN A.P.";
                 cout<<"\n\n \t\t Form : Sum = (n/2)(2a + (n-1)d)";
                 cout<<"\n\n \t\t Enter the First Term (a) :";
                 cin>>w;
                 cout<<"\n \t\t Enter the Common Difference (d) :";
                 cin>>x;
                 cout<<"\n \t\t Enter the Number of Terms (n) :";
                 cin>>y;
                 z=(y/2)*((2*w) + (y-1)*x);
                 cout<<"\n\n \t\t The Sum of The A.P. is :"<<z;
                 getch();
                 break;

        case 2 : clrscr();
                 cout<<"\n\n\n \t\t GEOMATRIC PROGRESSION";
                 cout<<"\n\n\n \t\t FINDING THE SUM OF AN G.P.";
                 cout<<"\n\n \t\t Form : Sum = [(a)(r^n - 1)]/(r-1)";
                 cout<<"\n\n \t\t Enter the First Term (a) : ";
                 cin>>w;
                 cout<<"\n \t\t Enter the Common Ratio (r) : ";
                 cin>>x;
                 cout<<"\n \t\t Enter the Number of Terms (n) : ";
                 cin>>y;
```

```
                    if(x==1)
                        z=y*w;
                    else
                        z=(w*(pow(x,y) - 1))/(x-1);
                    cout<<"\n\n \t\t The Sum of The G.P. is : "<<z;
                    getch();
                    break;
        }
        cout<<"\n\n \t\t Do you want to continue with Seqyence and Series? (Y/N)
:";
        char s;
        cin>>s;
        if(s=='Y'||s=='y')
            ss();
        else
            algo();
        getch();
}

void area() // For area
{
        clrscr();
        int n;
        double w,x,y,z;
        cout<<" \n\n\n \t\t AREA OF DIFFERENT GEOMETRICAL FIGURES"
           <<" \n\n\n \t\t <1> SQUARE "
           <<" \n \t\t <2> RECTANGLE "
           <<" \n \t\t <3> CIRCLE "
           <<" \n \t\t <4> TRIANGLE "
           <<" \n \t\t <5> ELLIPSE "
           <<" \n \t\t <6> TRAPEZIUM "
           <<" \n \t\t <7> RETURN TO PREVIOUS MENU "
           <<" \n\n \t\t ENTER YOUR CHOICE : ";
        cin>>n;
        switch(n)
        {
            case 1 : clrscr();
```

```
                cout<<"\n\n\n \t\t\t AREA OF A SQUARE"
                   <<"\n\n \t\t Formula : (Side)^2 "
                   <<" \n\n \t\t Enter length of side of square : ";
                cin>>x;
                z = x * x ;
                cout<<"\n\n \t\t Area of the square of side "<<x<<" is : "<<z;
                break;
        case 2 : clrscr();
                cout<<"\n\n\n \t\t\t AREA OF A RECTANGLE"
                   <<"\n\n \t\t Formula : BASE * HEIGHT "
                   <<"\n\n \t\t Enter length of base of rectangle : ";
                cin>>x;
                cout<<"\n\n \t\t Enter height of the rectangle : ";
                cin>>y;
                z = x * y ;
                cout<<"\n\n \t\t Area of the rectangle is : "<<z;
                break;
        case 3 : clrscr();
                cout<<"\n\n\n \t\t\t AREA OF A CIRCLE"
                   <<"\n\n \t\t Formula : (22/7)r^2 "
                   <<"\n\n \t\t Enter the radius of the circle : ";
                cin>>x;
                z = pi * x * x ;
                cout<<"\n\n \t\t Area of the circle of radius "<<x<<" is : "<<z;
                break;
        case 4 : clrscr();
                cout<<"\n\n\n \t\t\t AREA OF A TRIANGLE"
                   <<"\n\n \t\t Formula : (1/2)(base)(height) "
                   <<"\n\n \t\t Enter length of base of triangle : ";
                cin>>x;
                cout<<"\n\n \t\t Enter height of the triangle : ";
                cin>>y;
                z=0.5*x*y ;
                cout<<"\n\n \t\t Area of the triangle of base "<<x<<" and
height "<<y<<" is :"<<z;
                break;
        case 5 : clrscr();
```

```
                cout<<"\n\n\n \t\t\t AREA OF A ELLIPSE"
                  <<"\n\n \t\t Formula : (22/7)A^B "
                  <<"\n\n \t\t Enter the length of semi major axis : ";
                cin>>x;
                cout<<"\n\n \t\t Enter the length of semi minor axis : ";
                cin>>y;
                z = pi * x * y ;
                cout<<"\n\n \t\t Area of the ellipse is : "<<z;
                break;
        case 6 : clrscr();
                cout<<"\n\n\n \t\t\t AREA OF A TRAPEZIUM"
                  <<"\n\n \t\t Formula : (1/2)(sum of length of parallel
sides)(height)"
                  <<"\n\n \t\t Enter lengths of parallel sides : ";
                cin>>x>>y;
                cout<<"\n\n \t\t Enter height of the trapezium : ";
                cin>>w;
                z = 0.5*(x + y)*w ;
                cout<<"\n\n \t\t Area of the trapezium is : "<<z;
                break;
        case 7 : cogeo();
                break;
    }
    cout<<"\n\n\n \t\t Do you want to continue(y/n)?";
    char cont;
    cin>>cont;
    if((cont=='y') || (cont=='Y'))
        area();
    else
        cogeo();

}

void point()            // For point
{
    clrscr();
    int n;
```

```
        double w,x,y,z;
        cout<<" \n\n\n \t\t\t POINT"
           <<" \n\n\n \t\t <1> DISTANCE BETWEEN TWO POINTS "
           <<" \n \t\t <2> SHIFTING OF ORIGIN "
           <<" \n \t\t <3> CENROID "
           <<" \n \t\t <4> AREA OF TRIANGLE "
           <<" \n \t\t <5> RETURN TO PREVIOUS MENU "
           <<" \n\n \t\t ENTER YOUR CHOICE : ";
        cin>>n;
        switch(n)
        {
                case 1 : clrscr();
                        float x1,x2,y1,y2;
                        double z,x;
                        cout<<"\n\n\n \t\t\t DISTANCE BETWEEN TWO POINTS"
                           <<"\n\n \t\t Formula : ((x1 - x2)^2 + (y1 - y2)^2)^(1/2)"
                           <<" \n\n \t\t Enter co-ordinates of first point (x1 y1) : ";
                        cin>>x1 >>y1;
                        cout<<" \n\n \t\t Enter co-ordinates of second point (x2 y2) : ";
                        cin>>x2 >>y2;
                        z = pow(pow(x1-x2,2) + pow(y1-y2,2),0.5);
                        cout<<"\n\n \t\t DISTANCE BETWEEN ("<<x1<<","<<y1<<") and
("<<x2<<","<<y2<<") is : "<<z;
                        break;
                case 2 : clrscr();
                        cout<<"\n\n\n \t\t\t SHIFTING OF ORIGIN"
                           <<"\n\n \t\t Form : X = x - h"
                           <<"\n\n \t\t Form : Y = y - k"
                           <<"\n\n \t\t Enter co-ordinates of the point (x y): ";
                        cin>>x1 >>y1;
                        cout<<"\n\n \t\t Enter co-ordinates of shifted origin (h k): ";
                        cin>>x2 >>y2;
                        cout<<"\n\n \t\t Co-ordinates of the point along the shifted
origin are :"<<"("<<x1-x2<<","<<y1-y2<<")";
                        break;
                case 3 : clrscr();
                        float x3, y3;
```

```
                cout<<"\n\n\n \t\t\t CENTROID"
                   <<"\n\n \t\t Form : X = (x1+x2+x3)/3"
                   <<"\n\n \t\t Form : Y = (y1+y2+y3)/3"
                   <<"\n\n \t\t Enter co-ordinates of first point (x1 y1) : ";
                cin>>x1 >>y1;
                cout<<" \n\n \t\t Enter co-ordinates of second point (x2 y2) : ";
                cin>>x2 >>y2;
                cout<<" \n\n \t\t Enter co-ordinates of third point (x3 y3) : ";
                cin>>x3 >>y3;
                cout<<" \n\n \t\t The co-ordinates of centroid are
:"<<"("<<(x1+x2+x3)/3<<","<<(y1+y2+y3)/3<<")";
                break;
        case 4 : clrscr();
                cout<<"\n\n\n \t\t\t AREA OF TRIANGLE"
                   <<"\n\n \t\t Form : AREA = (1/2)*( x1*(y2-y3) + x2*(y3-y1) +
x3*(y1-y2) )"
                   <<"\n\n \t\t Enter co-ordinates of first point (x1 y1) : ";
                cin>>x1 >>y1;
                cout<<" \n\n \t\t Enter co-ordinates of second point (x2 y2) : ";
                cin>>x2 >>y2;
                cout<<" \n\n \t\t Enter co-ordinates of third point (x3 y3) : ";
                cin>>x3 >>y3;
                z=((x1*(y2-y3)) + (x2*(y3-y1)) + (x3*(y1-y2)))/2;
                cout<<" \n\n \t\t Area of the triangle is : "<<z;
                break;
        case 5 : cogeo();
                break;
    }
    cout<<"\n\n\n \t\t Do you want to continue(y/n)?";
    char cont;
    cin>>cont;
    if((cont=='y') || (cont=='Y'))
        point();
    else
        cogeo();

}
```

```
void line()                 // For line
{
        clrscr();
        int n,x1,x2,y1,y2;
        double z;
        cout<<"\n\n\n \t\t STRAIGHT LINE ";
        cout<<"\n\n\n \t\t <1> DISTANCE BETWEEN TWO POINTS"
                <<"\n\t\t <2> SLOPE"
                <<"\n\t\t <3> RETURN TO PREVIOUS MENU"
                <<"\n\n \t\t ENTER YOUR CHOICE : ";
        cin>>n;
        switch(n)
        {
                case 1 :clrscr();
                        cout<<"\n\n\n \t\tDISTANCE BETWEEN TWO POINTS"
                        <<"\n\n \t\tFormula : [(x1-x2)^2 + (y1-y2)^2]^(1/2)";
                        cout<<"\n\n \t\t Enter co-ordinates of first point(x1 y1) : ";
                        cin>>x1>>y1;
                        cout<<"\n\n \t\t Enter co-ordinates of second point(x2 y2) : ";
                        cin>>x2>>y2;
                        z=pow((pow(x1-x2,2) + pow(y1-y2,2)),(0.5));
                        cout<<"\n\n \t\t Distance between the two points is : "<<z;
                        break;
                case 2 :clrscr();
                        cout<<"\n\n\n \t\t SLOPE OF A LINE"
                        <<"\n\n\n \t\t Formula : (y1-y2)/(x1-x2)";
                        cout<<"\n\n \t\t Enter co-ordinates of first point(x1, y1) : ";
                        cin>>x1>>y1;
                        cout<<"\n\n \t\t Enter co-ordinates of second point(x2, y2) : ";
                        cin>>x2>>y2;
                        if(x1==x2)
                        {
                                cout<<"Error";
                                line( );
                        }
                        else
```

```
                {
                        z=(y1-y2)/(x1-x2);
                        cout<<"\n\n \t\t Slope of the line is : "<<z;
                }
                break;
        case 3 :cogeo();
                break;
        }
        cout<<"\n\n\n \t\t Do you want to continue(y/n)?";
        char cont;
        cin>>cont;
        if((cont=='y') || (cont=='Y'))
                line();
        else
                cogeo();

}

void circle()               //For circle
{
        clrscr();
        int n,x1,y1,f,g,c;
        double r;
        cout<<"\n\n\n \t\t CIRCLE"
        <<"\n\n\n \t\t <1> EQUATION OF CIRCLE"
        <<"\n \t\t <2> RADIUS AND CENTER"
        <<"\n \t\t <3> TANGENT AND NORMAL"
        <<"\n \t\t <4> DIRECTOR CIRCLE"
        <<"\n \t\t <5> RETURN TO PREVIOUS MENU"
        <<"\n\n \t\t ENTER YOUR CHOICE : ";
        cin>>n;
        switch(n)
        {
                case 1 :clrscr();
                        cout<<"\n\n\n \t\t EQUATION OF CIRCLE";
                        cout<<"\n \t\t Form : x^2 + y^2 = r^2";
                        cout<<"\n\n\n \t\t Enter radius of circle : ";
```

```
                cin>>r;
                cout<<"\n\n\n \t\t Equation of circle is : x^2 + y^2 = "<<(r*r);
                break;
        case 2 :clrscr();
                cout<<"\n\n\n \t\t CENTER AND RADIUS";
                cout<<"\n \t\t Form : x^2 + y^2 +2gx +2fy +c = 0";
                cout<<"\n\n\n \t\t Enter g, f & c (in order) : ";
                cin>>g>>f>>c;
                cout<<"\n\n\n \t\t Center of circle is : ("<<-g<<" , "<<-f<<")";
                r=pow((pow(g,2) + pow(f,2) - c),0.5);
                cout<<"\n\n \t\t Radius of circle is : "<<r;
                break;
        case 3 :clrscr();
                cout<<"\n\n\n \t\t TANGENT AND NORMAL";
                cout<<"\n \t\t Form : x^2 + y^2 = r^2";
                cout<<"\n\n\n \t\t Enter radius of the circle : ";
                cin>>r;
                cout<<"\n\n \t\t Enter a point (on circle) : ";
                cin>>x1>>y1;
                cout<<"\n\n\n \t\t Tangent to circle is : x."<<x1<<" +
y."<<y1<<" = "<<r*r;
                cout<<"\n\n \t\t Normal to circle is : x."<<y1<<" - y."<<x1<<" =
0";
                break;
        case 4 :clrscr();
                cout<<"\n\n\n \t\t DIRECTOR CIRCLE";
                cout<<"\n \t\t Form : x^2 + y^2 = r^2";
                cout<<"\n\n\n \t\t Enter radius of the circle : ";
                cin>>r;
                cout<<"\n\n\n \t\t Equation of original circle is : x^2 + y^2 =
"<<(r*r);
                cout<<"\n\n\n \t\t Equation of director circle is : x^2 + y^2 =
"<<(2*(pow(r,2)));
                break;
        case 5 :cogeo();
                break;
        }
```

```
        cout<<"\n\n\n \t\t Do you want to continue(y/n)?";
        char cont;
        cin>>cont;
        if((cont=='y') || (cont=='Y'))
                circle();
        else
                cogeo();

}

void parabola()          //For Parabola
{
        clrscr();
        double x1,y1;
        double a,k;
        int n;
        cout<<"\n\n\n \t\t PARABOLA"
        <<"\n\n\n \t\t <1> EQUATION OF PARABOLA"
        <<"\n \t\t <2> FOCUS AND LENGTH OF LATUS RECTUM"
        <<"\n \t\t <3> TANGENT AND NORMAL"
        <<"\n \t\t <4> EQUATION OF DIRECTRIX"
        <<"\n \t\t <5> RETURN TO PREVIOUS MENU"
        <<"\n\n \t\t ENTER YOUR CHOICE : ";
        cin>>n;
        switch(n)
        {
                case 1 :clrscr();
                        cout<<"\n\n\n \t\t EQUATION OF PARABOLA";
                        cout<<"\n \t\t Form : y^2 = 4 * a * x";
                        cout<<"\n\n\n \t\t Enter the value of a : ";
                        cin>>a;
                        cout<<"\n\n\n \t\t Equation of the parabola is : y^2 =
"<<4*a<<".x";
                        break;
                case 2 :clrscr();
                        cout<<"\n\n\n \t\t FOCUS AND LENGTH OF LATUS RECTUM";
                        cout<<"\n \t\t Form : y^2 = 4 * a * x";
```

```
                cout<<"\n\n\n \t\t Enter the value of a : ";
                cin>>a;
                cout<<"\n\n\n \t\t The co-ordinates of the Focus are :
("<<a<<",0)";
                cout<<"\n\n\n \t\t The Length of the Latus Rectum is : "<<4*a;
                break;
        case 3 :clrscr();
                cout<<"\n\n\n \t\t TANGENT AND NORMAL";
                cout<<"\n \t\t Form : y^2 = 4 * a * x";
                cout<<"\n\n\n \t\t Enter the value of a : ";
                cin>>a;
                cout<<"\n\n \t\t Enter a point (on parabola) : ";
                cin>>x1>>y1;
                cout<<"\n\n\n \t\t Tangent to parabola is : y."<<y1<<" =
"<<2*a<<".(x + "<<x1<<")";
                k = (0 - (y1/(2*a)));
                cout<<"\n\n \t\t Normal to the parabola is : y - "<<y1<<" =
"<<k<<"(x - "<<x1<<")";
                break;
        case 4 :clrscr();
                cout<<"\n\n\n \t\t EQUATION OF DIRECTRIX";
                cout<<"\n \t\t Form : y^2 = 4 * a * x";
                cout<<"\n\n\n \t\t Enter the value of a : ";
                cin>>a;
                cout<<"\n\n\n \t\t Equation of directrix is : x + ("<<a<<")";
                break;
        case 5 :cogeo();
                break;
    }
    cout<<"\n\n\n \t\t Do you want to continue(y/n)?";
    char cont;
    cin>>cont;
    if((cont=='y') || (cont=='Y'))
        parabola();
    else
        cogeo();
}
```

```
void ellipse()              //For ellipse
{
        clrscr();
        double x1,y1;
        double a,b,e;
        int n;
        cout<<"\n\n\n \t\t ELLIPSE"
        <<"\n\n\n \t\t <1> EQUATION OF ELLIPSE"
        <<"\n \t\t <2> ECCENTRICITY OF ELLIPSE"
        <<"\n \t\t <3> FOCI, LENGTH OF AXES AND LENGTH OF LATUS RECTUM"
        <<"\n \t\t <4> TANGENT AND NORMAL"
        <<"\n \t\t <5> EQUATION OF DIRECTOR CIRCLE"
        <<"\n \t\t <6> RETURN TO PREVIOUS MENU"
        <<"\n\n \t\t ENTER YOUR CHOICE : ";
        cin>>n;
        switch(n)
        {
                case 1 :clrscr();
                        cout<<"\n\n\n \t\t EQUATION OF ELLIPSE";
                        cout<<"\n \t\t Form : (x/a)^2 + (y/b)^2 = 1";
                        cout<<"\n\n\n \t\t Enter the value of a : ";
                        cin>>a;
                        cout<<"\n\n\n \t\t Enter the value of b (b not equal to a) : ";
                        cin>>b;
                        cout<<"\n\n\n \t\t Equation of the ellipse is : (x^2/"<<a*a<<")
+ (y^2/"<<b*b<<") = 1";
                        break;
                case 2 :clrscr();
                        cout<<"\n\n\n \t\t ECCENTRICITY OF ELLIPSE";
                        cout<<"\n \t\t Form : (x/a)^2 + (y/b)^2 = 1";
                        cout<<"\n \t\t Eccentricity (e) = (1 - (b*b/a*a))^0.5 ( if a>b)";
                        cout<<"\n \t\t Eccentricity (e) = (1 - (a*a/b*b))^0.5 ( if a<b)";
                        cout<<"\n\n\n \t\t Enter the value of a : ";
                        cin>>a;
                        cout<<"\n\n\n \t\t Enter the value of b (b not equal to a) : ";
                        cin>>b;
```

```
                    if(a>b)
                        e = pow(1 - ((b*b)/(a*a)),0.5);
                    if(b>a)
                        e = pow(1 - ((a*a)/(b*b)),0.5);
                    cout<<"\n\n\n \t\t Eccentricity of the ellipse is : "<<e;
                    break;
               case 3 :clrscr();
                    cout<<"\n\n\n \t\t FOCI, LENGTH OF AXES AND LENGTH OF
LATUS RECTUM";
                    cout<<"\n \t\t Form : (x/a)^2 + (y/b)^2 = 1";
                    cout<<"\n \t\t Foci : (a*e,0) and (-a*e,0) (if a>b)";
                    cout<<"\n \t\t Foci : (0,b*e) and (0,-b*e) (if a<b)";
                    cout<<"\n \t\t Length of Major Axis and Minor Axis : 2*a and
2*b ( if a>b)";
                    cout<<"\n \t\t Length of Major Axis and Minor Axis : 2*b and
2*a ( if a<b)";
                    cout<<"\n \t\t Length of Latus Rectum : (2*b*b)/a ( if a>b)";
                    cout<<"\n \t\t Length of Latus Rectum : (2*a*a)/b ( if a<b)";
                    cout<<"\n\n\n \t\t Enter the value of a : ";
                    cin>>a;
                    cout<<"\n\n \t\t Enter the value of b (b not equal to a) : ";
                    cin>>b;
                    if(a>b)
                    {
                        e = pow(1 - ((b*b)/(a*a)),0.5);
                        cout<<"\n\n \t\t The Foci of the ellipse are :
("<<a*e<<",0) and ("<< 0 - a*e<<",0)";
                        cout<<"\n \t\t The length of Major Axis is : "<<2*a;
                        cout<<"\n \t\t The length of Minor Axis is : "<<2*b;
                        cout<<"\n \t\t The length of Latus Rectum is : "<<
(2*b*b)/a;
                    }
                    if(b>a)
                    {
                        e = pow(1 - ((a*a)/(b*b)),0.5);
                        cout<<"\n\n \t\t The Foci of the ellipse are :
(0,"<<b*e<<") and (0,"<< 0 - b*e<<")";
```

```
                        cout<<"\n \t\t The length of Major Axis is : "<<2*b;
                        cout<<"\n \t\t The length of Minor Axis is : "<<2*a;
                        cout<<"\n \t\t The length of Latus Rectum is : "<<
(2*a*a)/b;
                }
                break;
        case 4 :clrscr();
                cout<<"\n\n\n \t\t TANGENT AND NORMAL";
                cout<<"\n \t\t Form : (x/a)^2 + (y/b)^2 = 1";
                cout<<"\n\n\n \t\t Enter the value of a : ";
                cin>>a;
                cout<<"\n\n \t\t Enter the value of b (b not equal to a) : ";
                cin>>b;
                cout<<"\n\n \t\t Enter a point (on ellipse) : ";
                cin>>x1>>y1;
                cout<<"\n\n\n \t\t Tangent to ellipse is :
(x."<<x1<<")/"<<a*a<<" + (y."<<y1<<")/"<<b*b<<" = 1";
                cout<<"\n\n \t\t Normal to the ellipse is :
"<<a*a<<".x/"<<x1<<" - "<<b*b<<".y/"<<y1<<" = "<<(a*a) - (b*b);
                break;
        case 5 :clrscr();
                cout<<"\n\n\n \t\t EQUATION OF DIRECTOR CIRCLE";
                cout<<"\n \t\t Form : (x/a)^2 + (y/b)^2 = 1";
                cout<<"\n\n\n \t\t Enter the value of a : ";
                cin>>a;
                cout<<"\n\n \t\t Enter the value of b (b not equal to a) : ";
                cin>>b;
                cout<<"\n\n\n \t\t Equation of Director Circle is : x^2 + y^2 =
"<<(a*a) + (b*b);
                break;
        case 6 :cogeo();
                break;
    }
    cout<<"\n\n\n \t\t Do you want to continue(y/n)?";
    char cont;
    cin>>cont;
    if((cont=='y') || (cont=='Y'))
```

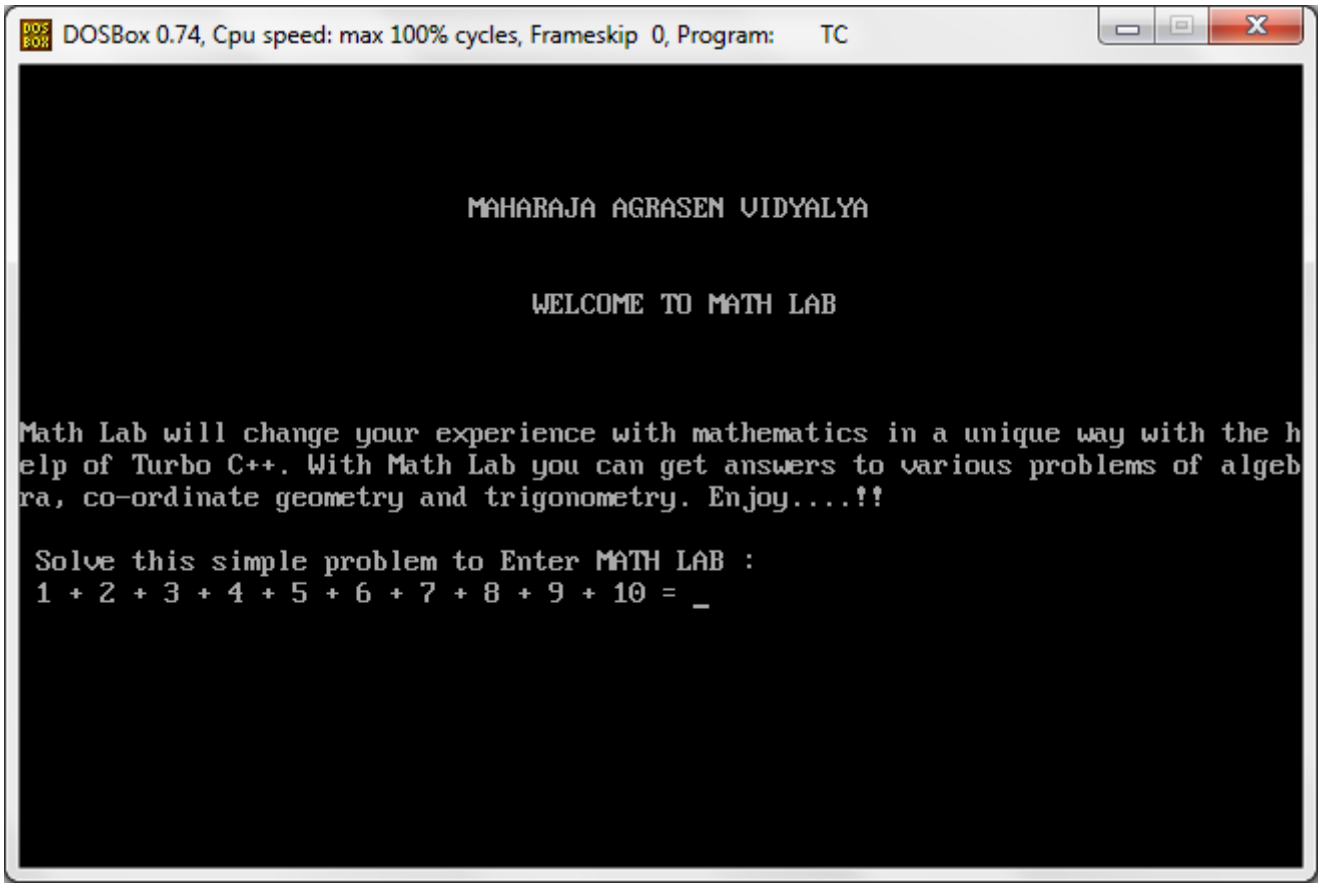
```
            ellipse();
        else
            cogeo();
}

void hyperbola()        //For hyperbola
{
        clrscr();
        double x1,y1;
        double a,b,e;
        int n;
        cout<<"\n\n\n \t\t HYPERBOLA"
        <<"\n\n\n \t\t <1> EQUATION OF HYPERBOLA"
        <<"\n \t\t <2> ECCENTRICITY OF HYPERBOLA"
        <<"\n \t\t <3> FOCI, LENGTH OF AXES AND LENGTH OF LATUS RECTUM"
        <<"\n \t\t <4> TANGENT AND NORMAL"
        <<"\n \t\t <5> EQUATION OF DIRECTOR CIRCLE"
        <<"\n \t\t <6> RETURN TO PREVIOUS MENU"
        <<"\n\n \t\t ENTER YOUR CHOICE : ";
        cin>>n;
        switch(n)
        {
            case 1 :clrscr();
                    cout<<"\n\n\n \t\t EQUATION OF HYPERBOLA";
                    cout<<"\n \t\t Form : (x/a)^2 - (y/b)^2 = 1 (if a>b)";
                    cout<<"\n \t\t Form : (y/b)^2 - (x/a)^2 = 1 (if a<b)";
                    cout<<"\n\n\n \t\t Enter the value of a : ";
                    cin>>a;
                    cout<<"\n\n\n \t\t Enter the value of b (b not equal to a): ";
                    cin>>b;
                    if(a>b)
                        cout<<"\n\n\n \t\t Equation of the hyperbola is :
(x^2/"<<a*a<<") - (y^2/"<<b*b<<") = 1";
                    if(a<b)
                        cout<<"\n\n\n \t\t Equation of the hyperbola is :
(y^2/"<<b*b<<") - (x^2/"<<a*a<<") = 1";
                    break;
```

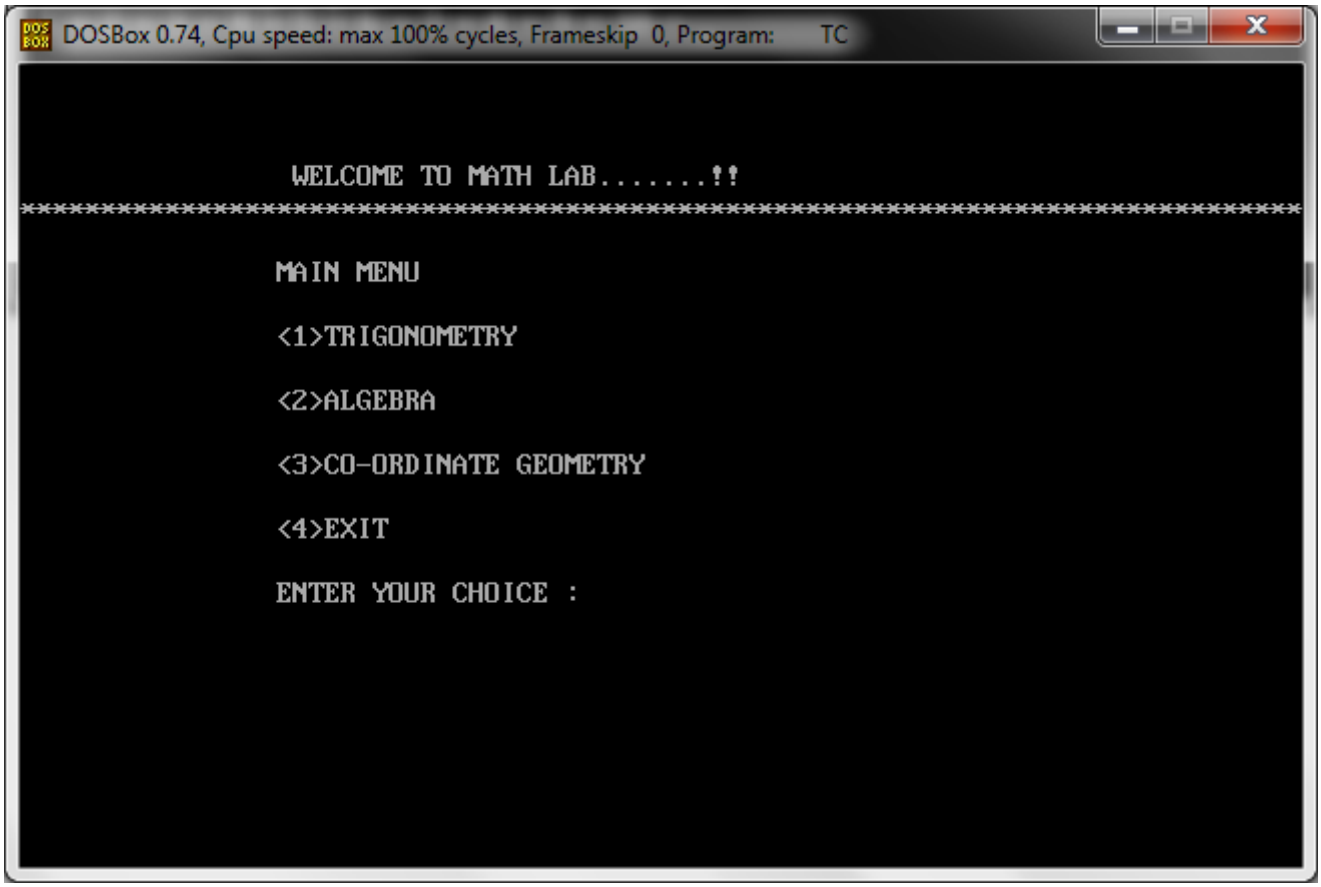
```
            case 2 :clrscr();
                  cout<<"\n\n\n \t\t ECCENTRICITY OF HYPERBOLA";
                  cout<<"\n \t\t Form : (x/a)^2 - (y/b)^2 = 1 (if a>b)";
                  cout<<"\n \t\t Form : (y/b)^2 - (x/a)^2 = 1 (if a<b)";
                  cout<<"\n \t\t Eccentricity (e) = (1 + (b*b/a*a))^0.5 ( if a>b)";
                  cout<<"\n \t\t Eccentricity (e) = (1 + (a*a/b*b))^0.5 ( if a<b)";
                  cout<<"\n\n\n \t\t Enter the value of a : ";
                  cin>>a;
                  cout<<"\n\n\n \t\t Enter the value of b (b not equal to a) : ";
                  cin>>b;
                  if(a>b)
                        e = pow(1 + ((b*b)/(a*a)),0.5);
                  if(b>a)
                        e = pow(1 + ((a*a)/(b*b)),0.5);
                  cout<<"\n\n\n \t\t Eccentricity of the hyperbola is : "<<e;
                  break;
            case 3 :clrscr();
                  cout<<"\n\n\n \t\t FOCI, LENGTH OF AXES AND LENGTH OF
LATUS RECTUM";
                  cout<<"\n \t\t Form : (x/a)^2 - (y/b)^2 = 1 (if a>b)";
                  cout<<"\n \t\t Form : (y/b)^2 - (x/a)^2 = 1 (if a<b)";
                  cout<<"\n \t\t Foci : (a*e,0) and (-a*e,0) (if a>b)";
                  cout<<"\n \t\t Foci : (0,b*e) and (0,-b*e) (if a<b)";
                  cout<<"\n \t\t Length of Transverse Axis and Conjugate Axis :
2*a and 2*b ( if a>b)";
                  cout<<"\n \t\t Length of Transverse Axis and Conjugate Axis :
2*b and 2*a ( if a<b)";
                  cout<<"\n \t\t Length of Latus Rectum : (2*b*b)/a ( if a>b)";
                  cout<<"\n \t\t Length of Latus Rectum : (2*a*a)/b ( if a<b)";
                  cout<<"\n\n\n \t\t Enter the value of a : ";
                  cin>>a;
                  cout<<"\n\n \t\t Enter the value of b (b not equal to a) : ";
                  cin>>b;
                  if(a>b)
                  {
                        e = pow(1 + ((b*b)/(a*a)),0.5);
```

```
                        cout<<"\n\n \t\t The Foci of the hyperbola are :
("<<a*e<<",0) and ("<< 0 - a*e<<",0)";
                        cout<<"\n \t\t The length of Transverse Axis is : "<<2*a;
                        cout<<"\n \t\t The length of Conjugate Axis is : "<<2*b;
                        cout<<"\n \t\t The length of Latus Rectum is : "<<
(2*b*b)/a;
                }
                if(b>a)
                {
                        e = pow(1 + ((a*a)/(b*b)),0.5);
                        cout<<"\n\n \t\t The Foci of the hyperbola are :
(0,"<<b*e<<") and (0,"<< 0 - b*e<<")";
                        cout<<"\n \t\t The length of Transverse Axis is : "<<2*b;
                        cout<<"\n \t\t The length of Conjugate Axis is : "<<2*a;
                        cout<<"\n \t\t The length of Latus Rectum is : "<<
(2*a*a)/b;
                }
                break;
        case 4 :clrscr();
                cout<<"\n\n\n \t\t TANGENT AND NORMAL";
                cout<<"\n \t\t Form : (x/a)^2 - (y/b)^2 = 1";
                cout<<"\n \t\t Form : (y/b)^2 - (x/a)^2 = 1";
                cout<<"\n\n\n \t\t Enter the value of a : ";
                cin>>a;
                cout<<"\n\n \t\t Enter the value of b (b not equal to a) : ";
                cin>>b;
                cout<<"\n\n \t\t Enter a point (on hyperbola) : ";
                cin>>x1>>y1;
                if(a>b)
                {
                        cout<<"\n\n\n \t\t Tangent to hyperbola is :
(x."<<x1<<")/"<<a*a<<" - (y."<<y1<<")/"<<b*b<<" = 1";
                        cout<<"\n\n \t\t Normal to the hyperbola is :
"<<a*a<<".x/"<<x1<<" + "<<b*b<<".y/"<<y1<<" = "<<(a*a) + (b*b);
                }
                if(a<b)
                {
```

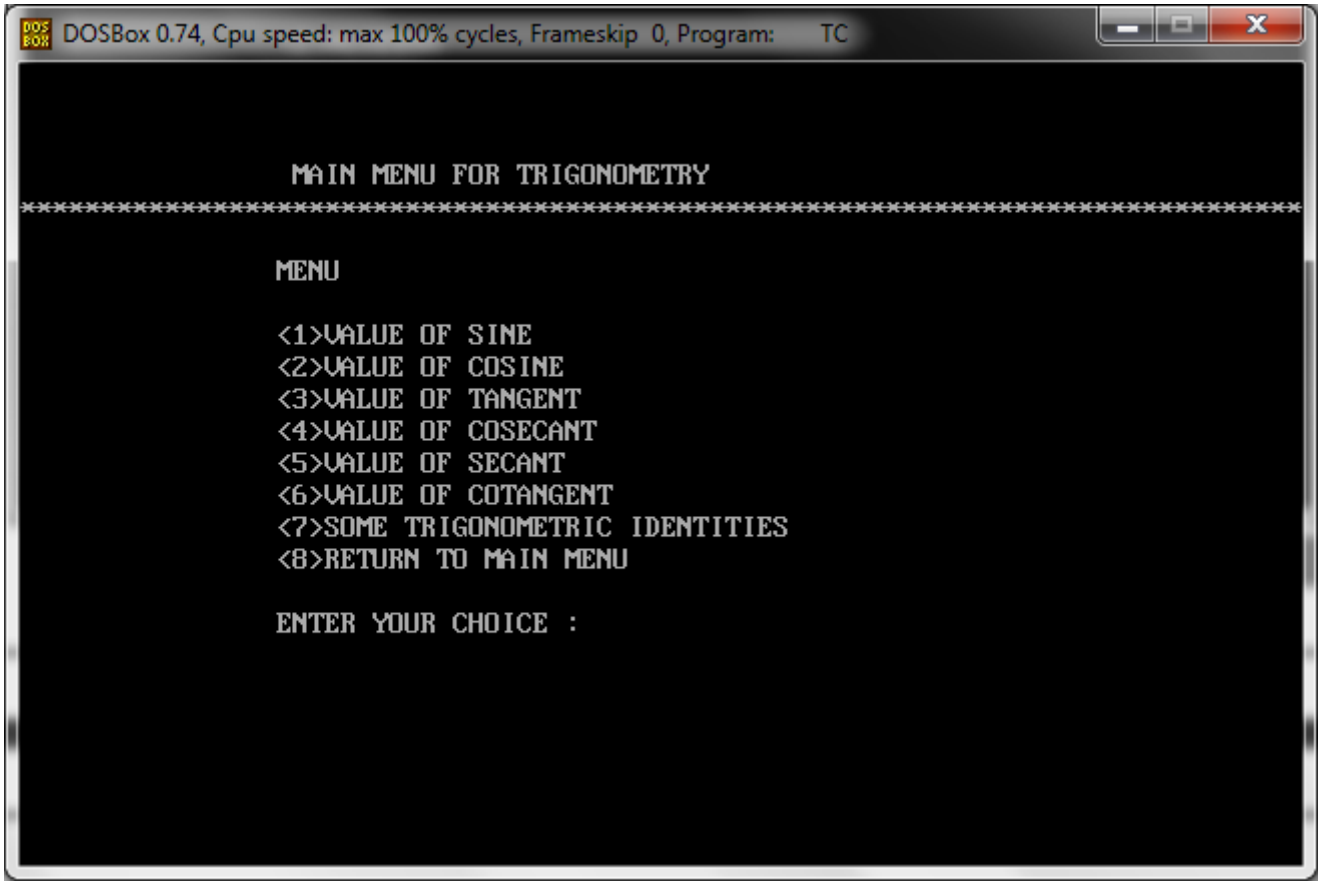
```
                        cout<<"\n\n\n \t\t Tangent to hyperbola is :
(y."<<y1<<")/"<<b*b<<" - (x."<<x1<<")/"<<a*a<<" = 1";
                        cout<<"\n\n \t\t Normal to the hyperbola is :
"<<a*a<<".x/"<<x1<<" + "<<b*b<<".y/"<<y1<<" = "<<(a*a) + (b*b);
                }
                break;
        case 5 :clrscr();
                cout<<"\n\n\n \t\t EQUATION OF DIRECTOR CIRCLE";
                cout<<"\n \t\t Form : (x/a)^2 - (y/b)^2 = 1 (if a>b)";
                cout<<"\n \t\t Form : (y/b)^2 - (x/a)^2 = 1 (if a<b)";
                cout<<"\n\n\n \t\t Enter the value of a : ";
                cin>>a;
                cout<<"\n\n \t\t Enter the value of b (b not equal to a) : ";
                cin>>b;
                if(a>b)
                        cout<<"\n\n\n \t\t Equation of Director Circle is : x^2 +
y^2 = "<<(a*a) - (b*b);
                if(a<b)
                        cout<<"\n\n\n \t\t Equation of Director Circle is : x^2 +
y^2 = "<<(b*b) - (a*a);
                break;
        case 6 :cogeo();
                break;
    }
    cout<<"\n\n\n \t\t Do you want to continue(y/n)?";
    char cont;
    cin>>cont;
    if((cont=='y') || (cont=='Y'))
        hyperbola();
    else
        cogeo();
}
/**************************************************************************
**********
        END OF THE PROGRAM
**************************************************************************
*********/
```

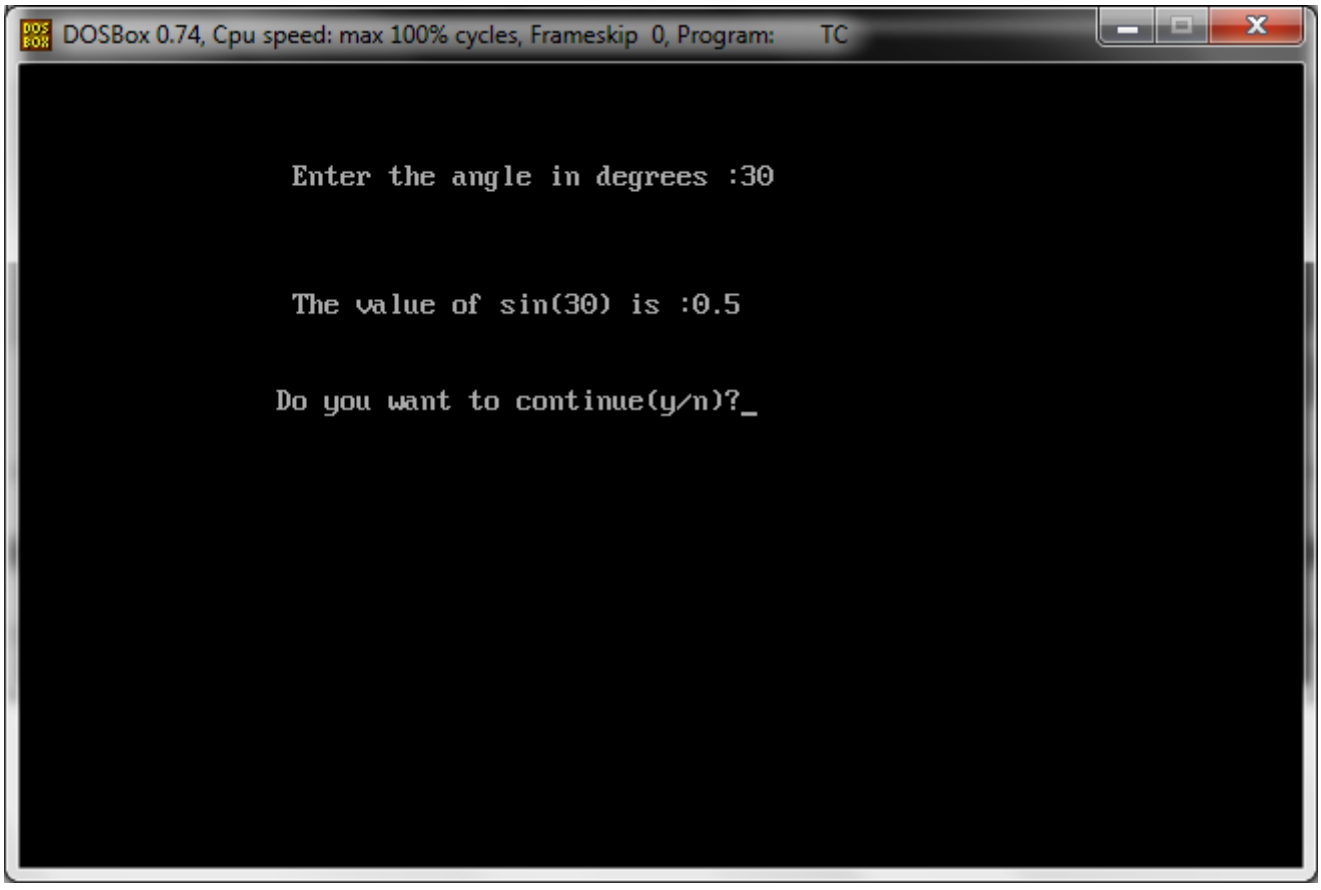
OUTPUT

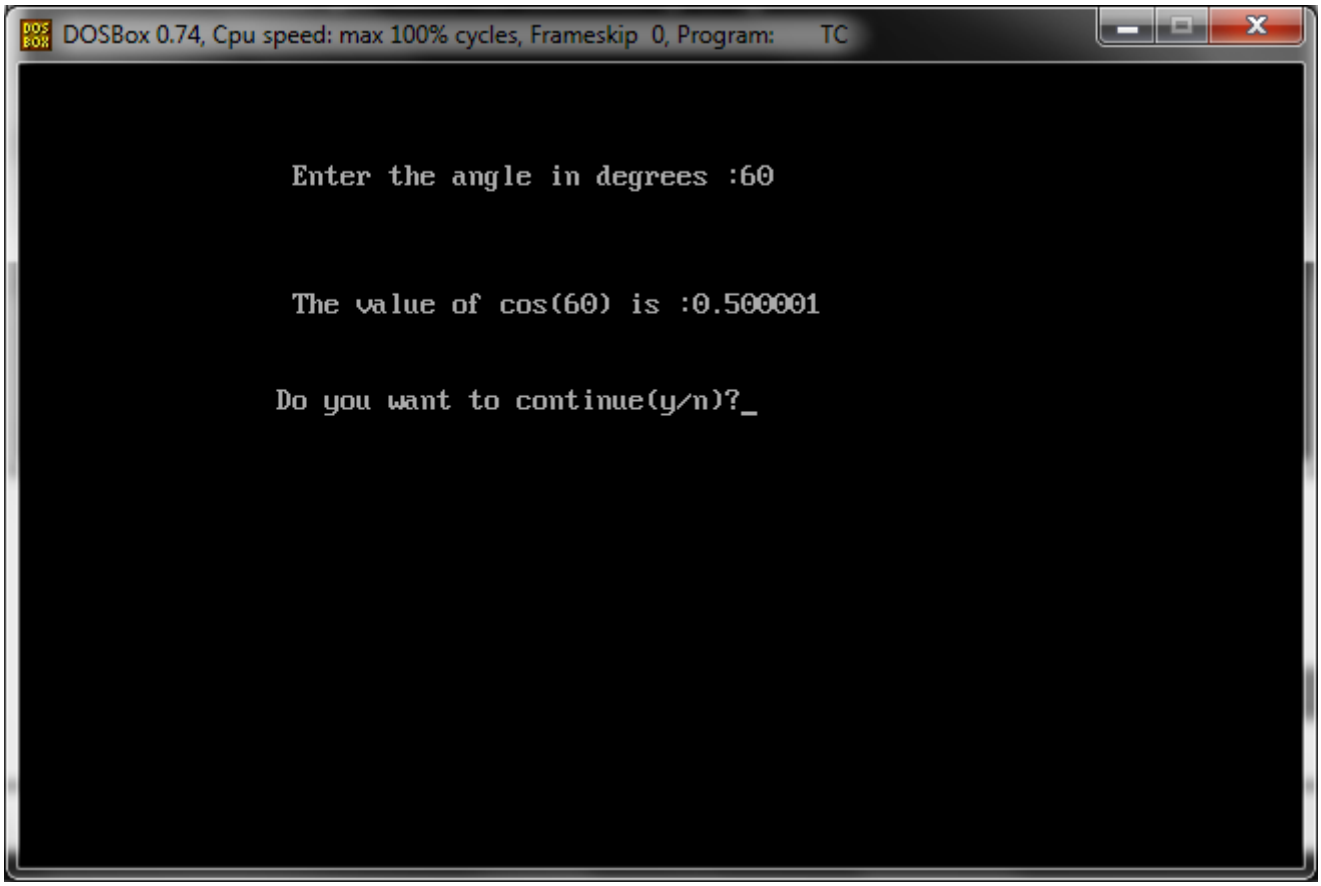

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
MAHARAJA AGRASEN VIDYALYA
WELCOME TO MATH LAB
Math Lab will change your experience with mathematics in a unique way with the h
elp of Turbo C++. With Math Lab you can get answers to various problems of algeb
ra, co-ordinate geometry and trigonometry. Enjoy....!!
Solve this simple problem to Enter MATH LAB :
1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = _

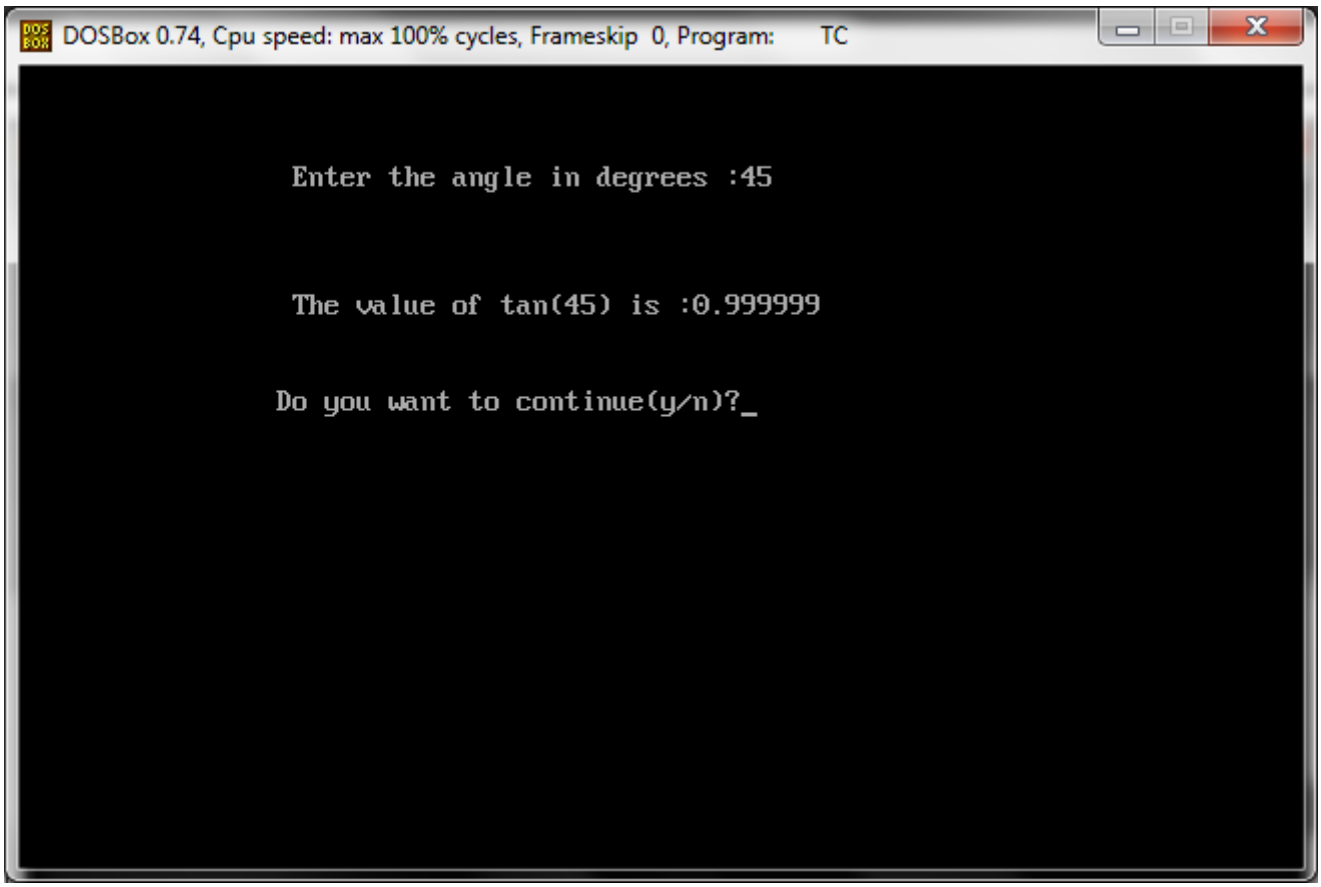

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
WELCOME TO MATH LAB.....!!
MAIN MENU
<1>TRIGONOMETRY
<2>ALGEBRA
<3>CO-ORDINATE GEOMETRY
<4>EXIT
ENTER YOUR CHOICE :

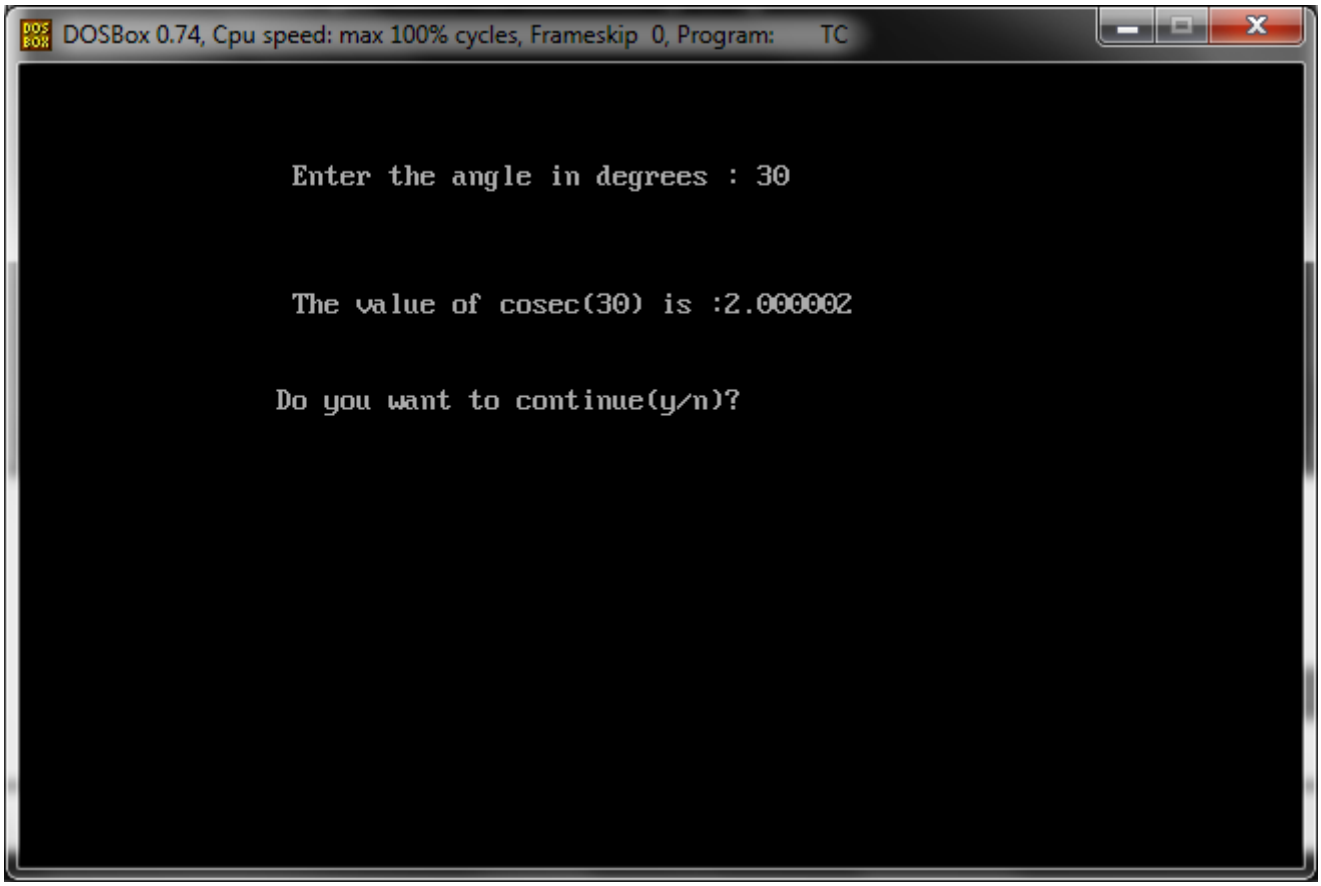
SECTION:TRIGONOMETRY

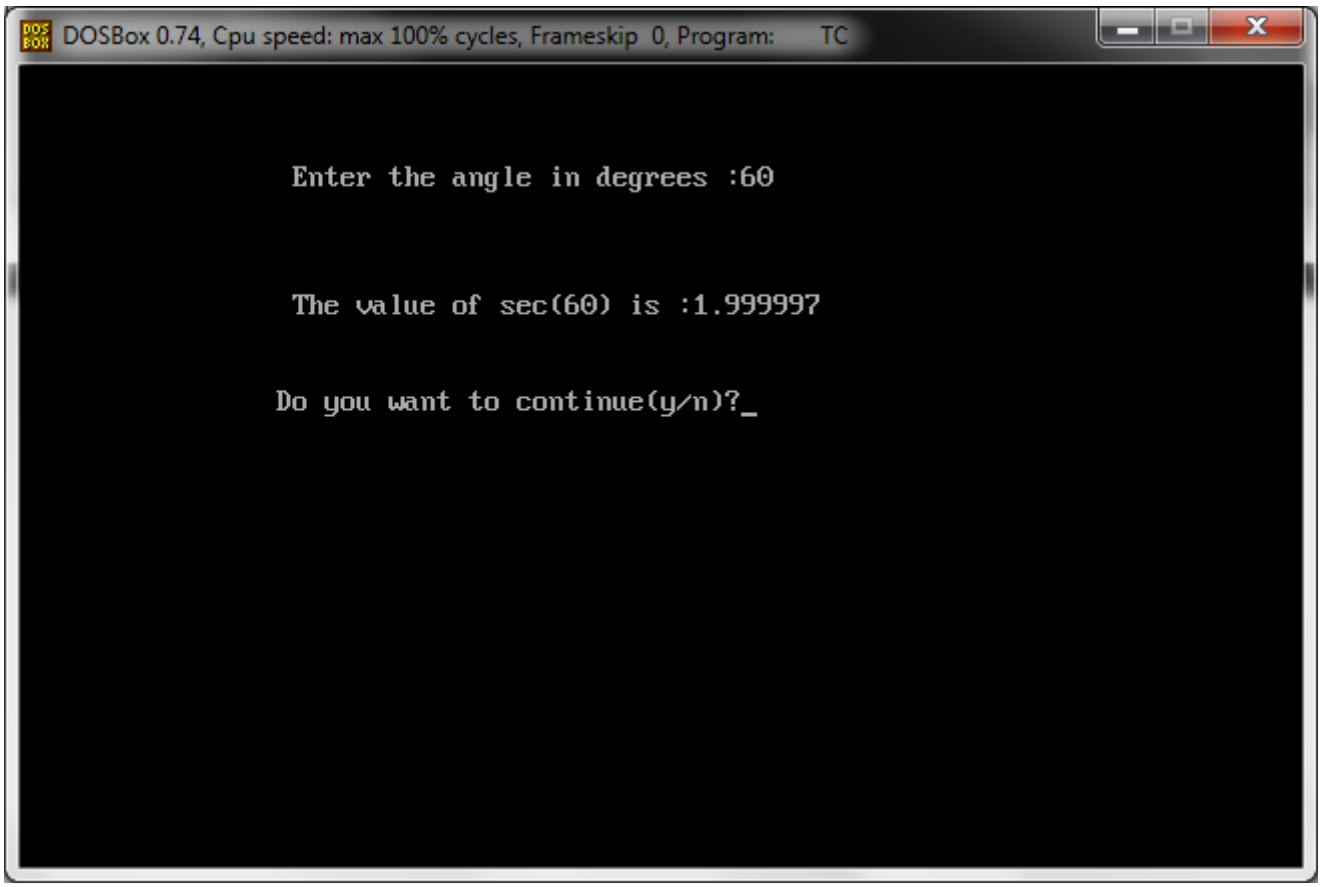


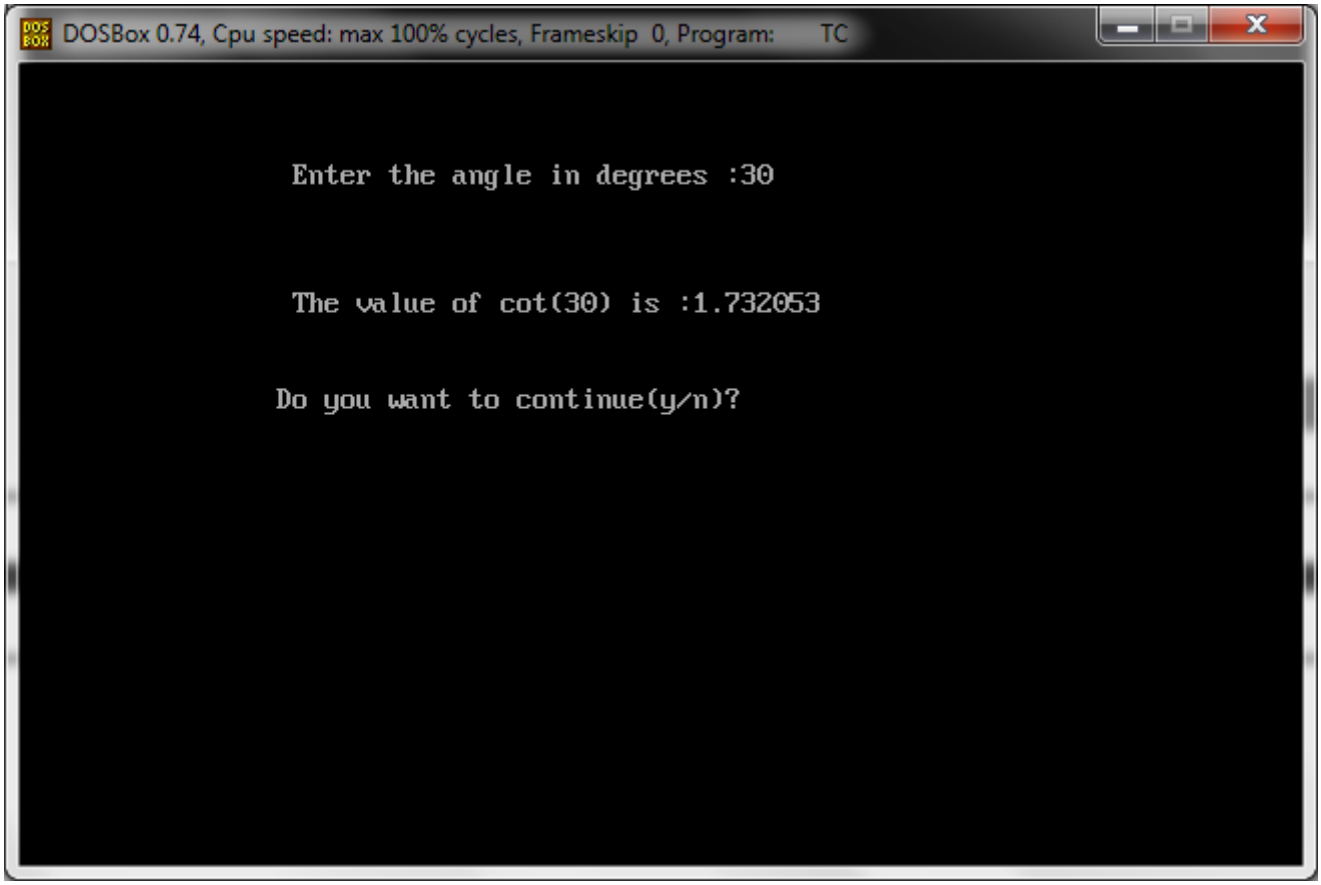


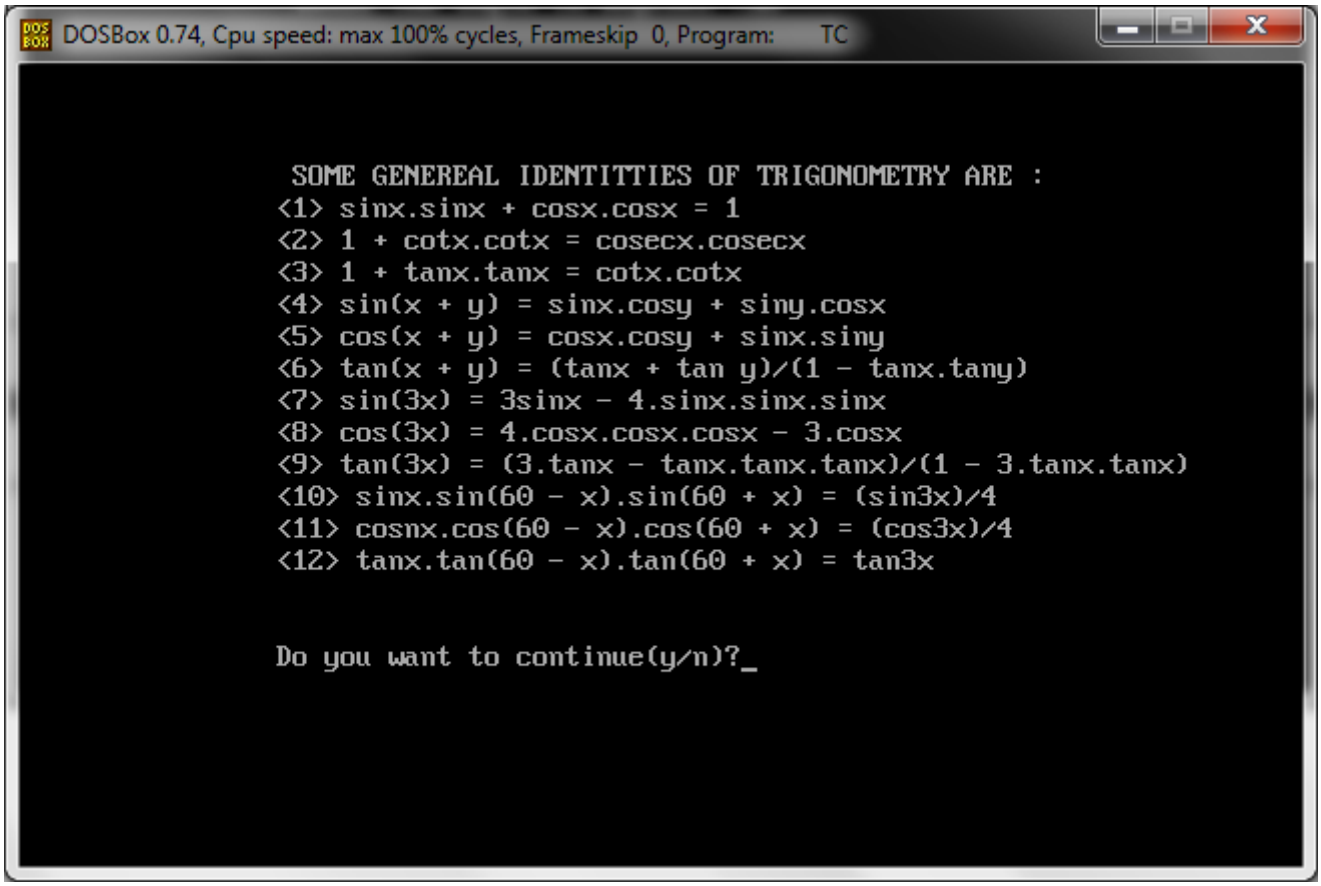

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
Enter the angle in degrees :60
The value of cos(60) is :0.500001
Do you want to continue(y/n)?_


DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
Enter the angle in degrees :45
The value of tan(45) is :0.999999
Do you want to continue(y/n)?_

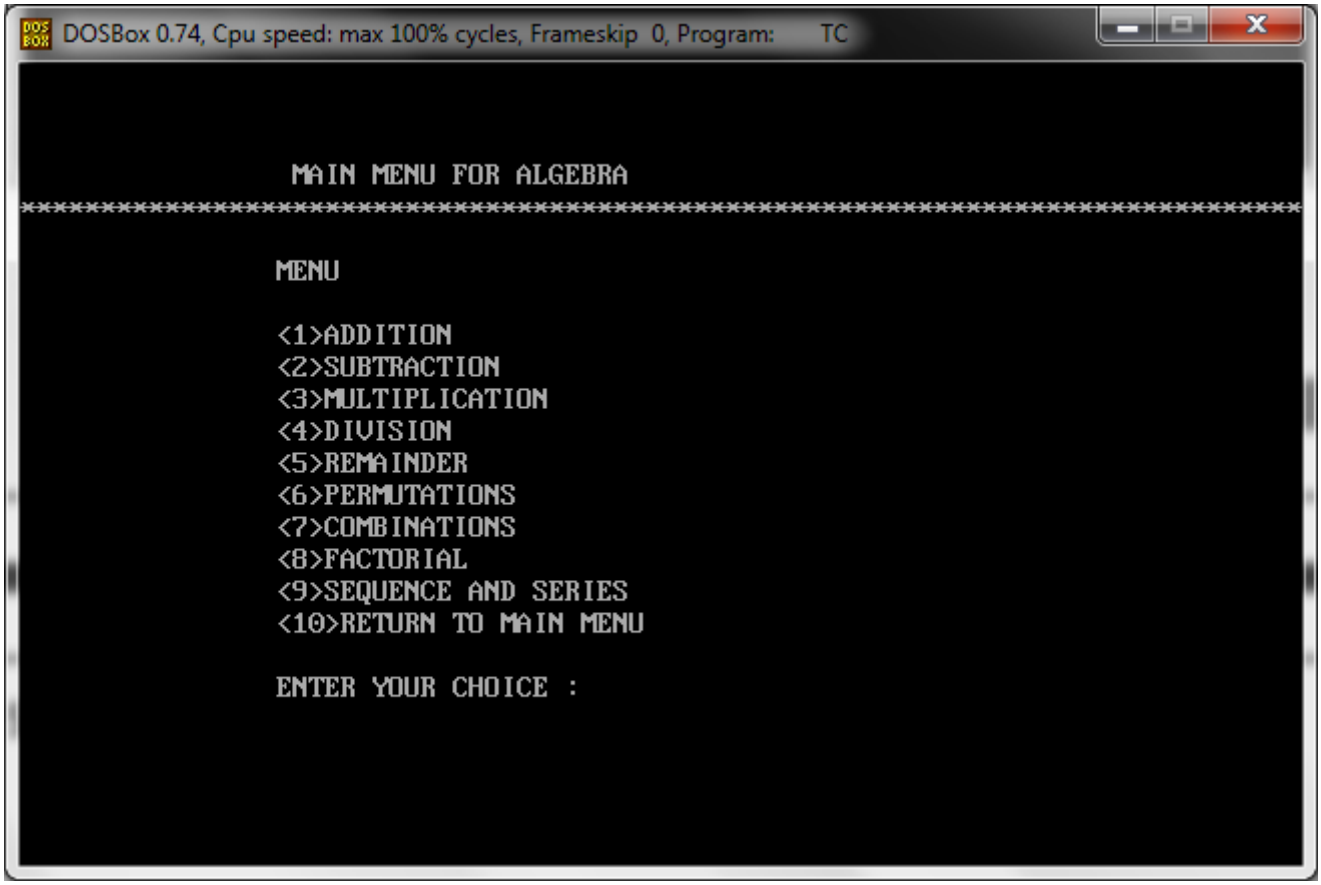

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
Enter the angle in degrees : 30
The value of cosec(30) is :2.000002
Do you want to continue(y/n)?

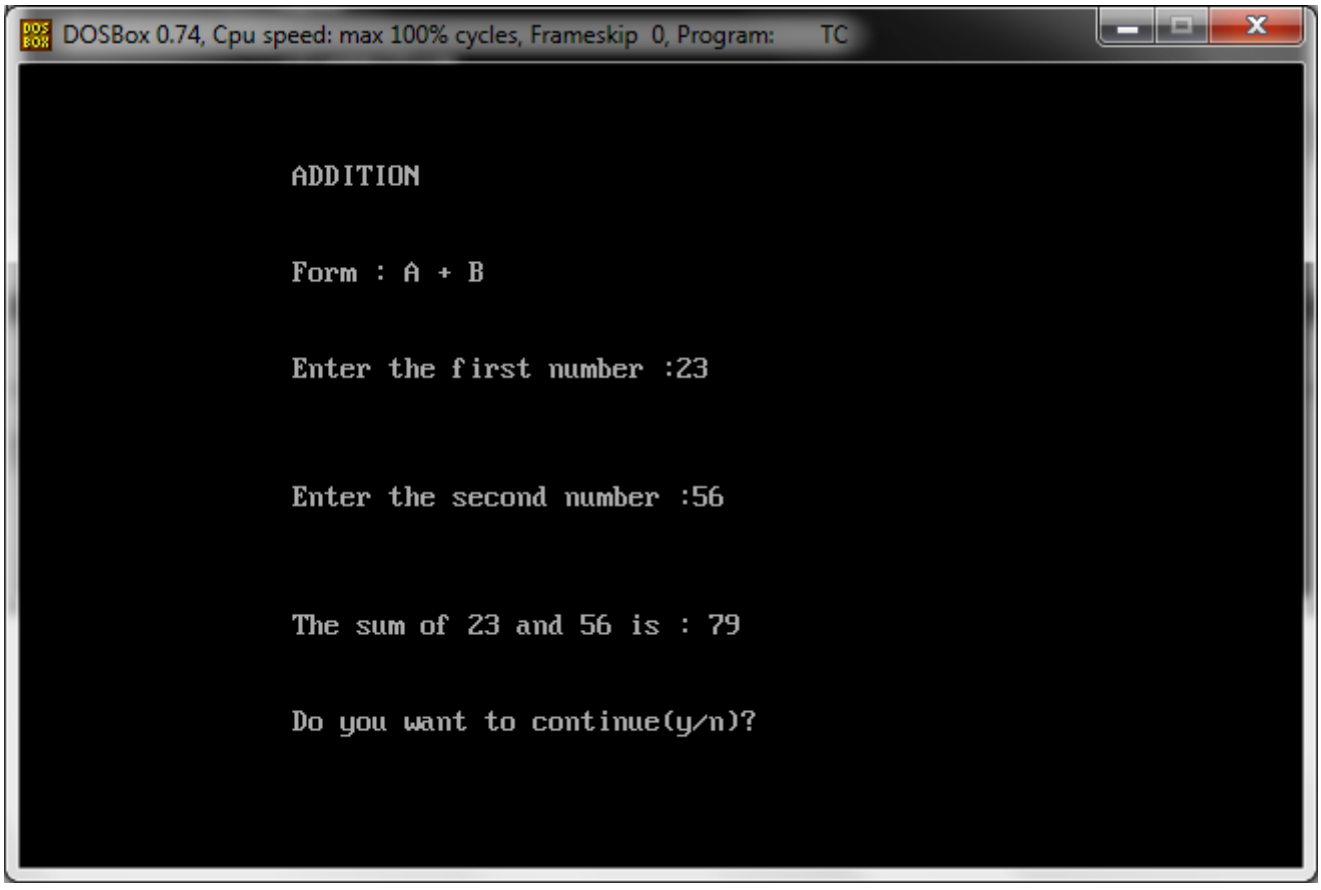

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
Enter the angle in degrees :60
The value of sec(60) is :1.999997
Do you want to continue(y/n)?_

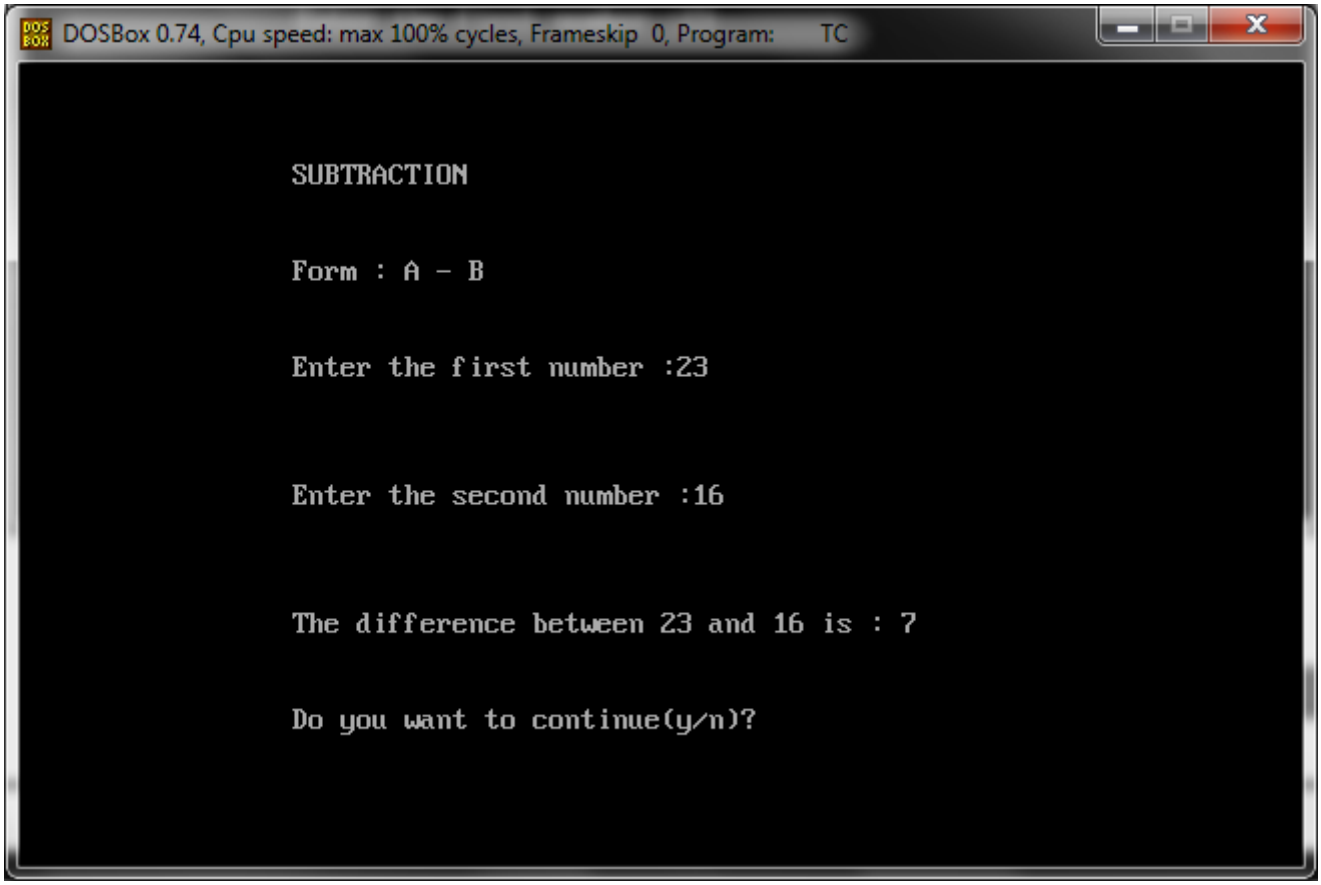

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
Enter the angle in degrees :30
The value of cot(30) is :1.732053
Do you want to continue(y/n)?

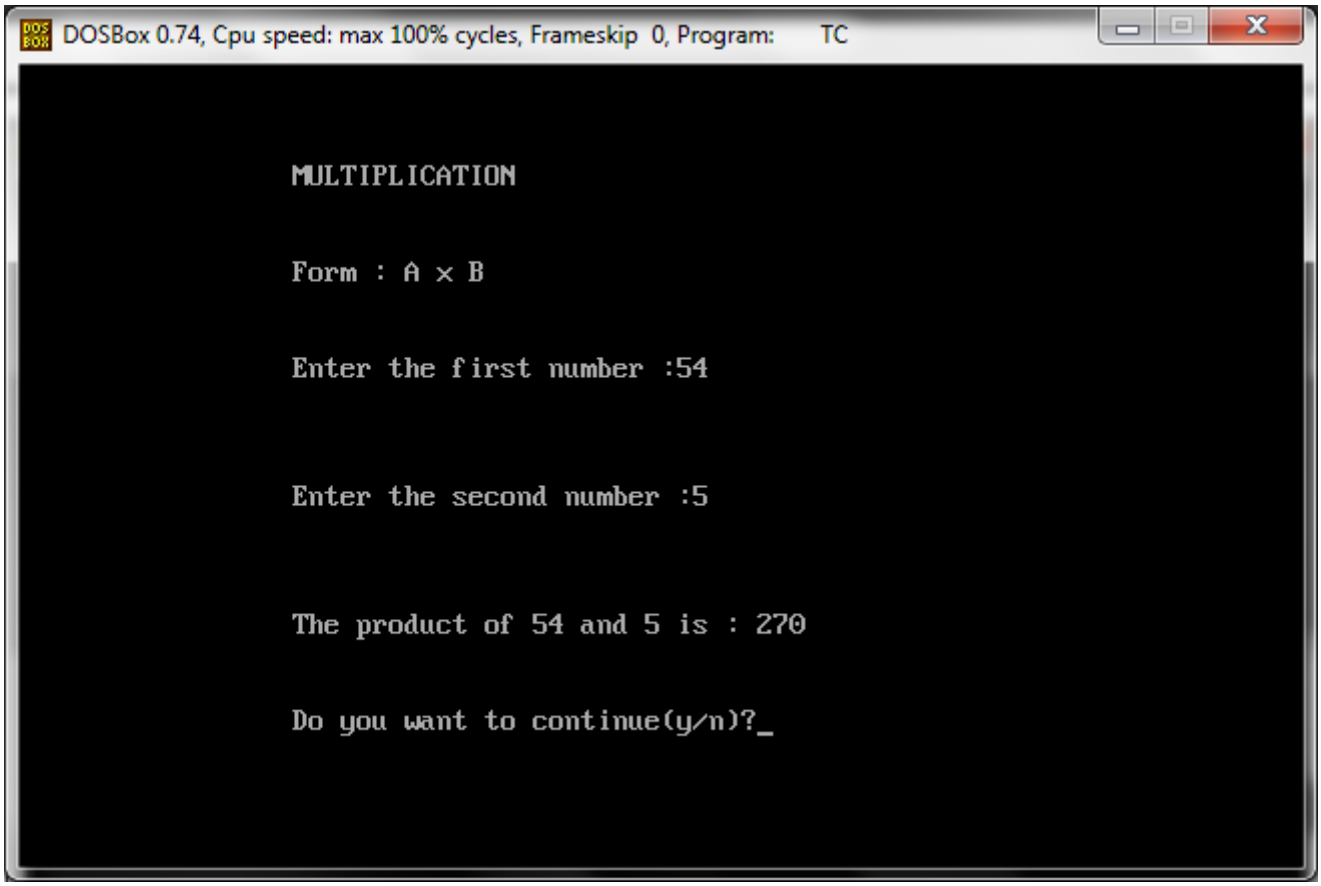

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
SOME GENEREAL IDENTITTIES OF TRIGONOMETRY ARE :
<1> sinx.sinx + cosx.cosx = 1
<2> 1 + cotx.cotx = cosecx.cosecx
<3> 1 + tanx.tanx = cotx.cotx
<4> sin(x + y) = sinx.cosy + siny.cosx
<5> cos(x + y) = cosx.cosy + sinx.siny
<6> tan(x + y) = (tanx + tan y)/(1 - tanx.tany)
<7> sin(3x) = 3sinx - 4.sinx.sinx.sinx
<8> cos(3x) = 4.cosx.cosx.cosx - 3.cosx
<9> tan(3x) = (3.tanx - tanx.tanx.tanx)/(1 - 3.tanx.tanx)
<10> sinx.sin(60 - x).sin(60 + x) = (sin3x)/4
<11> cosnx.cos(60 - x).cos(60 + x) = (cos3x)/4
<12> tanx.tan(60 - x).tan(60 + x) = tan3x
Do you want to continue(y/n)?_

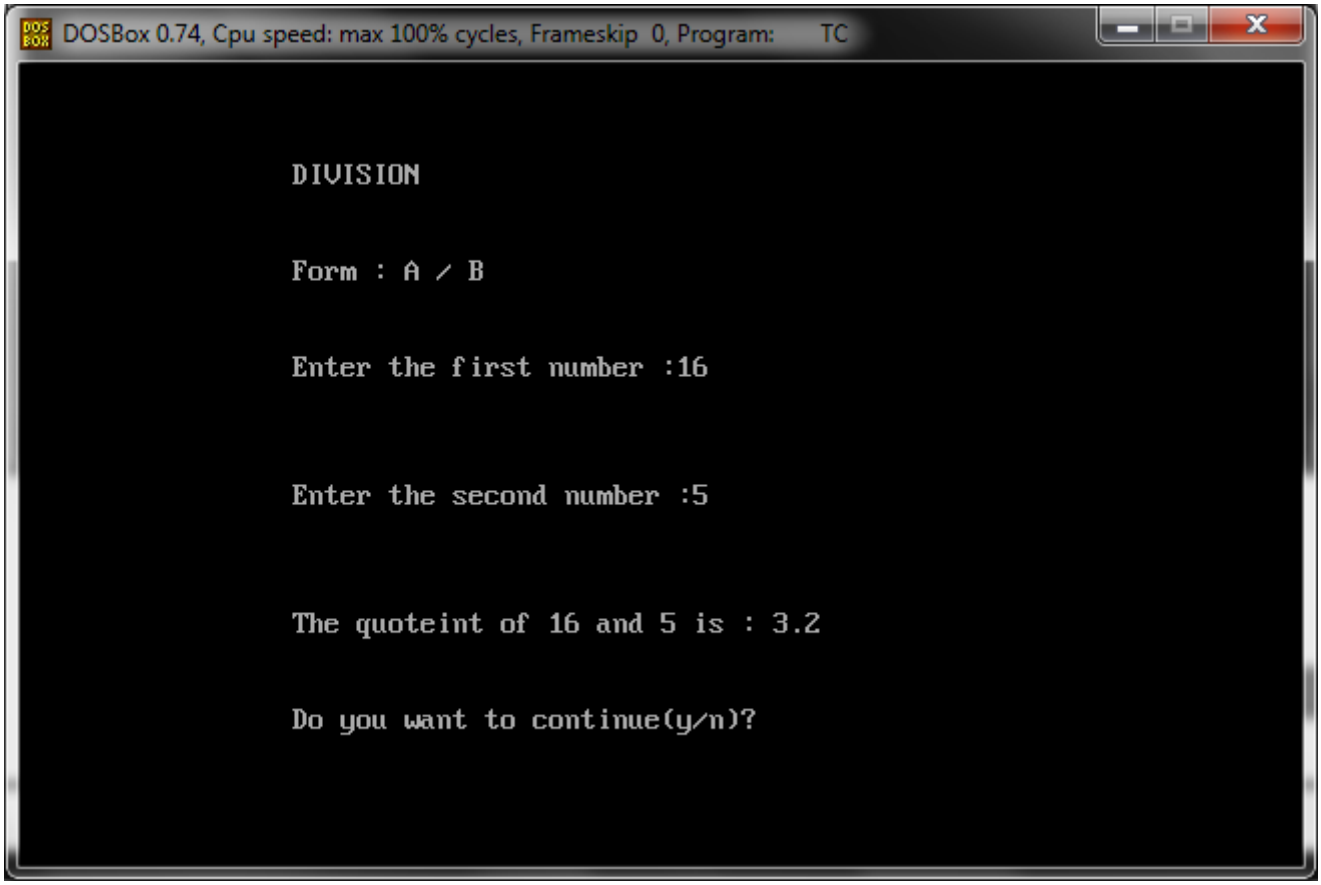
SECTION: ALGEBRA

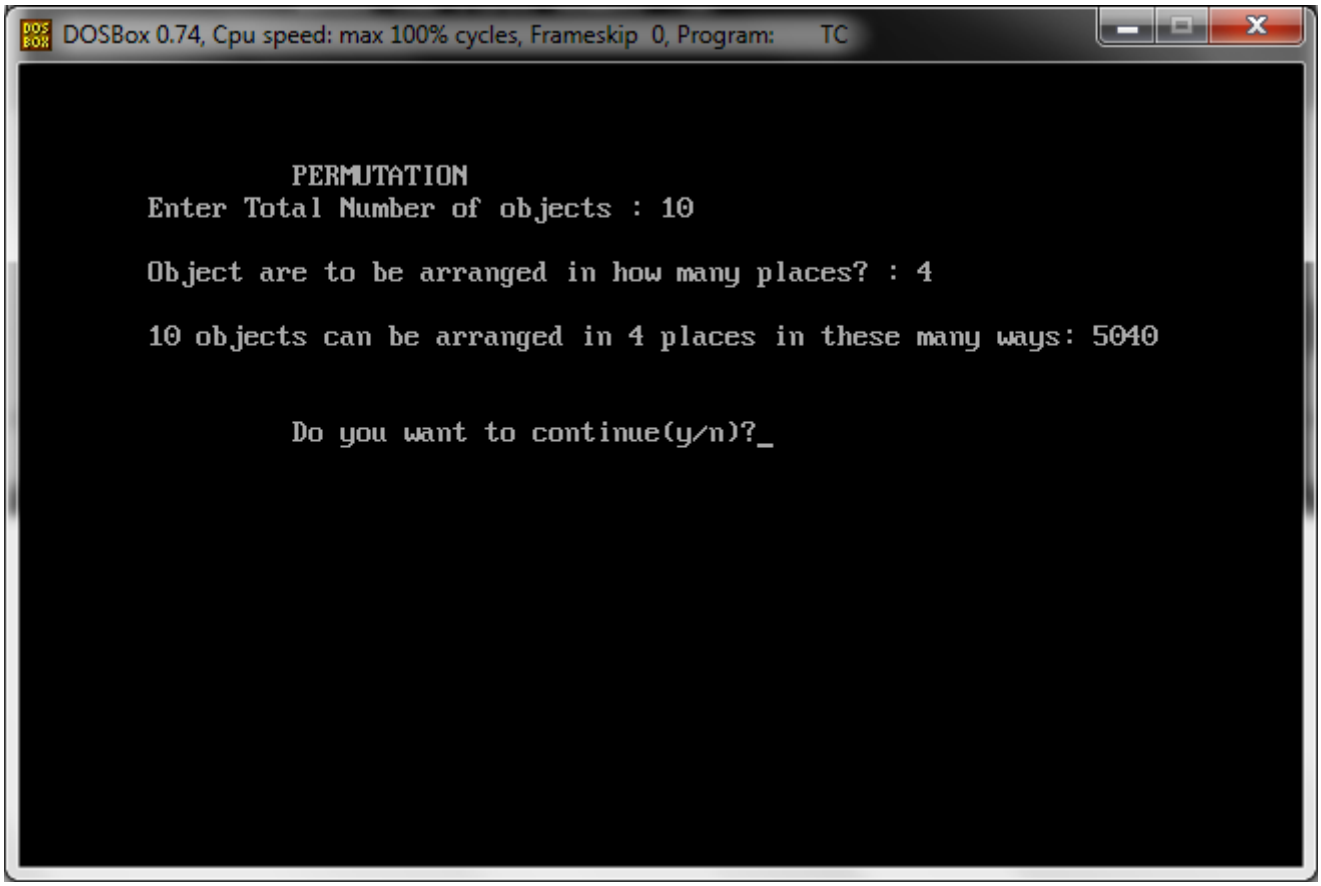


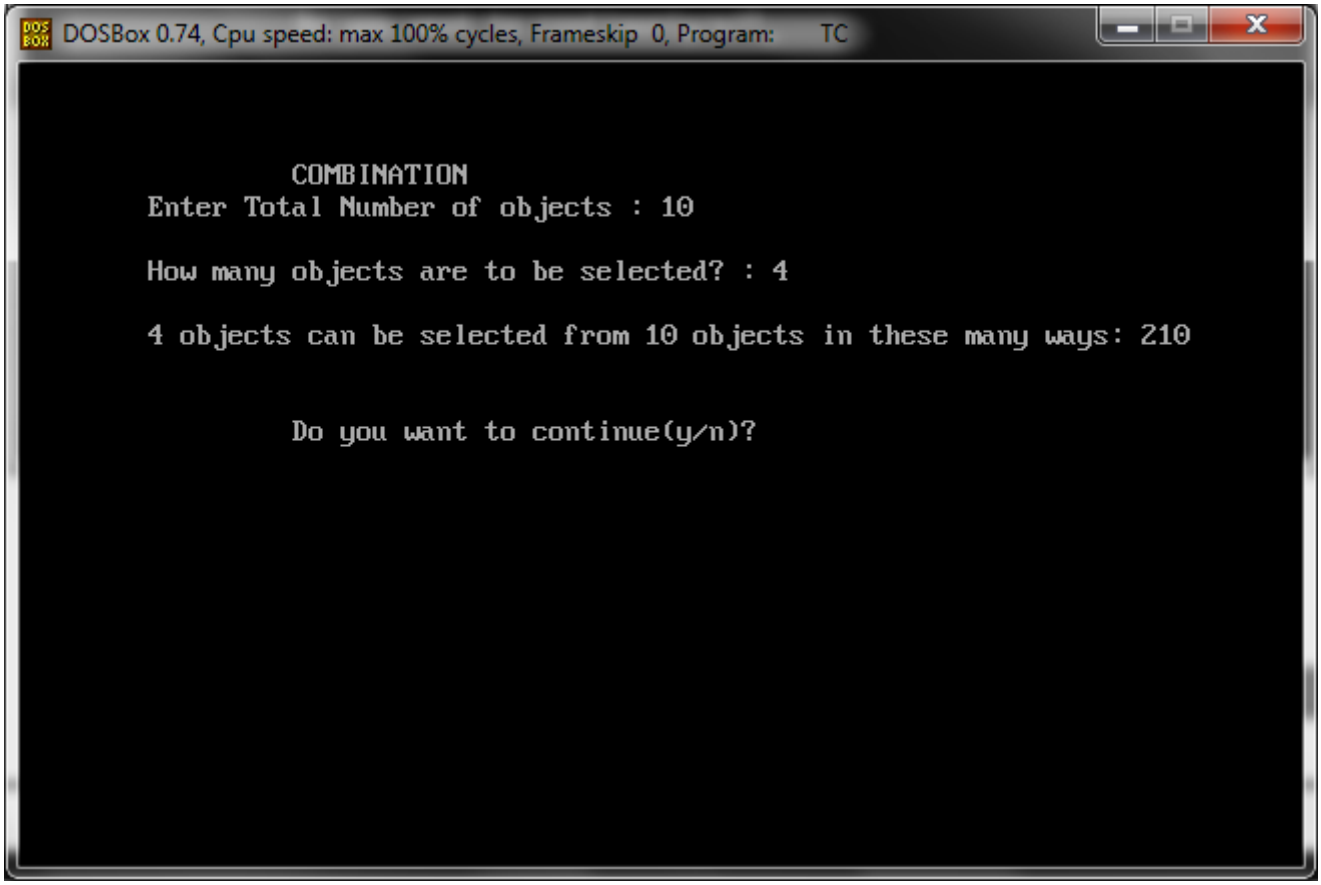


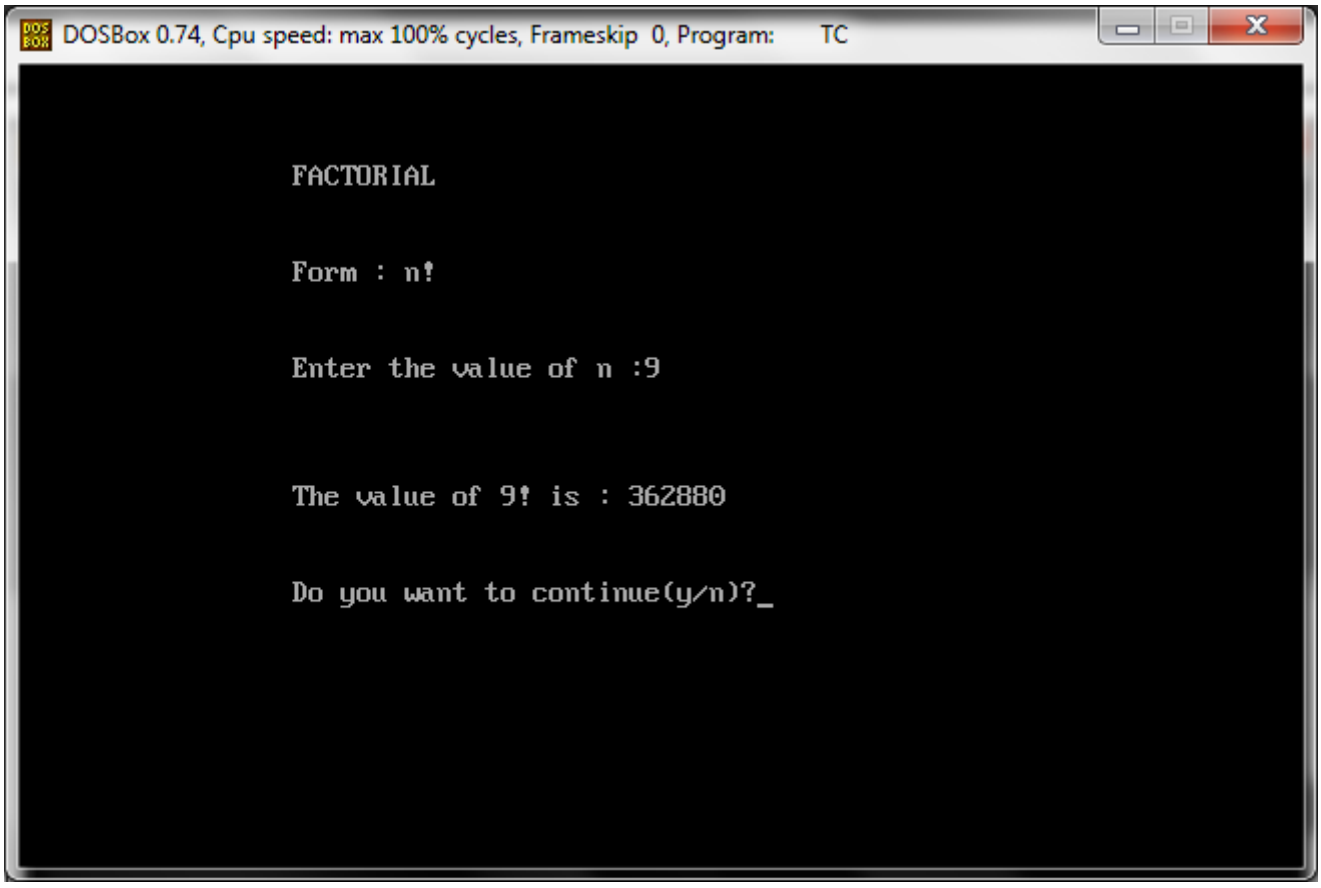

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
SUBTRACTION
Form : A - B
Enter the first number :23
Enter the second number :16
The difference between 23 and 16 is : 7
Do you want to continue(y/n)?


DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
MULTIPLICATION
Form : A × B
Enter the first number :54
Enter the second number :5
The product of 54 and 5 is : 270
Do you want to continue(y/n)?_

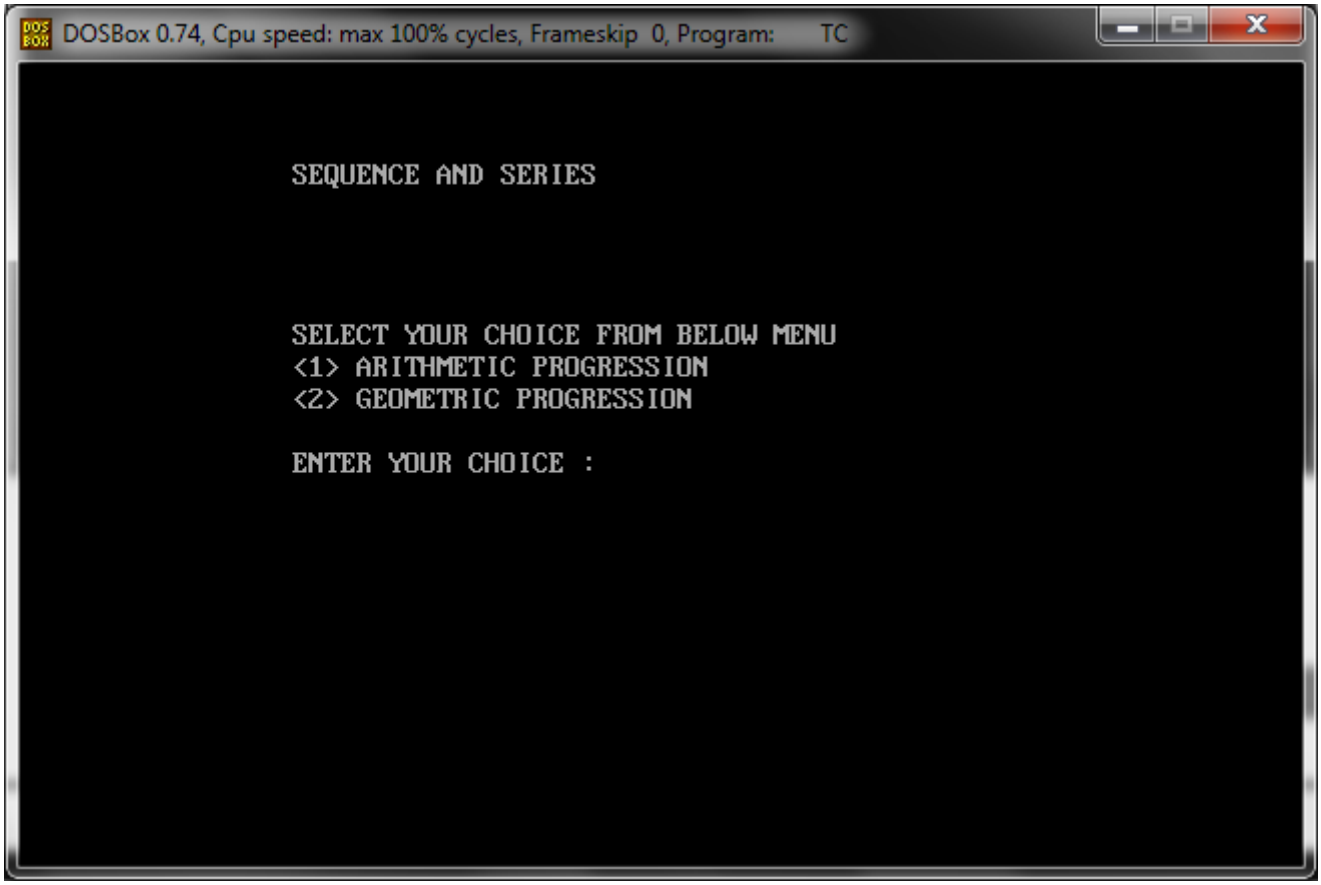

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
DIVISION
Form : A / B
Enter the first number :16
Enter the second number :5
The quoteint of 16 and 5 is : 3.2
Do you want to continue(y/n)?

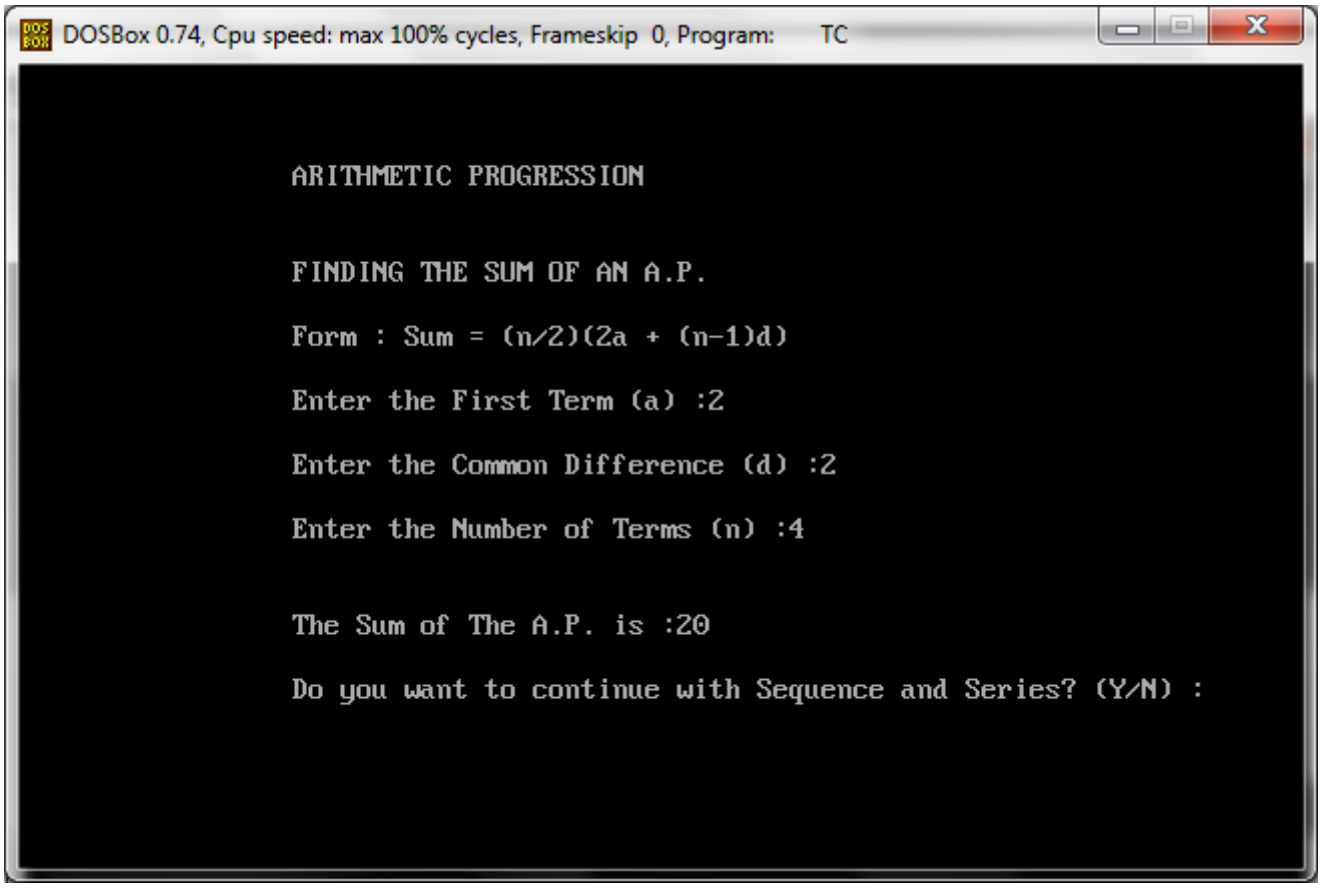

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
PERMUTATION
Enter Total Number of objects : 10
Object are to be arranged in how many places? : 4
10 objects can be arranged in 4 places in these many ways: 5040
Do you want to continue(y/n)?_

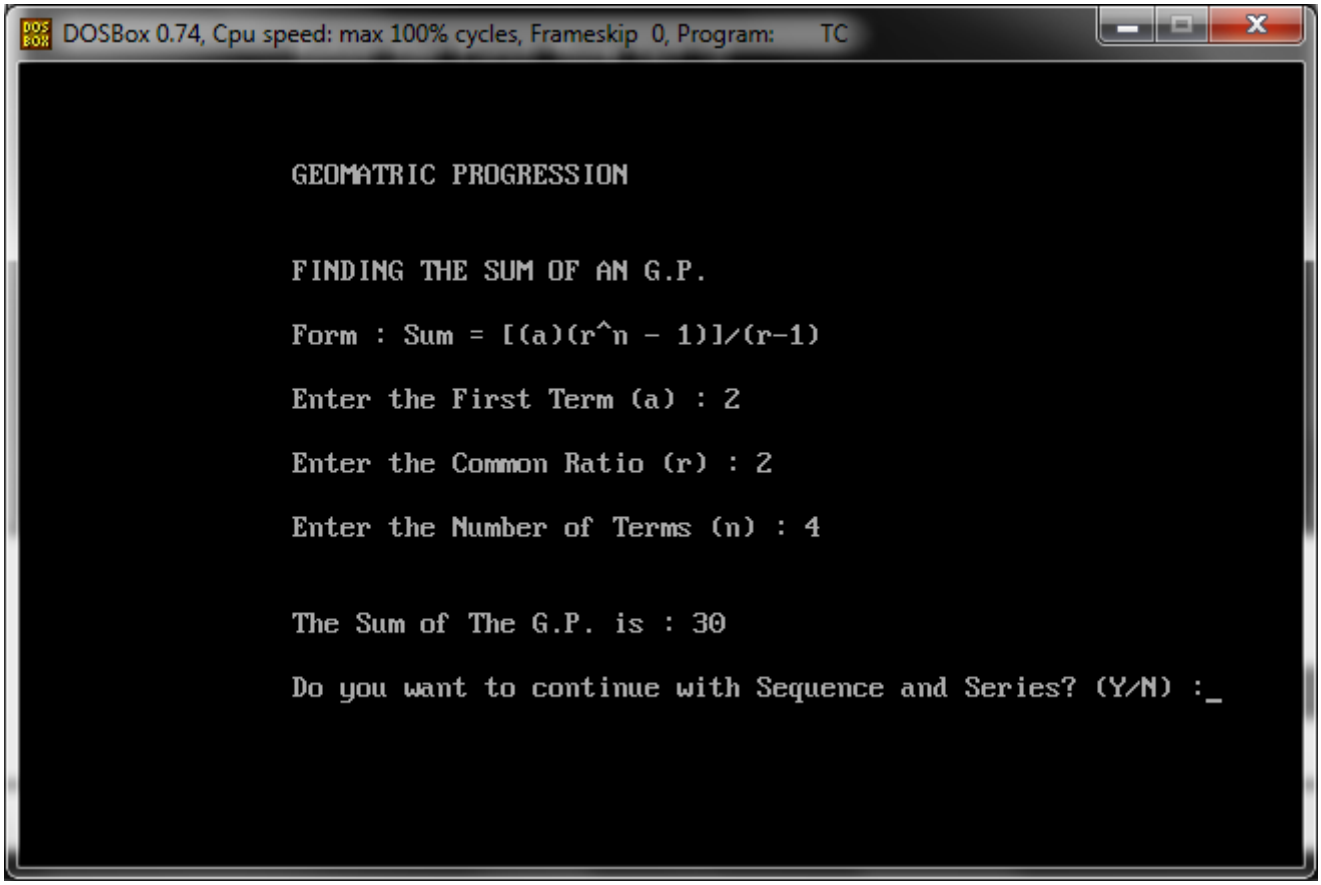

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
COMBINATION
Enter Total Number of objects : 10
How many objects are to be selected? : 4
4 objects can be selected from 10 objects in these many ways: 210
Do you want to continue(y/n)?


DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
FACTORIAL
Form : n!
Enter the value of n :9
The value of 9! is : 362880
Do you want to continue(y/n)?_

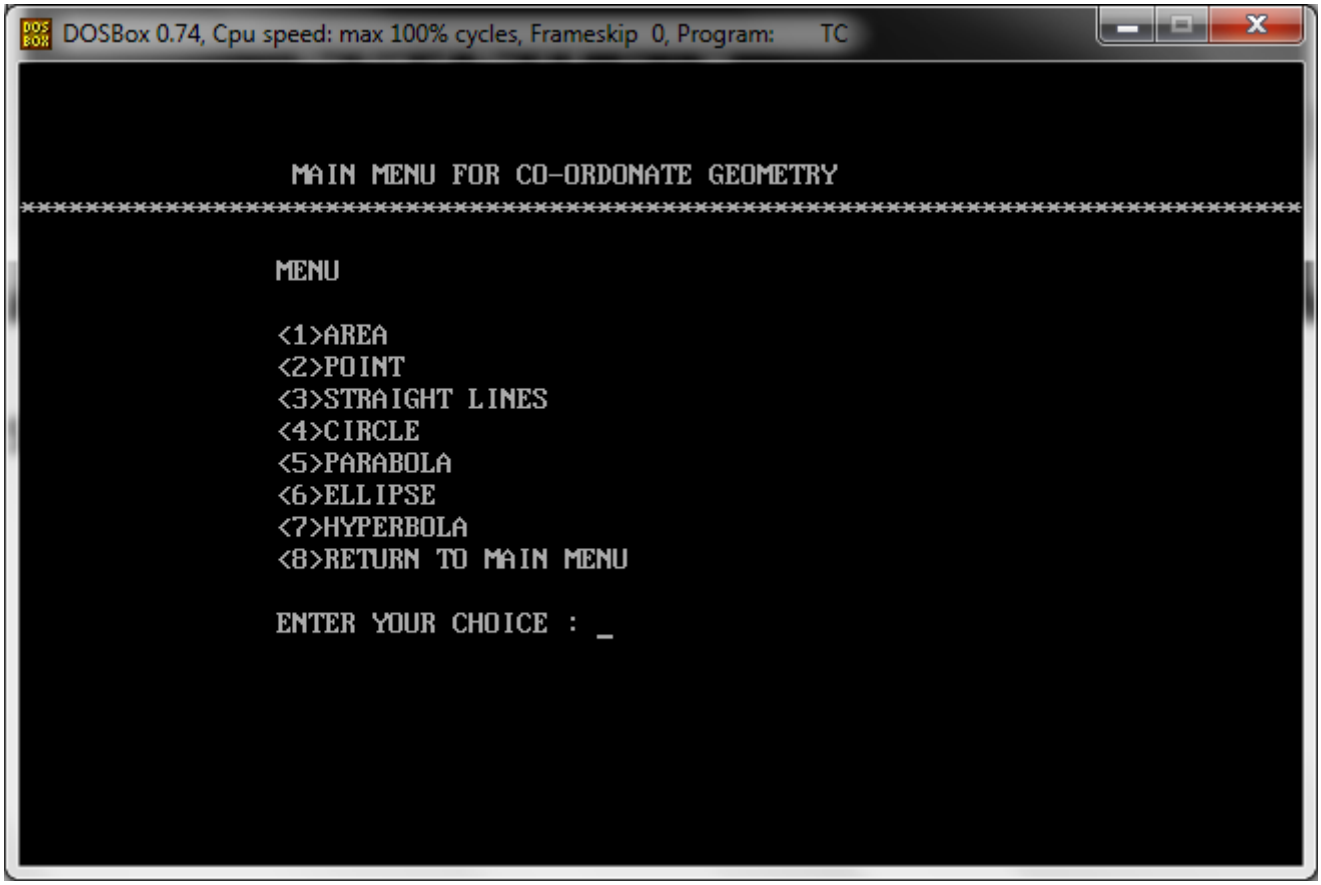
SECTION: SEQUENCE AND SERIES



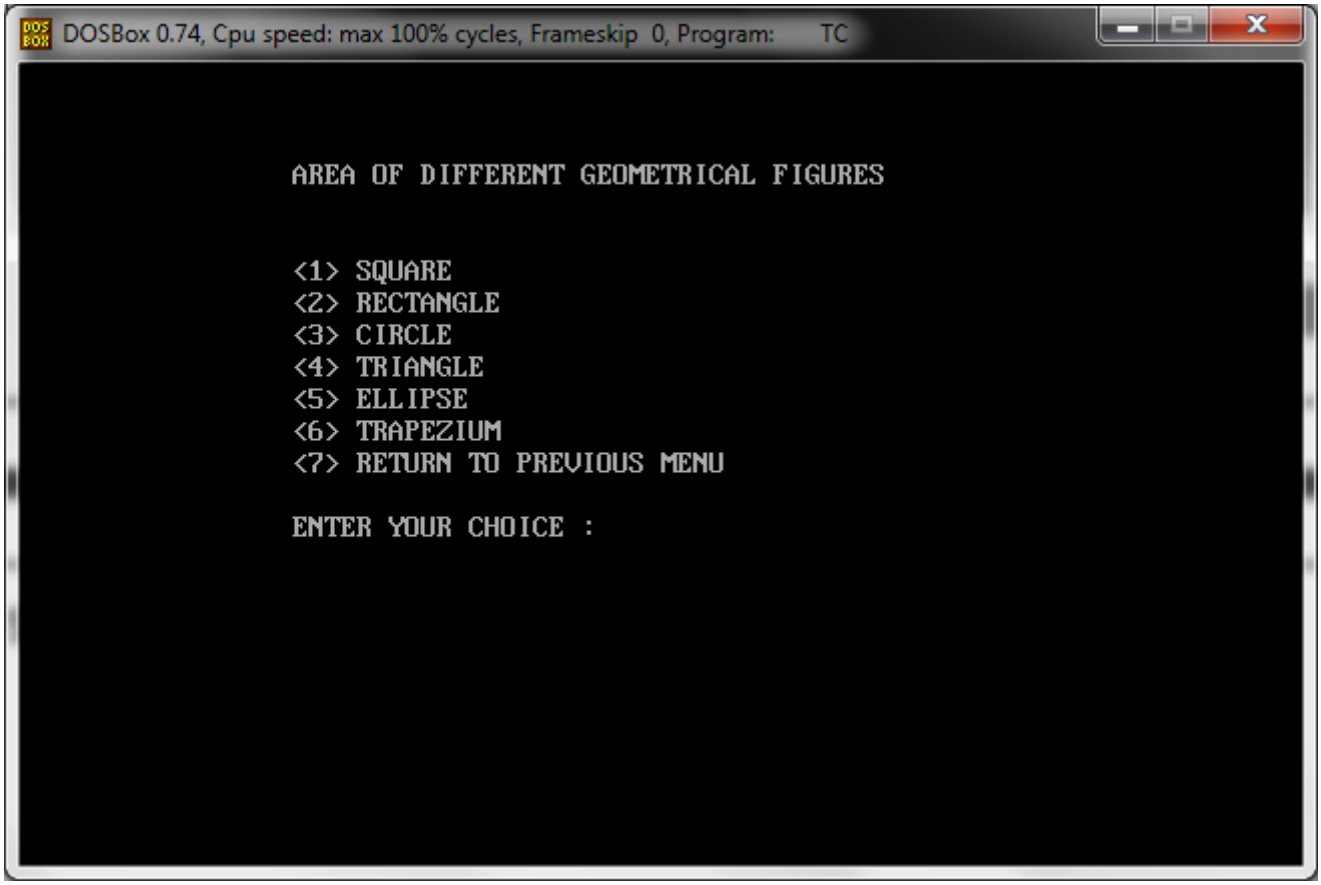


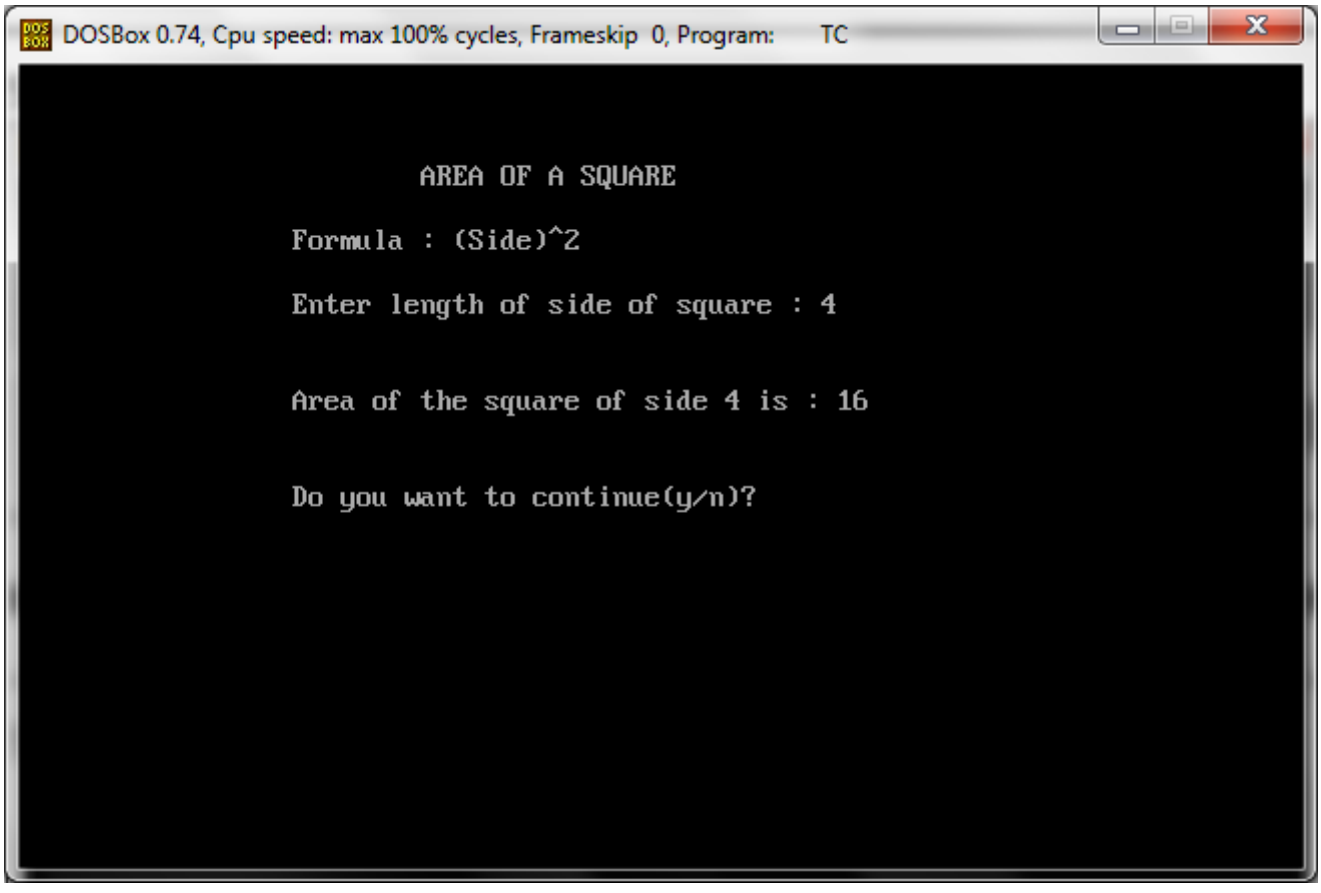


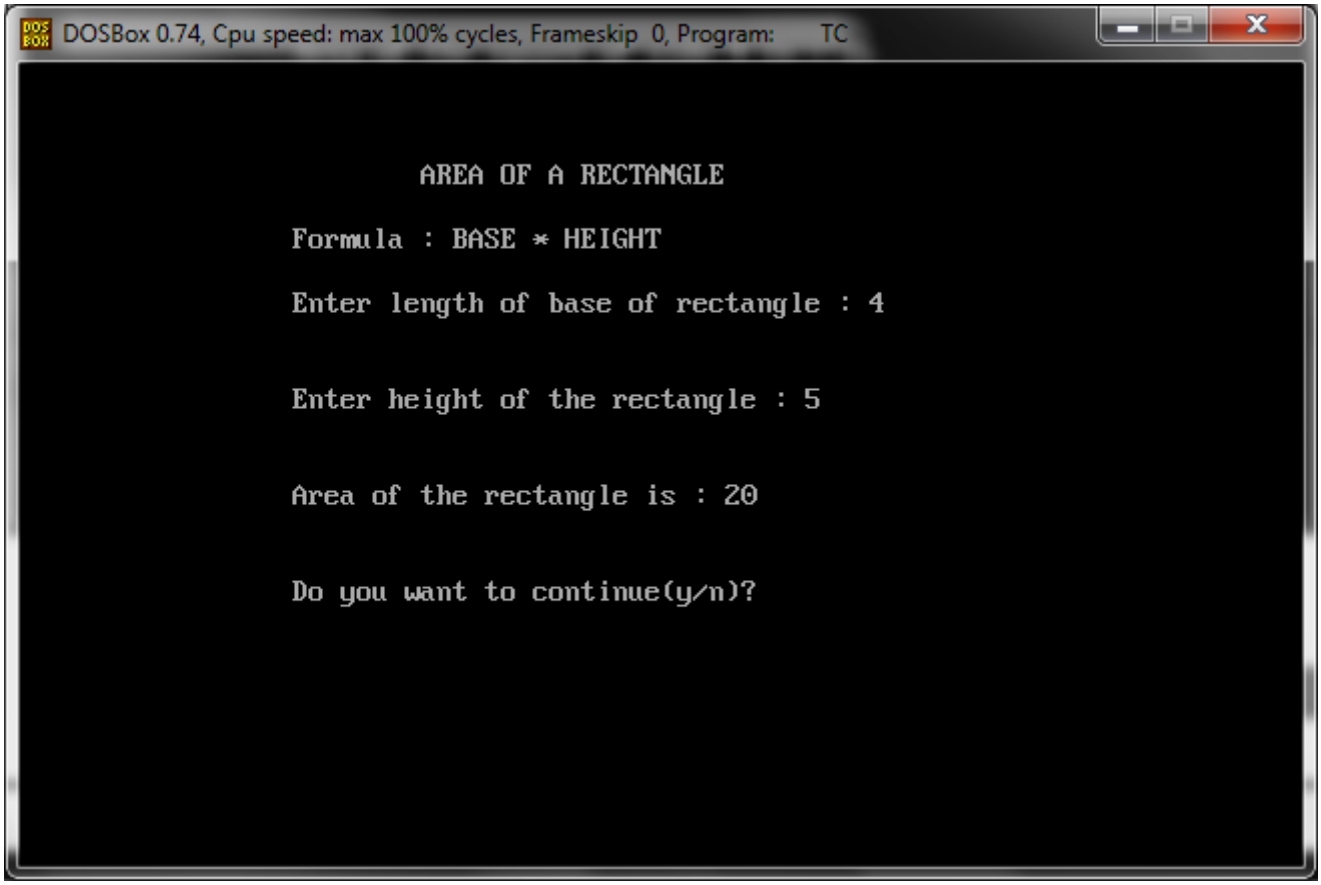
SECTION: CO-ORDINATE GEOMETRY

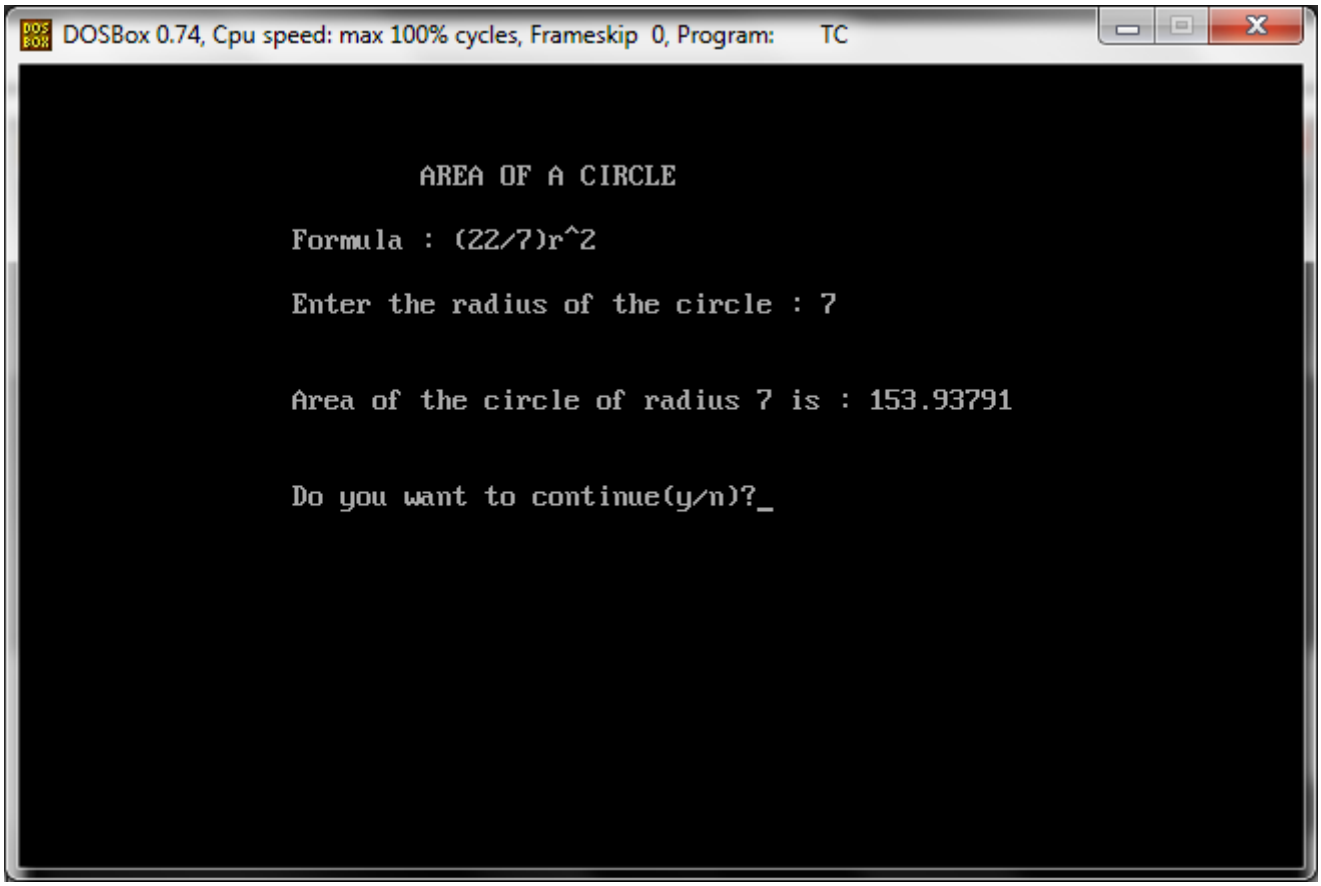


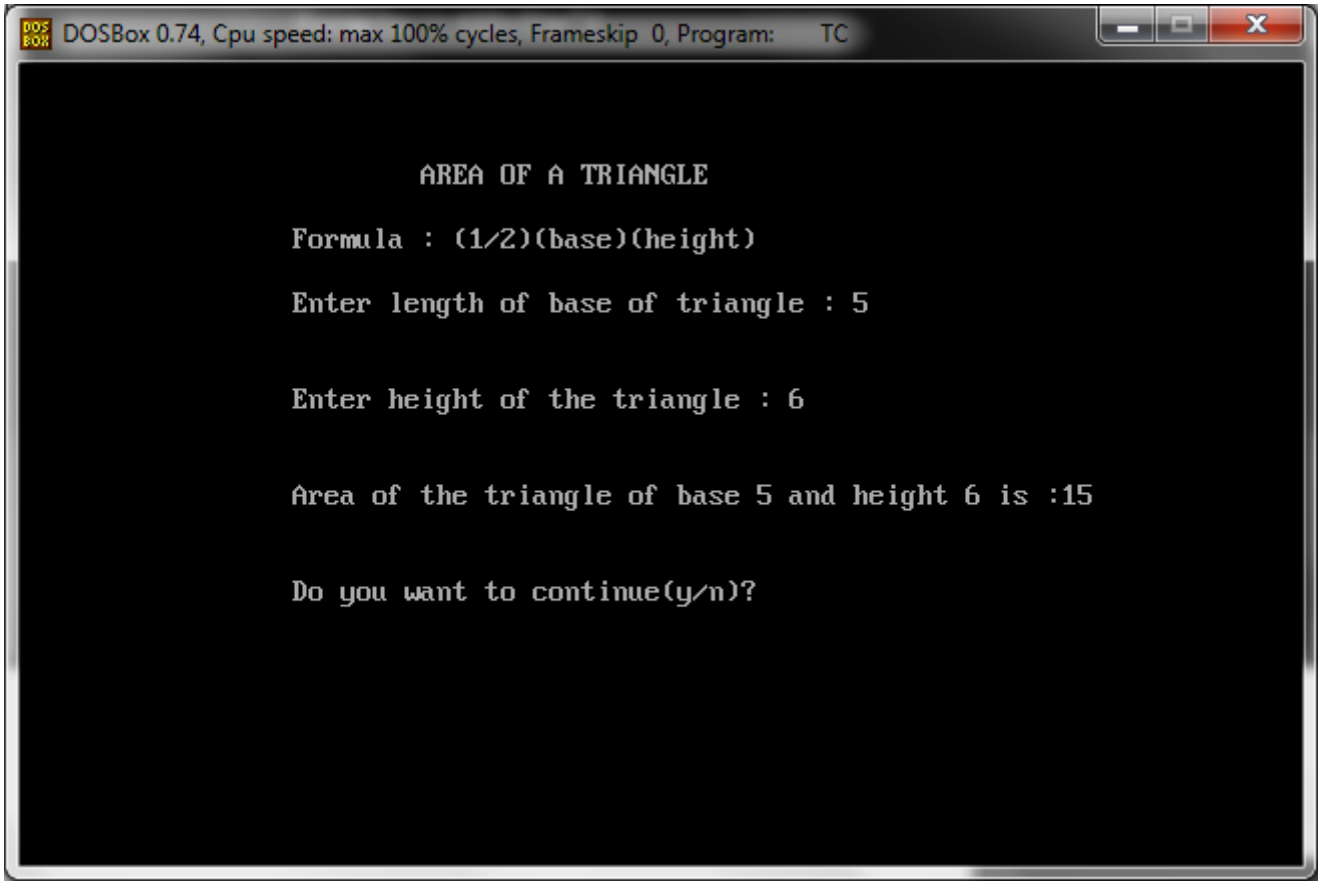
SECTION: AREA

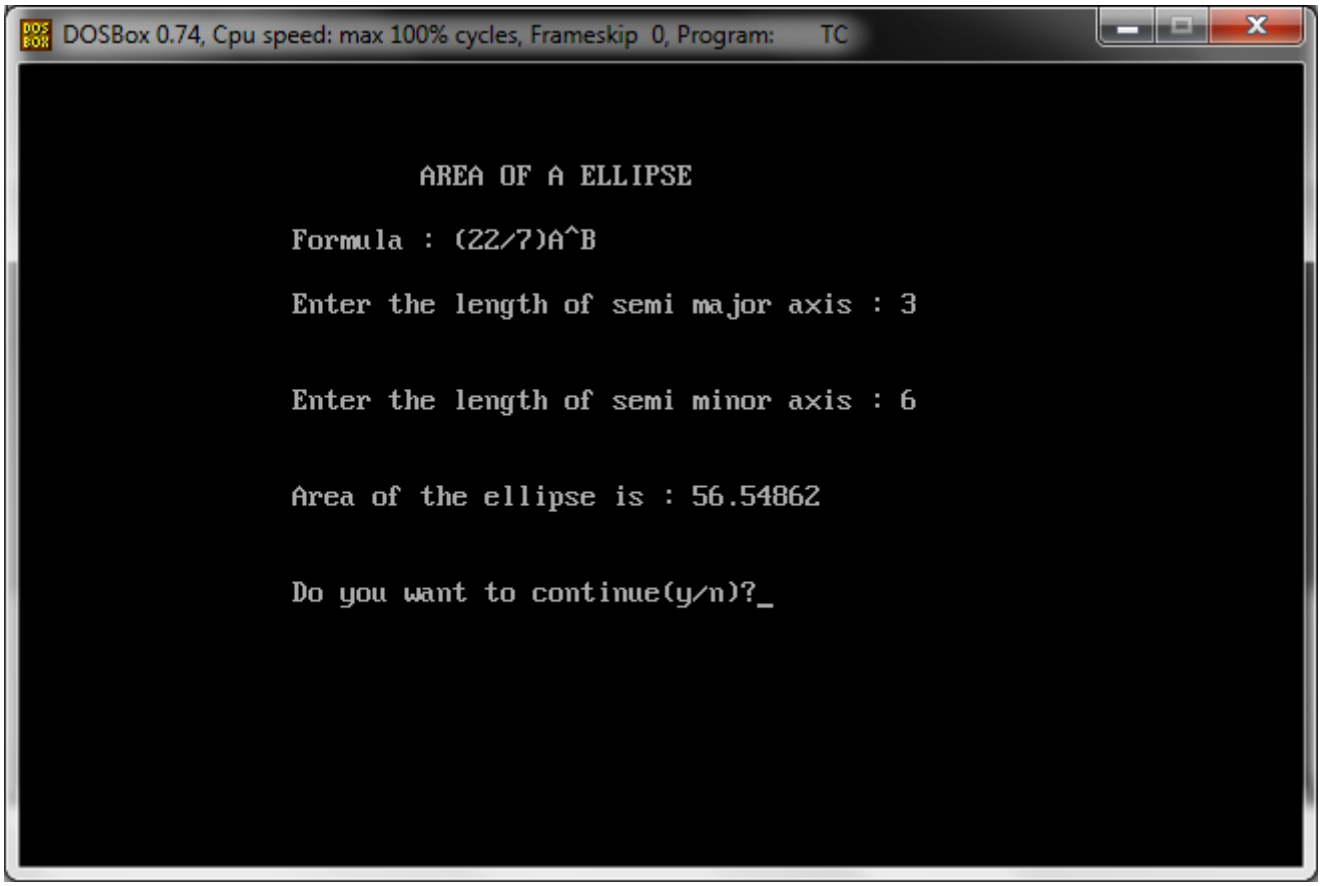


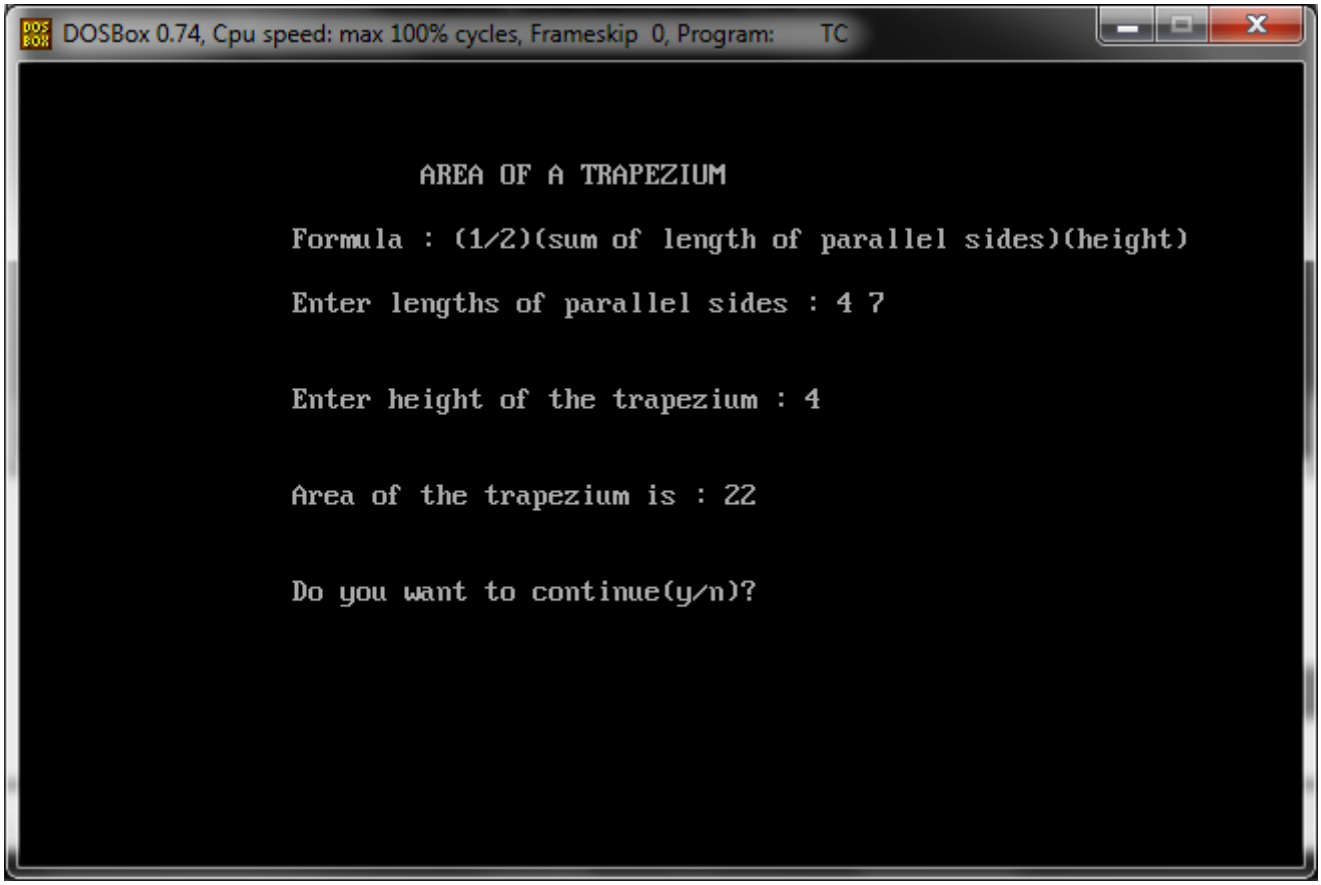



DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
AREA OF A RECTANGLE
Formula : BASE * HEIGHT
Enter length of base of rectangle : 4
Enter height of the rectangle : 5
Area of the rectangle is : 20
Do you want to continue(y/n)?

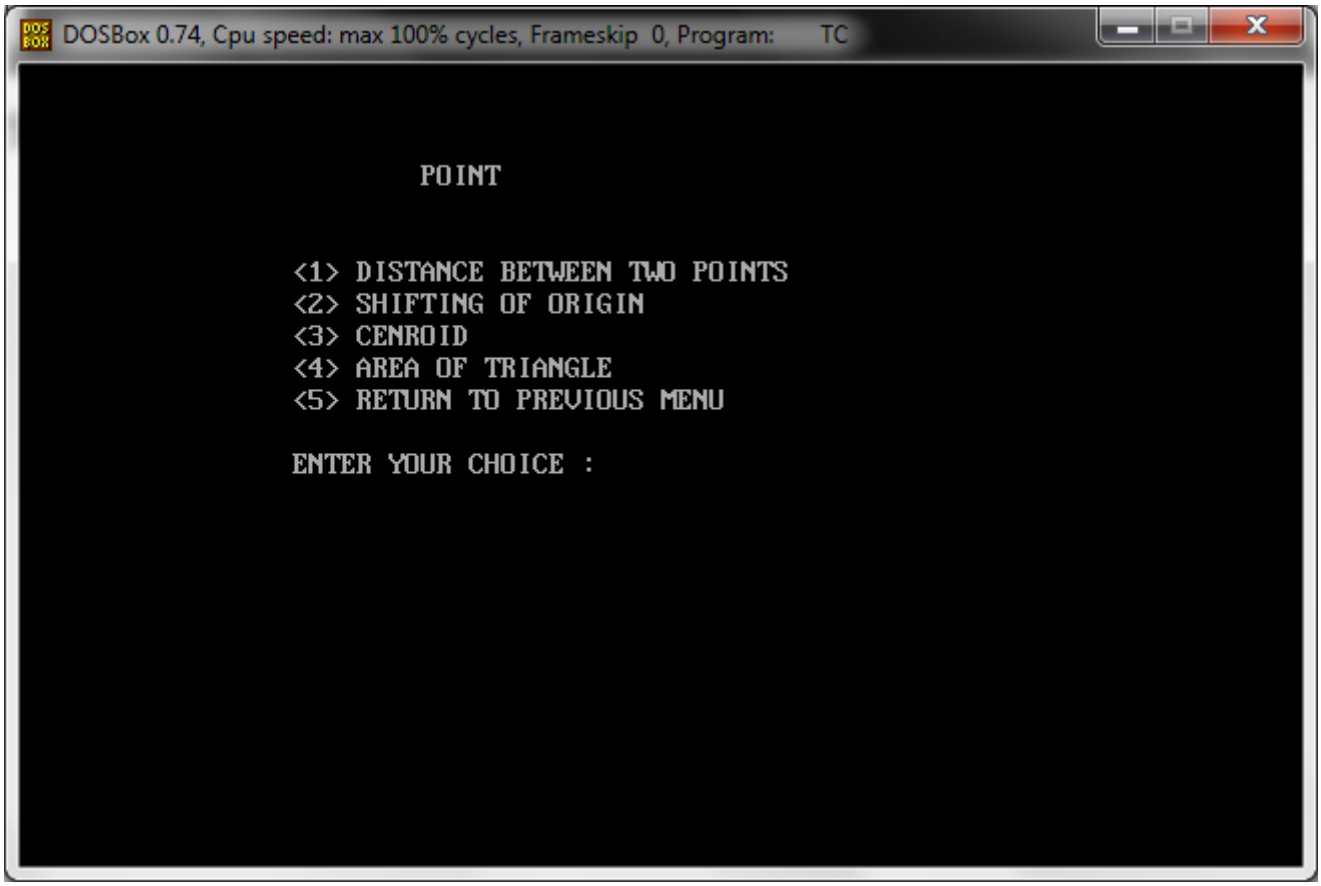

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
AREA OF A CIRCLE
Formula : (22/7)r^2
Enter the radius of the circle : 7
Area of the circle of radius 7 is : 153.93791
Do you want to continue(y/n)?_

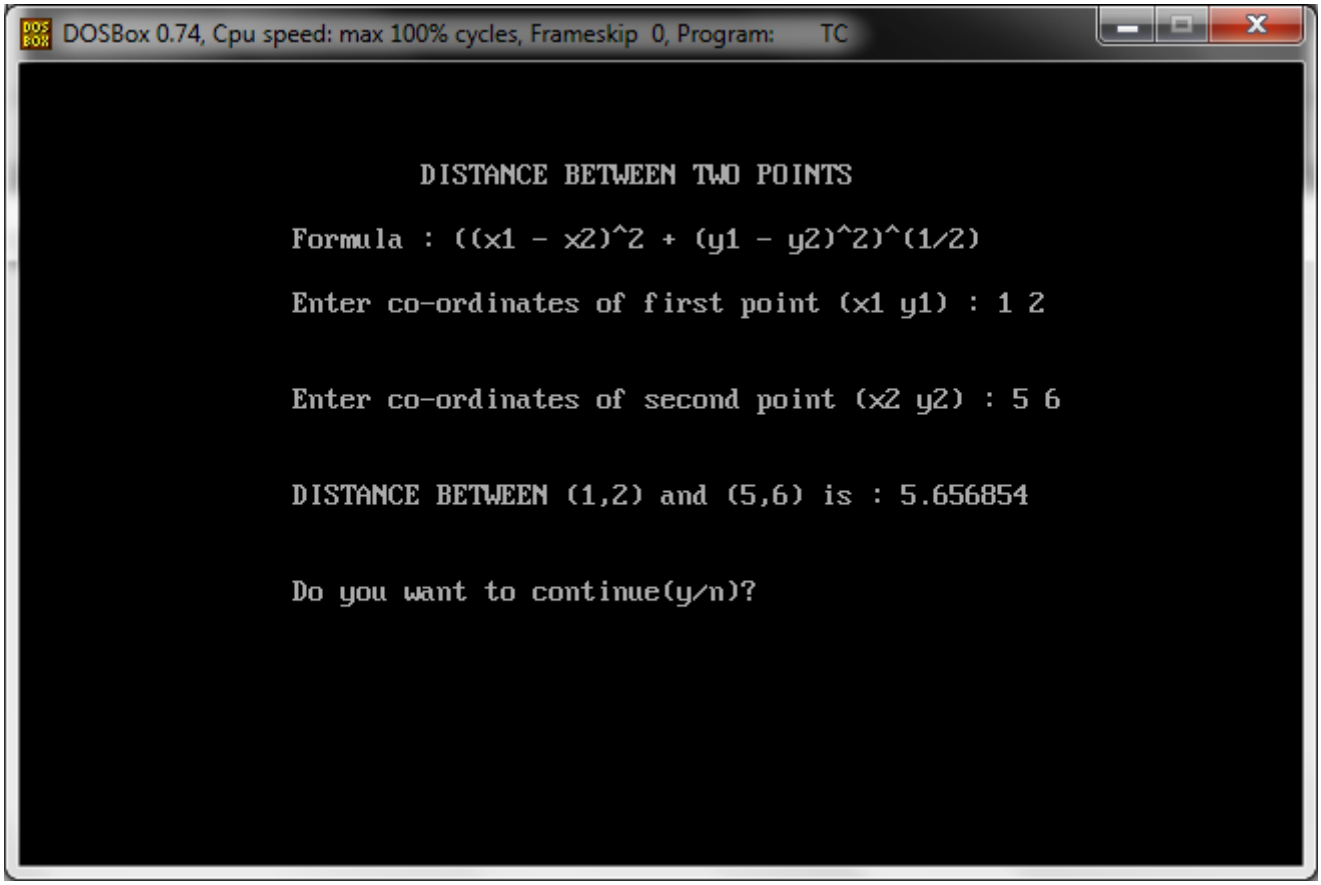

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
AREA OF A TRIANGLE
Formula : (1/2)(base)(height)
Enter length of base of triangle : 5
Enter height of the triangle : 6
Area of the triangle of base 5 and height 6 is :15
Do you want to continue(y/n)?

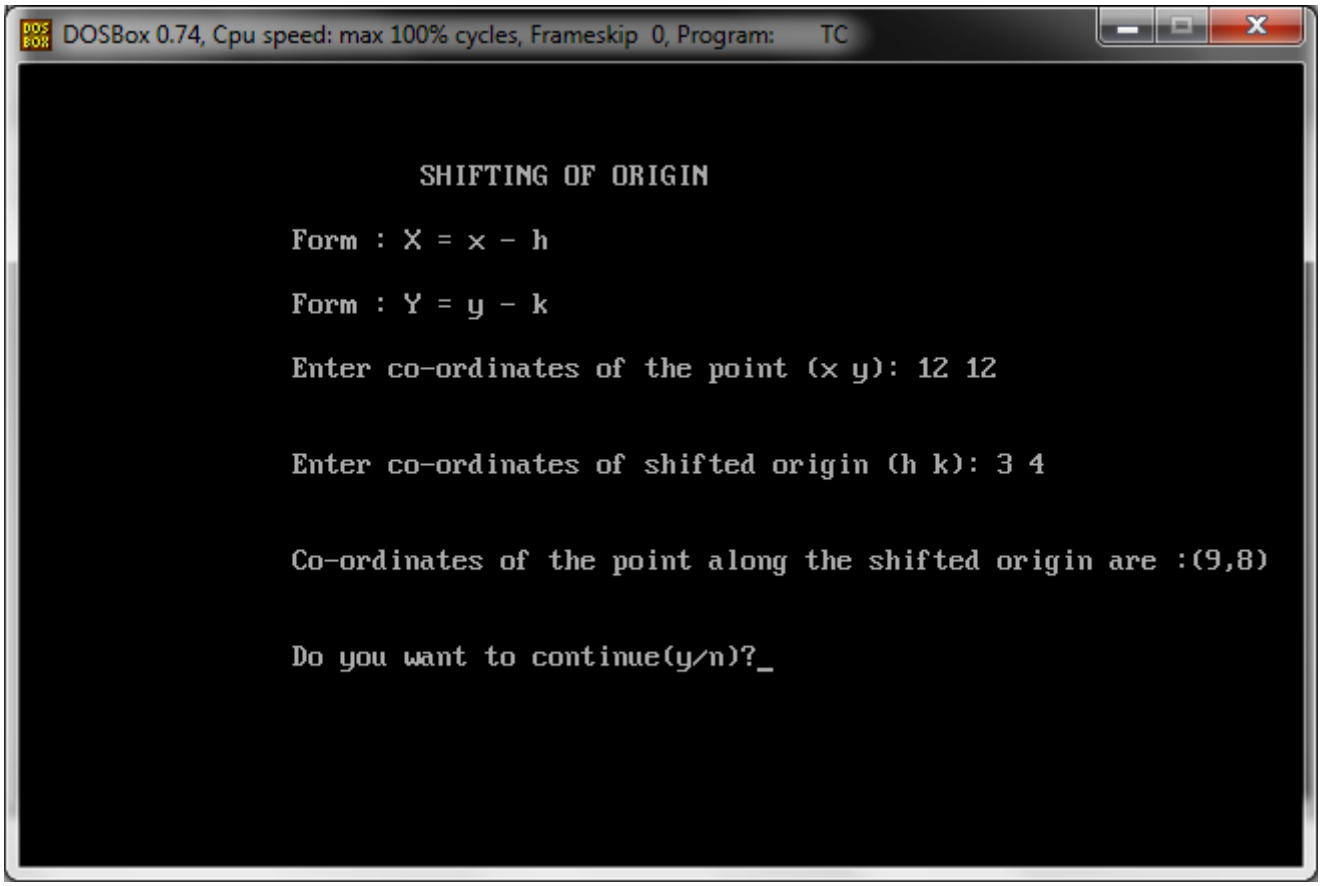

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
AREA OF A ELLIPSE
Formula : (22/7)A^B
Enter the length of semi major axis : 3
Enter the length of semi minor axis : 6
Area of the ellipse is : 56.54862
Do you want to continue(y/n)?_

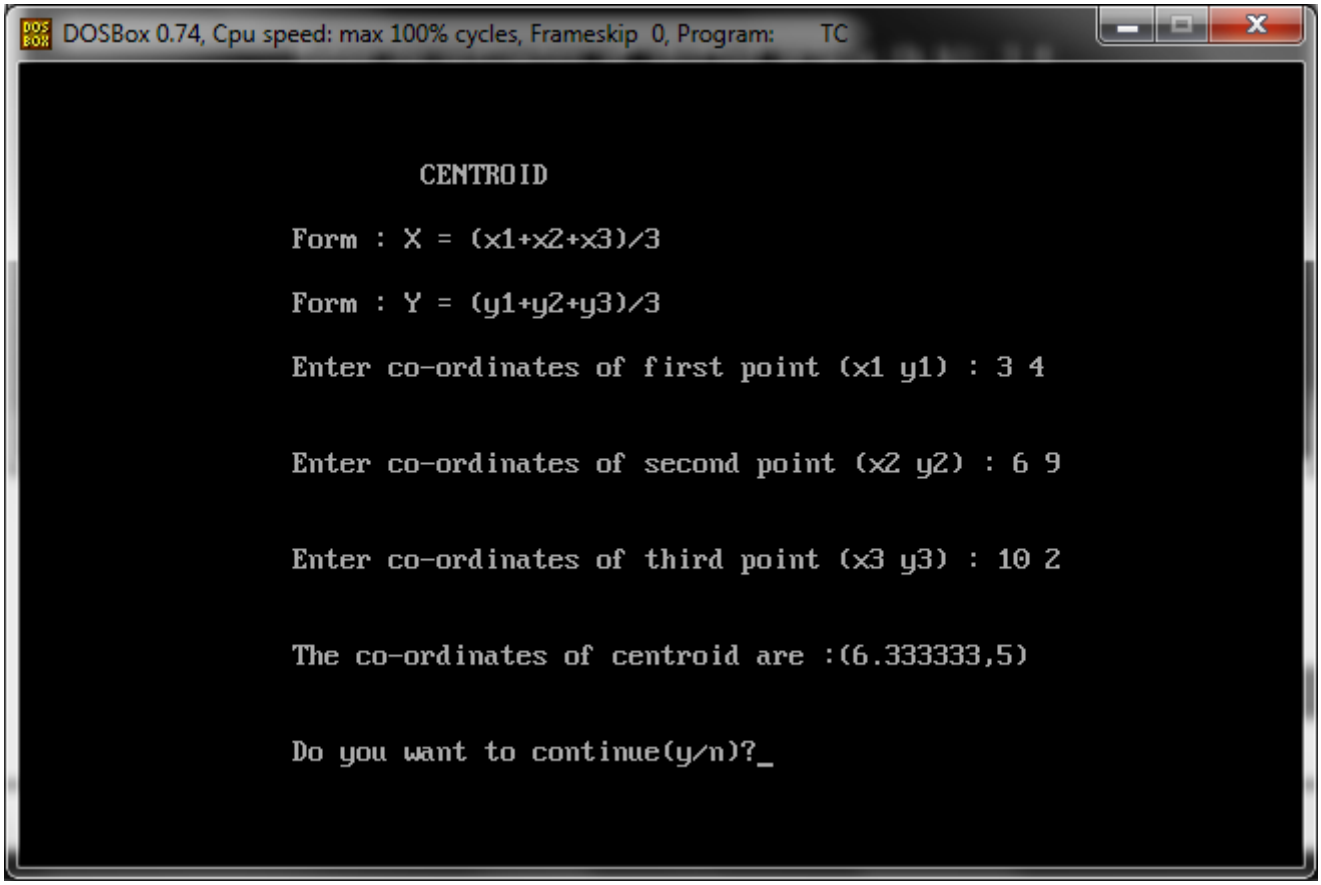


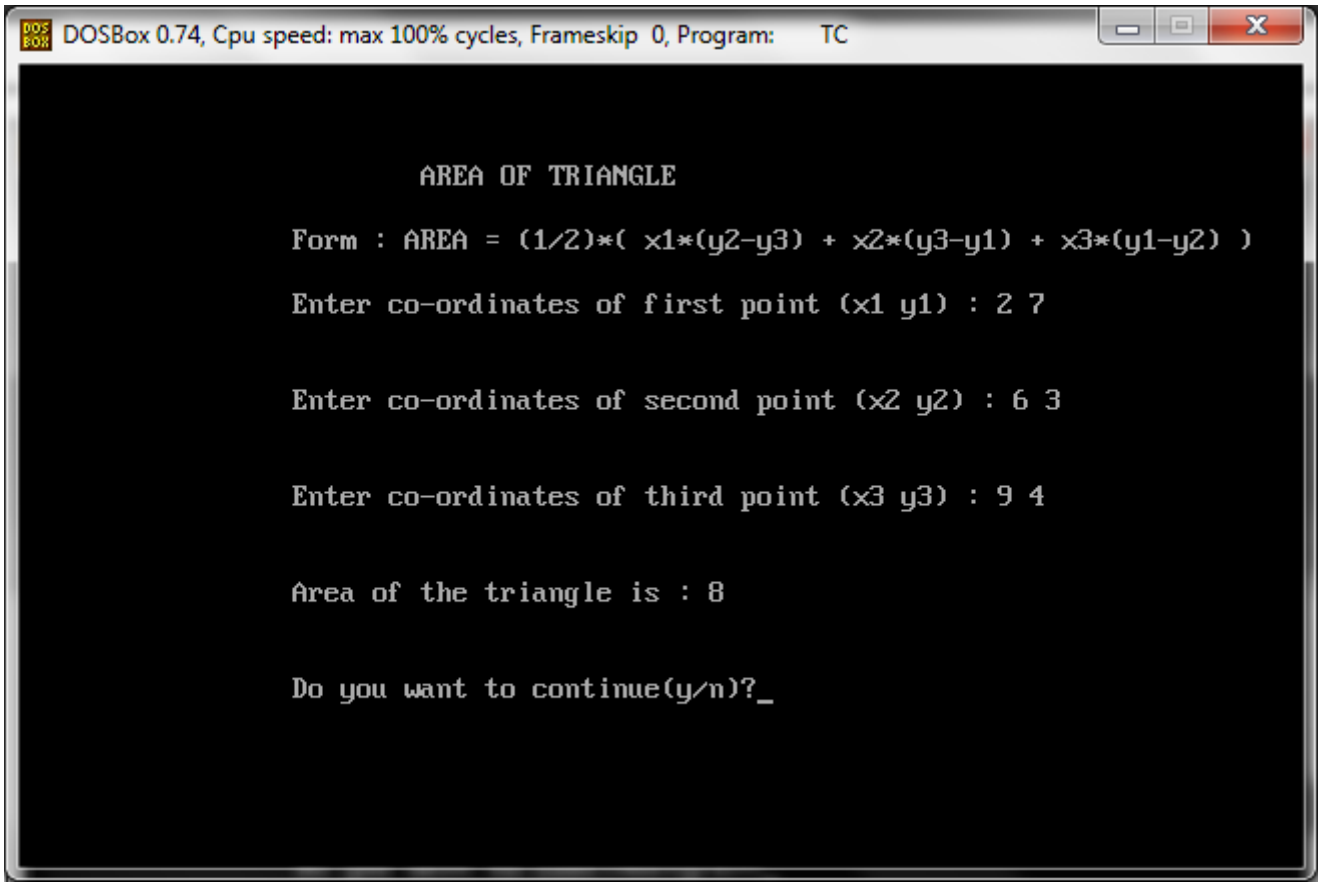
SECTION: POINT



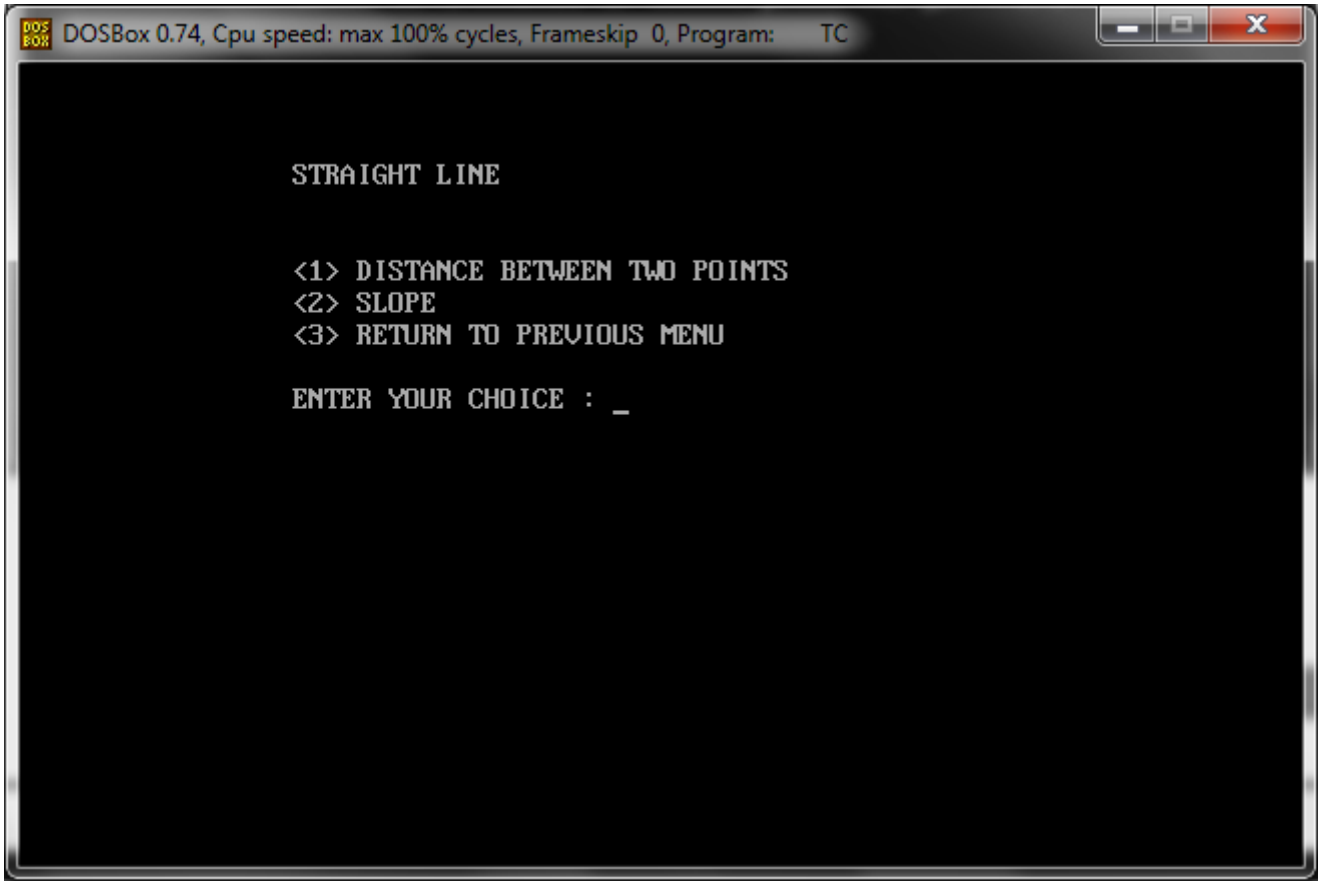

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
DISTANCE BETWEEN TWO POINTS
Formula : ((x1 - x2)^2 + (y1 - y2)^2)^(1/2)
Enter co-ordinates of first point (x1 y1) : 1 2
Enter co-ordinates of second point (x2 y2) : 5 6
DISTANCE BETWEEN (1,2) and (5,6) is : 5.656854
Do you want to continue(y/n)?

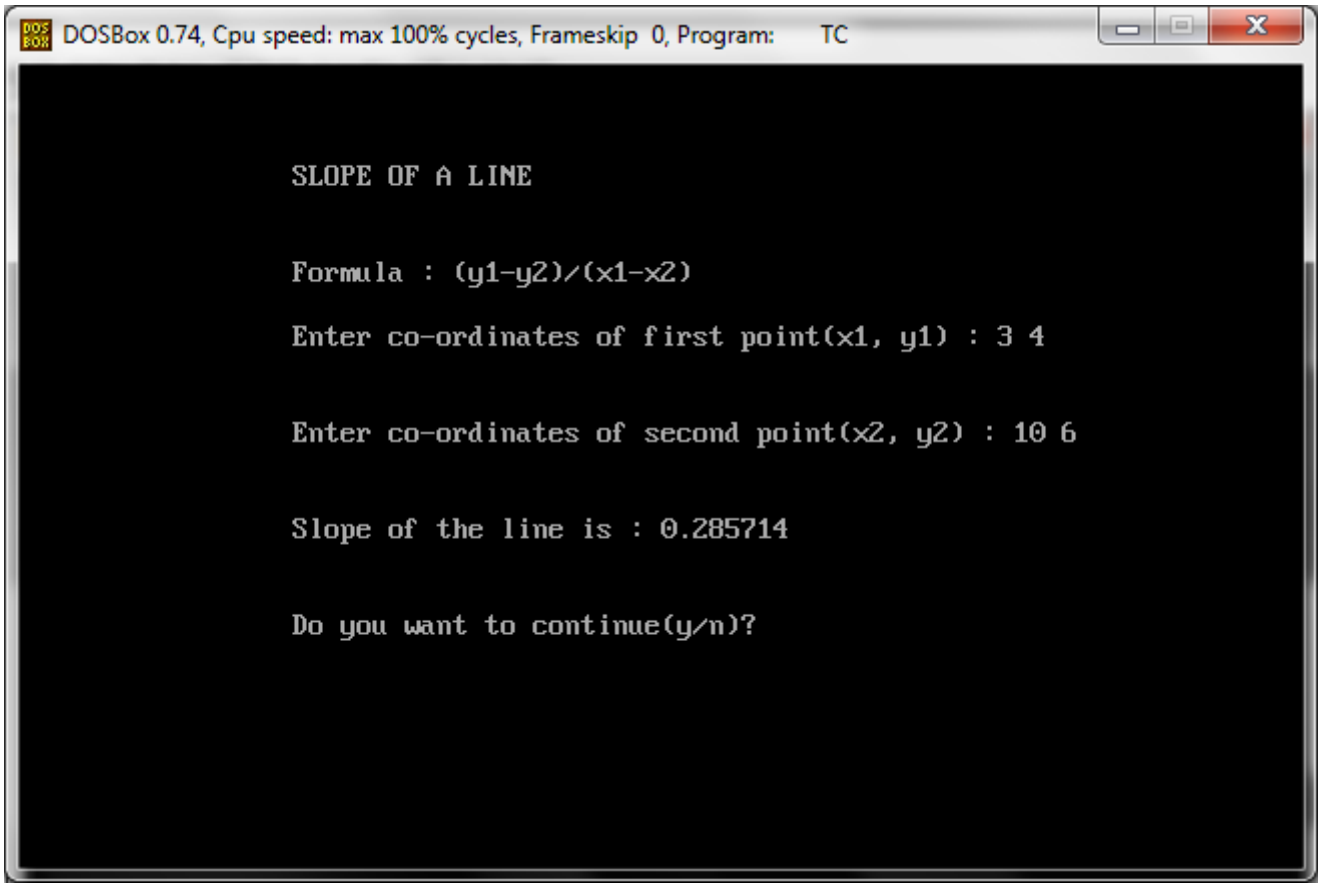

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
SHIFTING OF ORIGIN
Form : X = x - h
Form : Y = y - k
Enter co-ordinates of the point (x y): 12 12
Enter co-ordinates of shifted origin (h k): 3 4
Co-ordinates of the point along the shifted origin are :(9,8)
Do you want to continue(y/n)?_


DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
CENTROID
Form : X = (x1+x2+x3)/3
Form : Y = (y1+y2+y3)/3
Enter co-ordinates of first point (x1 y1) : 3 4
Enter co-ordinates of second point (x2 y2) : 6 9
Enter co-ordinates of third point (x3 y3) : 10 2
The co-ordinates of centroid are :(6.333333,5)
Do you want to continue(y/n)?_

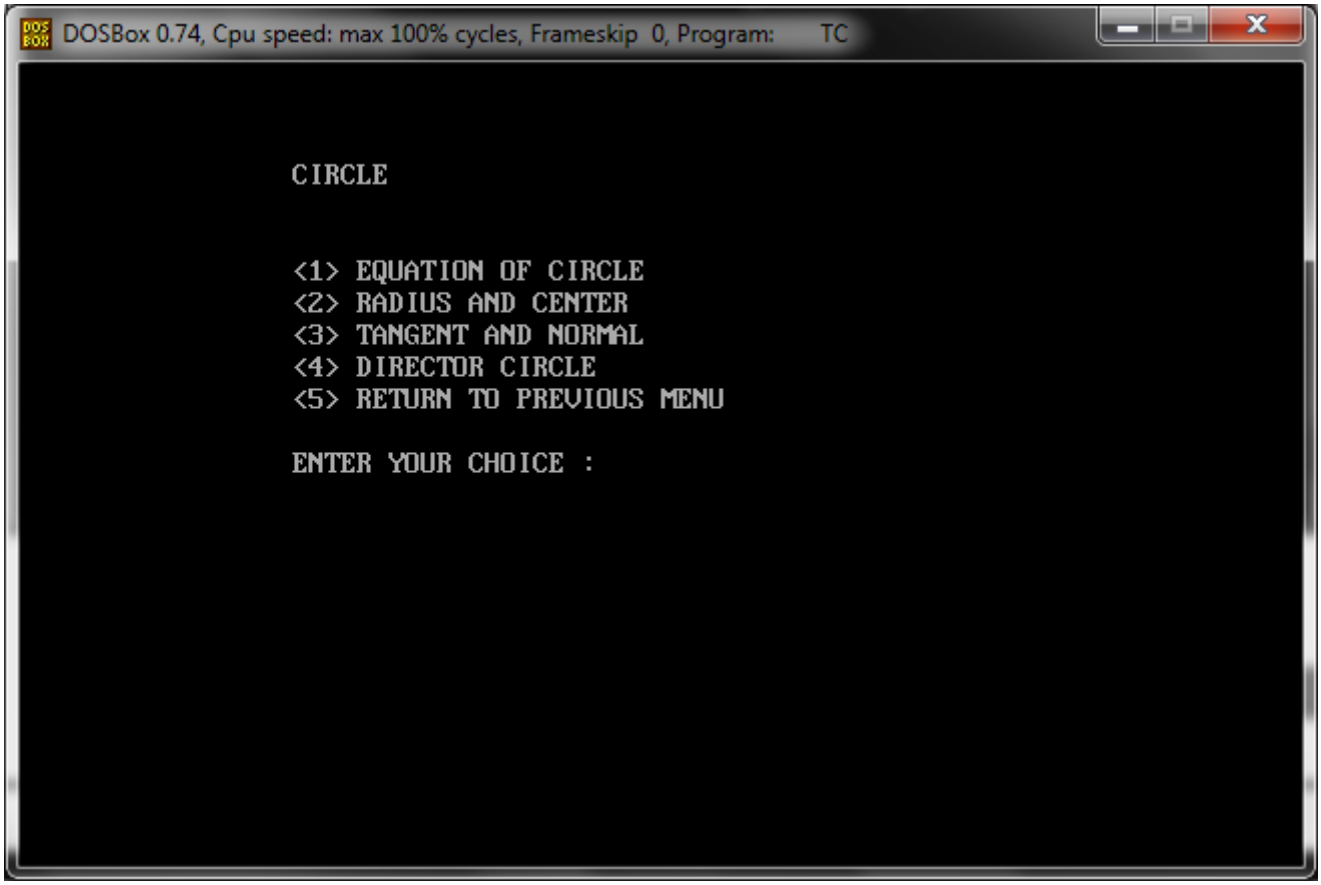

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
AREA OF TRIANGLE
Form : AREA = (1/2)*(x1*(y2-y3) + x2*(y3-y1) + x3*(y1-y2))
Enter co-ordinates of first point (x1 y1) : 2 7
Enter co-ordinates of second point (x2 y2) : 6 3
Enter co-ordinates of third point (x3 y3) : 9 4
Area of the triangle is : 8
Do you want to continue(y/n)?_

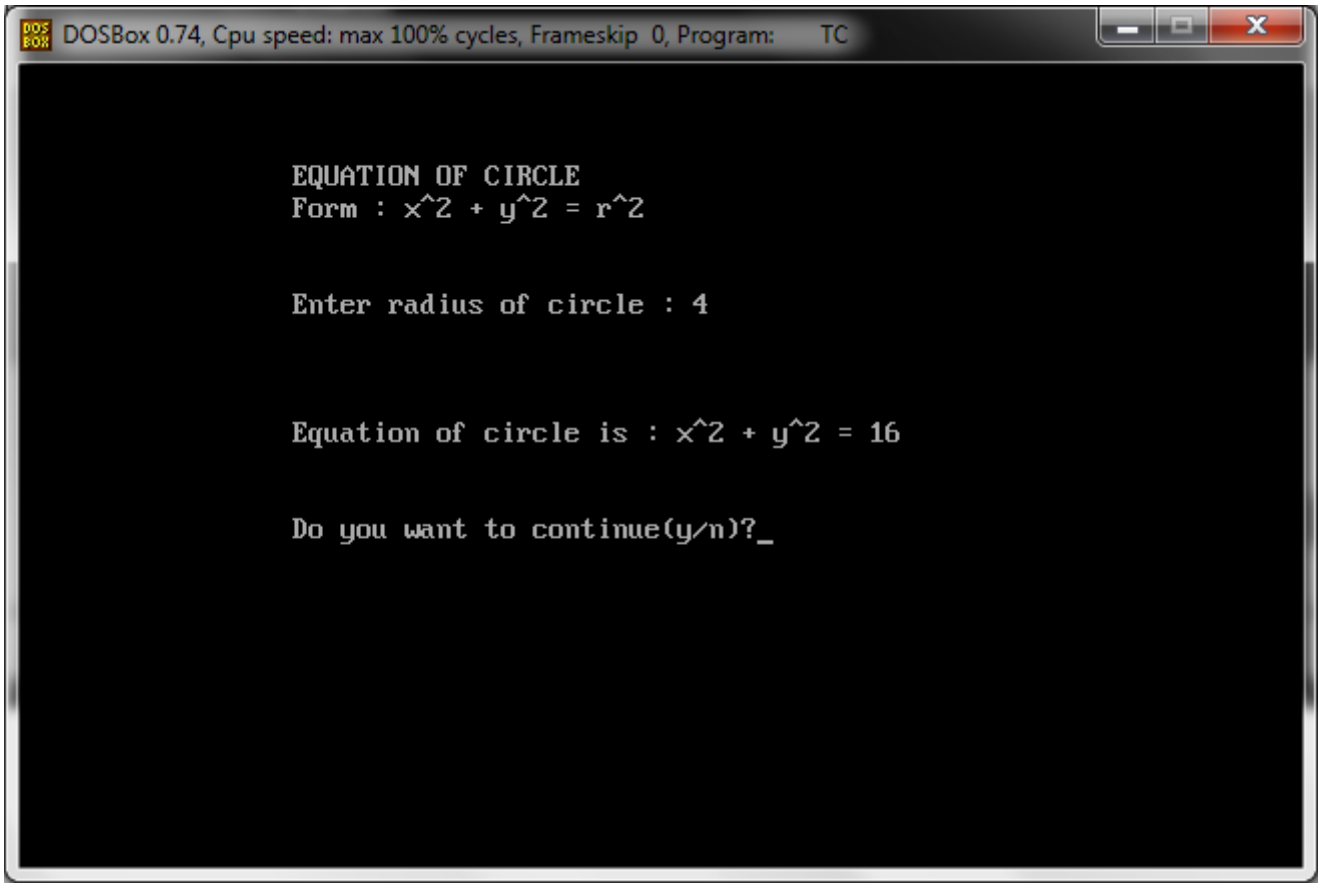
SECTION: STRAIGHT LINE

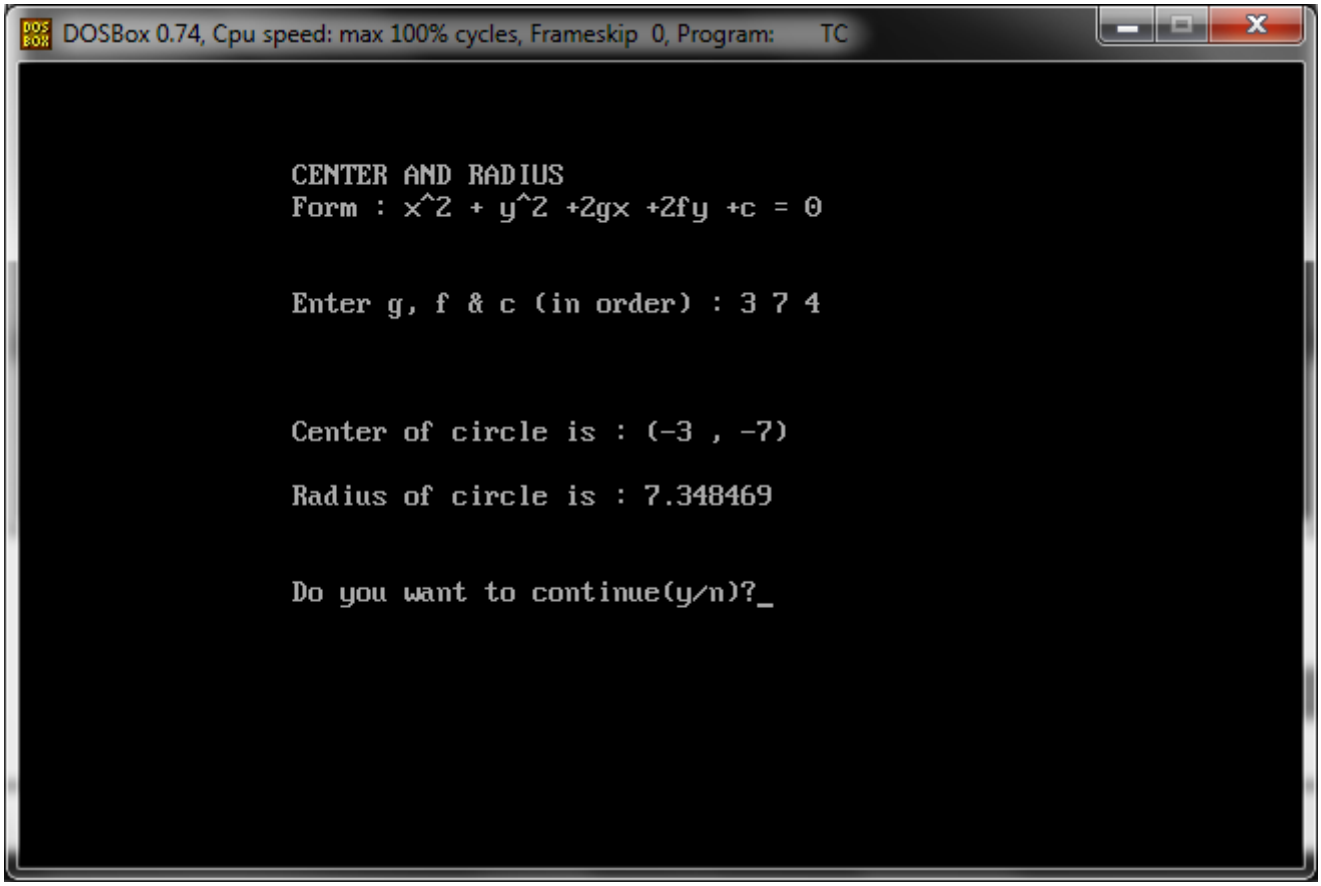


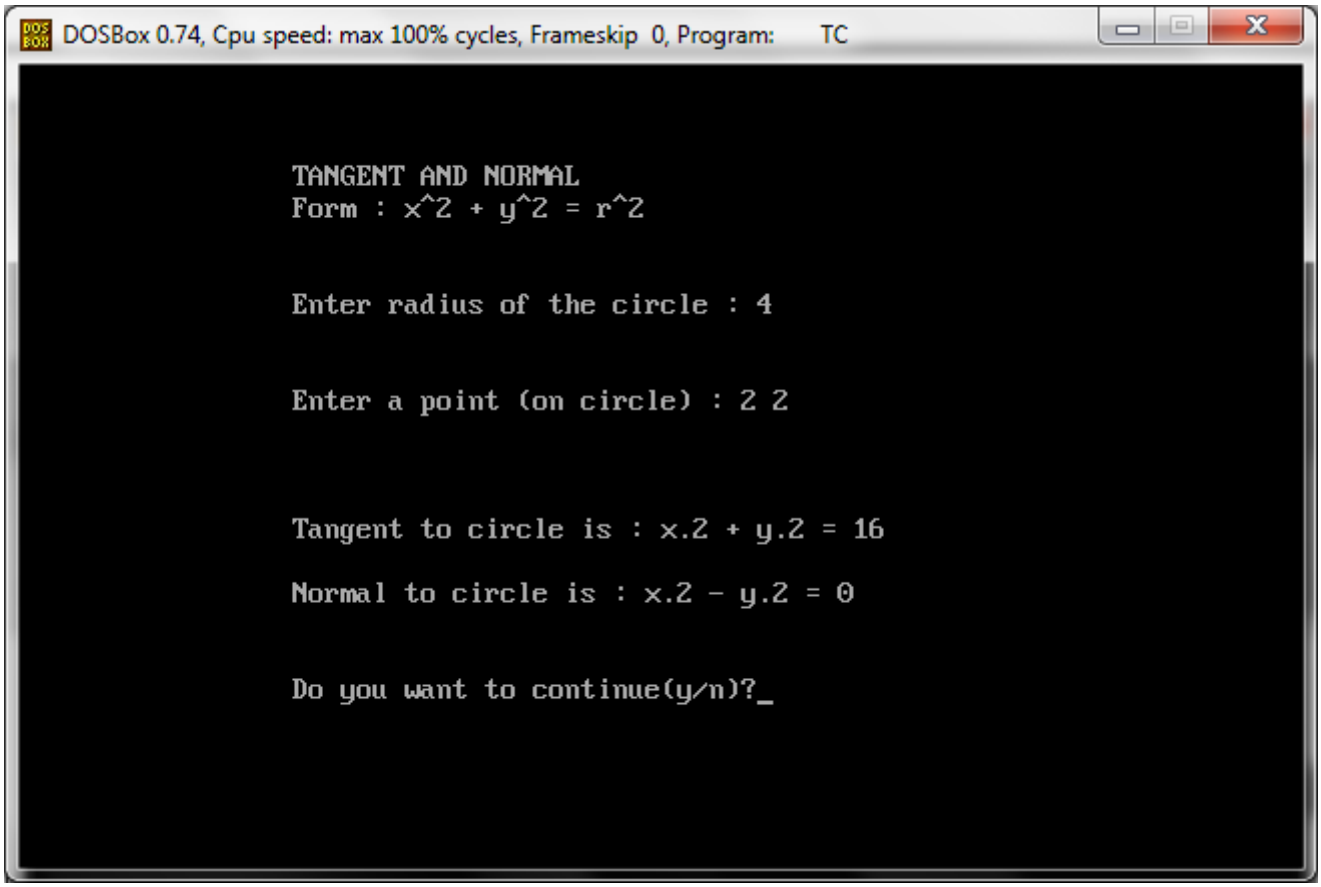


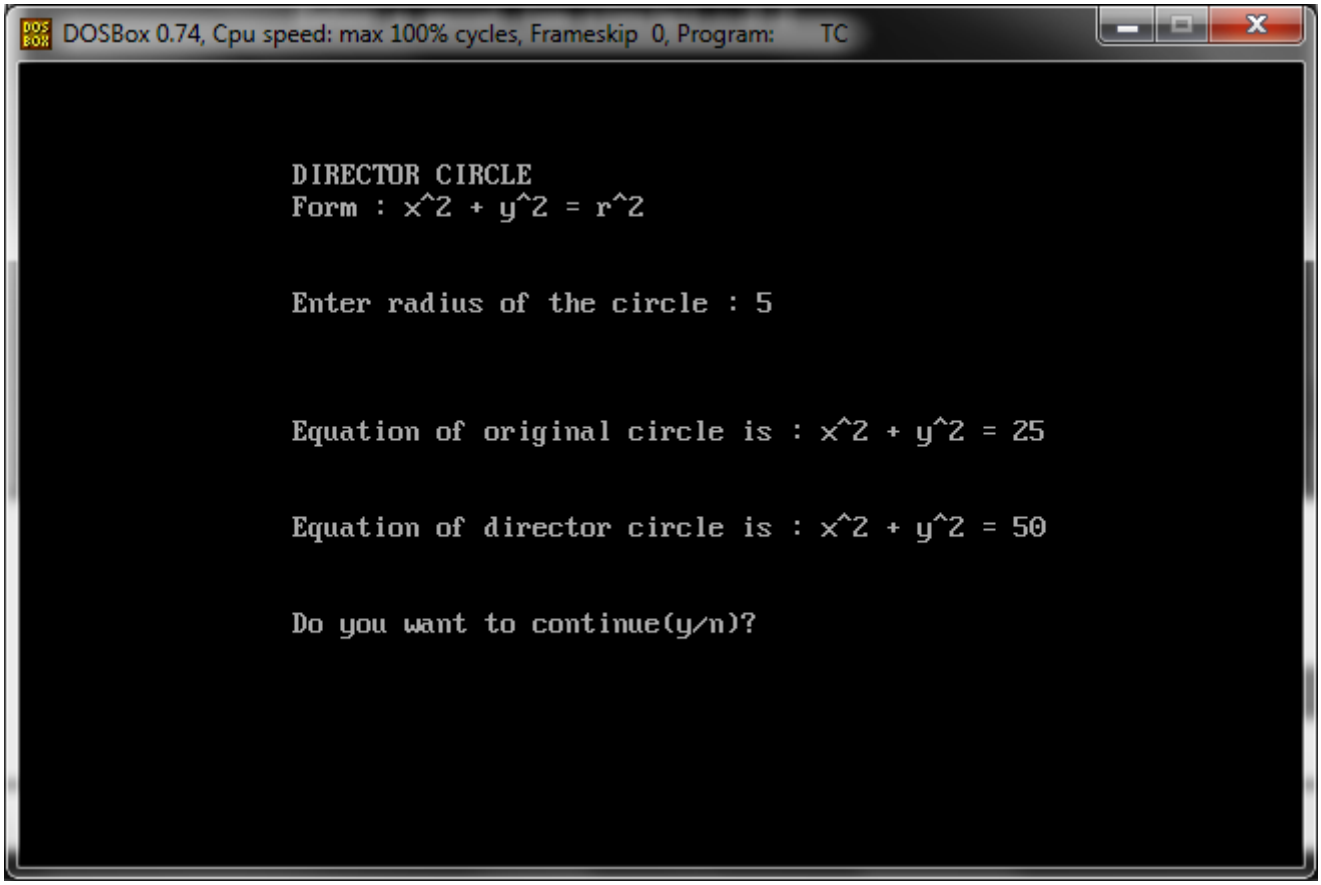
SECTION: CIRCLE



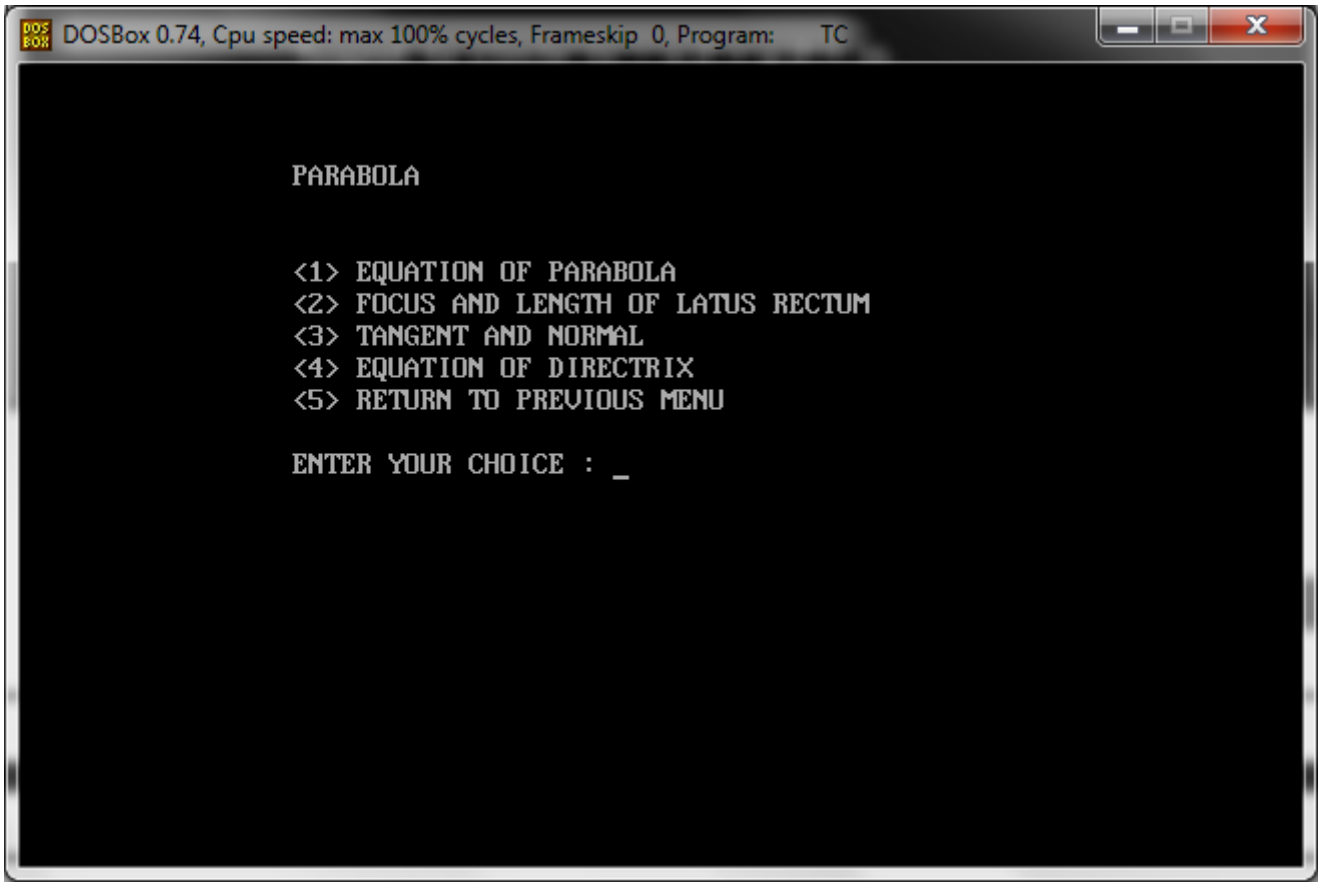


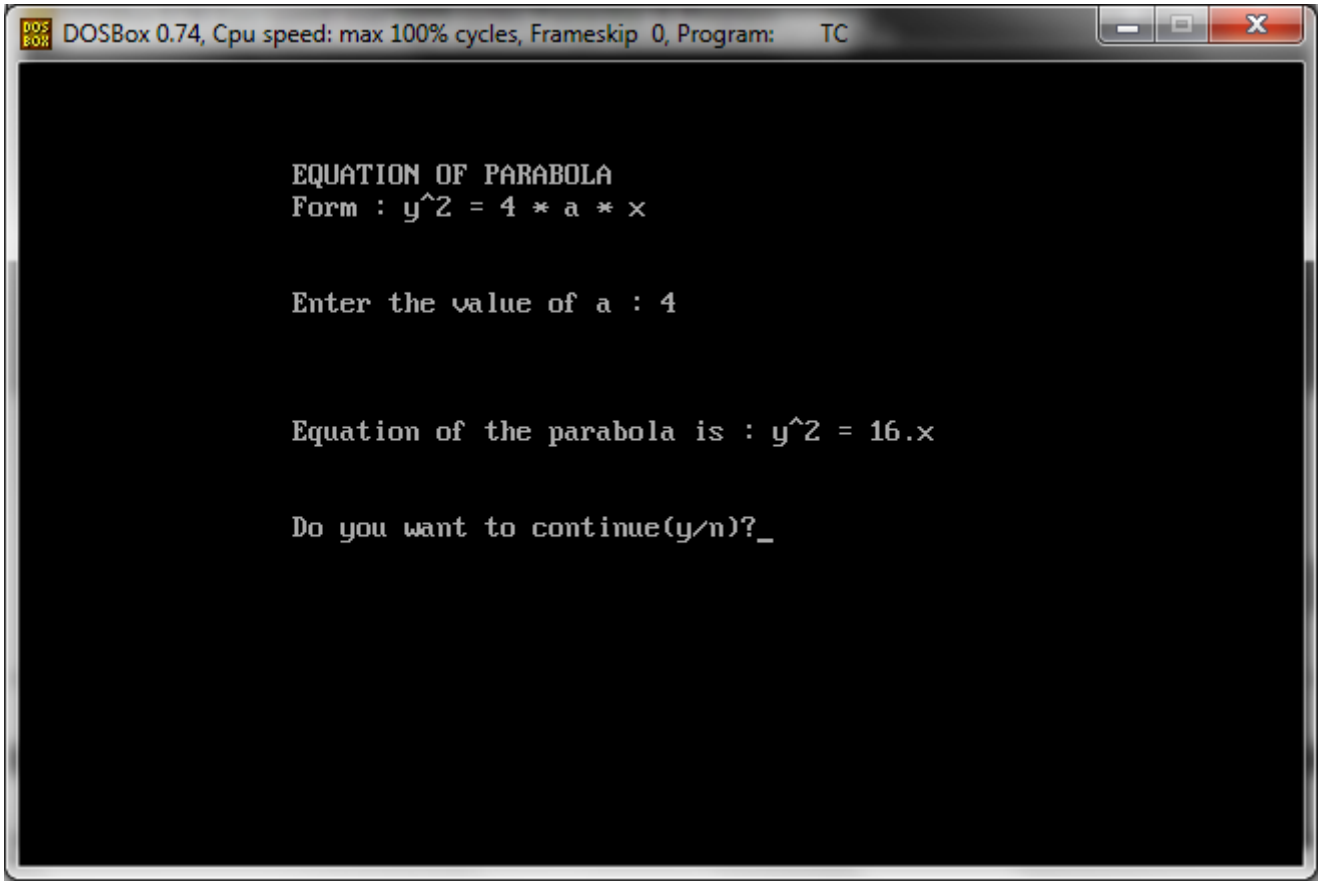

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
CENTER AND RADIUS
Form : x^2 + y^2 +2gx +2fy +c = 0
Enter g, f & c (in order) : 3 7 4
Center of circle is : (-3 , -7)
Radius of circle is : 7.348469
Do you want to continue(y/n)?_

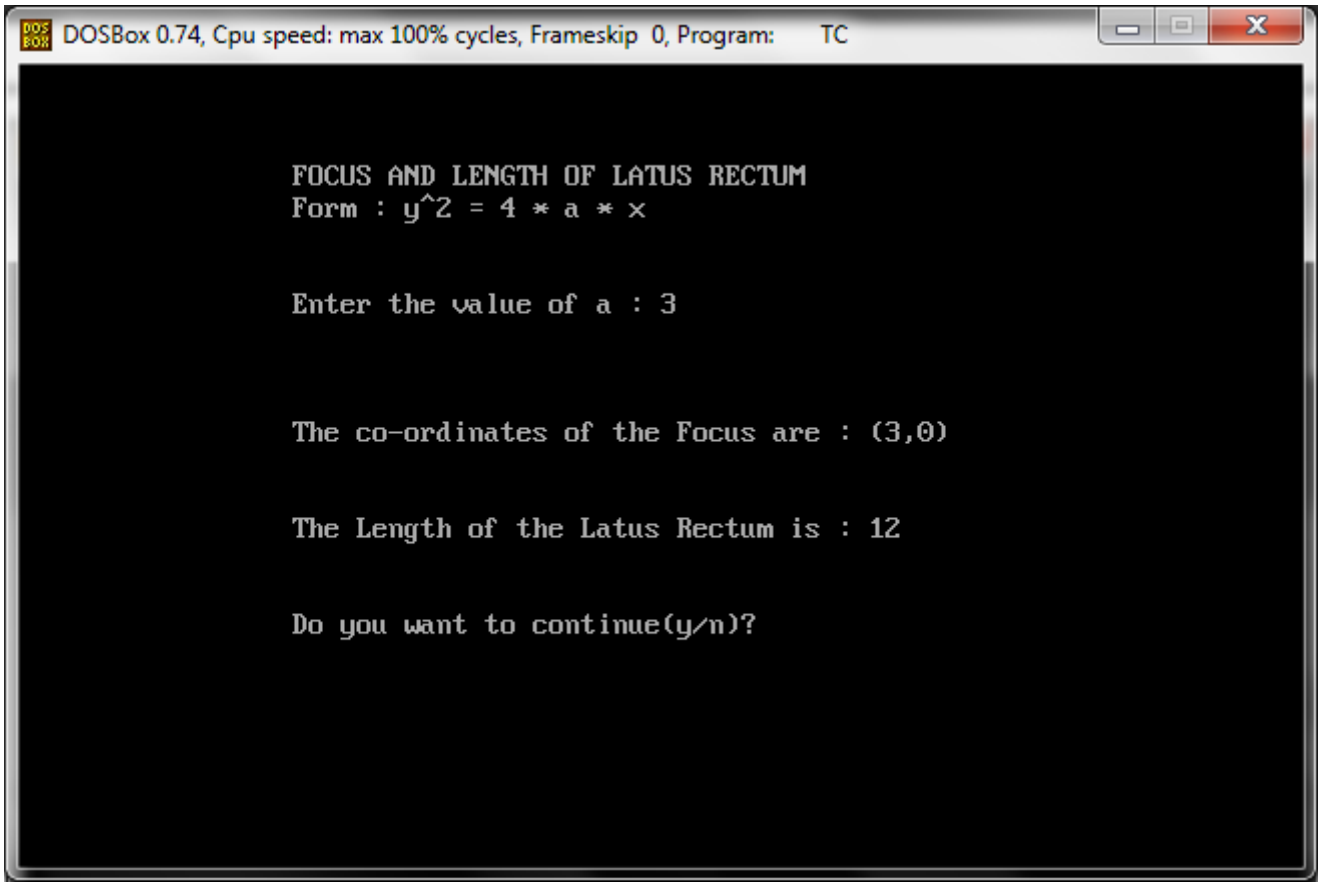

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
TANGENT AND NORMAL
Form : x^2 + y^2 = r^2
Enter radius of the circle : 4
Enter a point (on circle) : 2 2
Tangent to circle is : x.2 + y.2 = 16
Normal to circle is : x.2 - y.2 = 0
Do you want to continue(y/n)?_

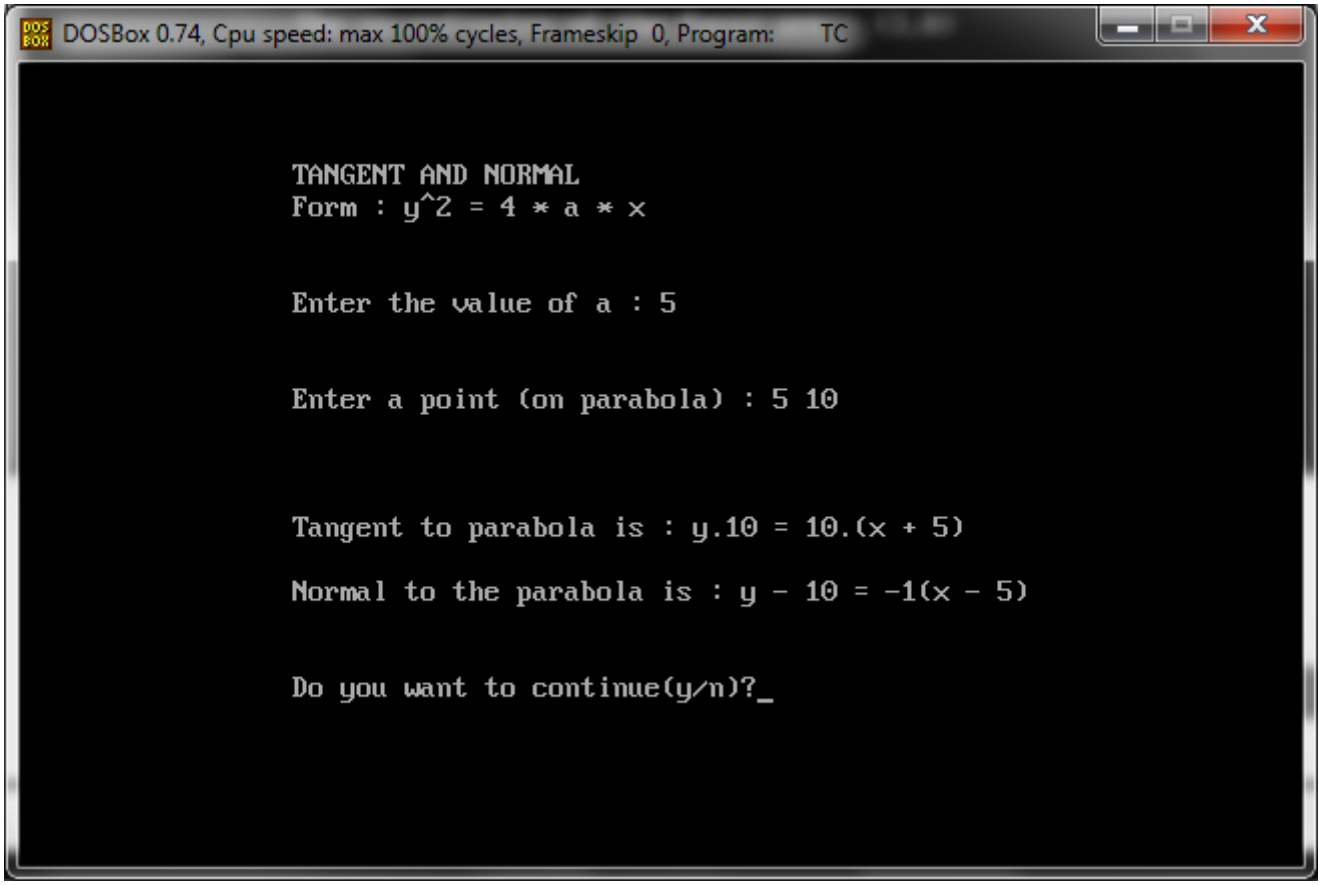


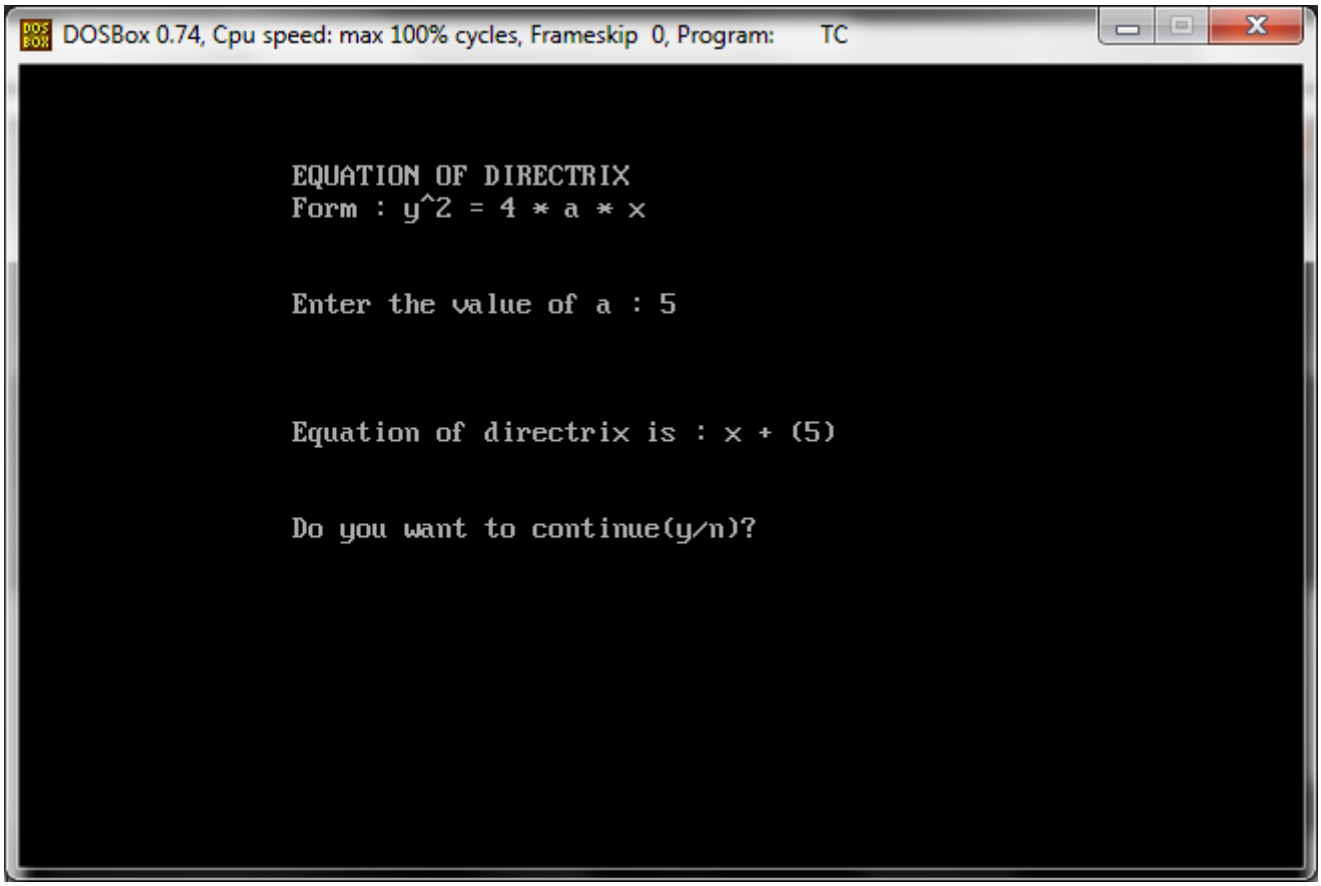
SECTION: PARABOLA



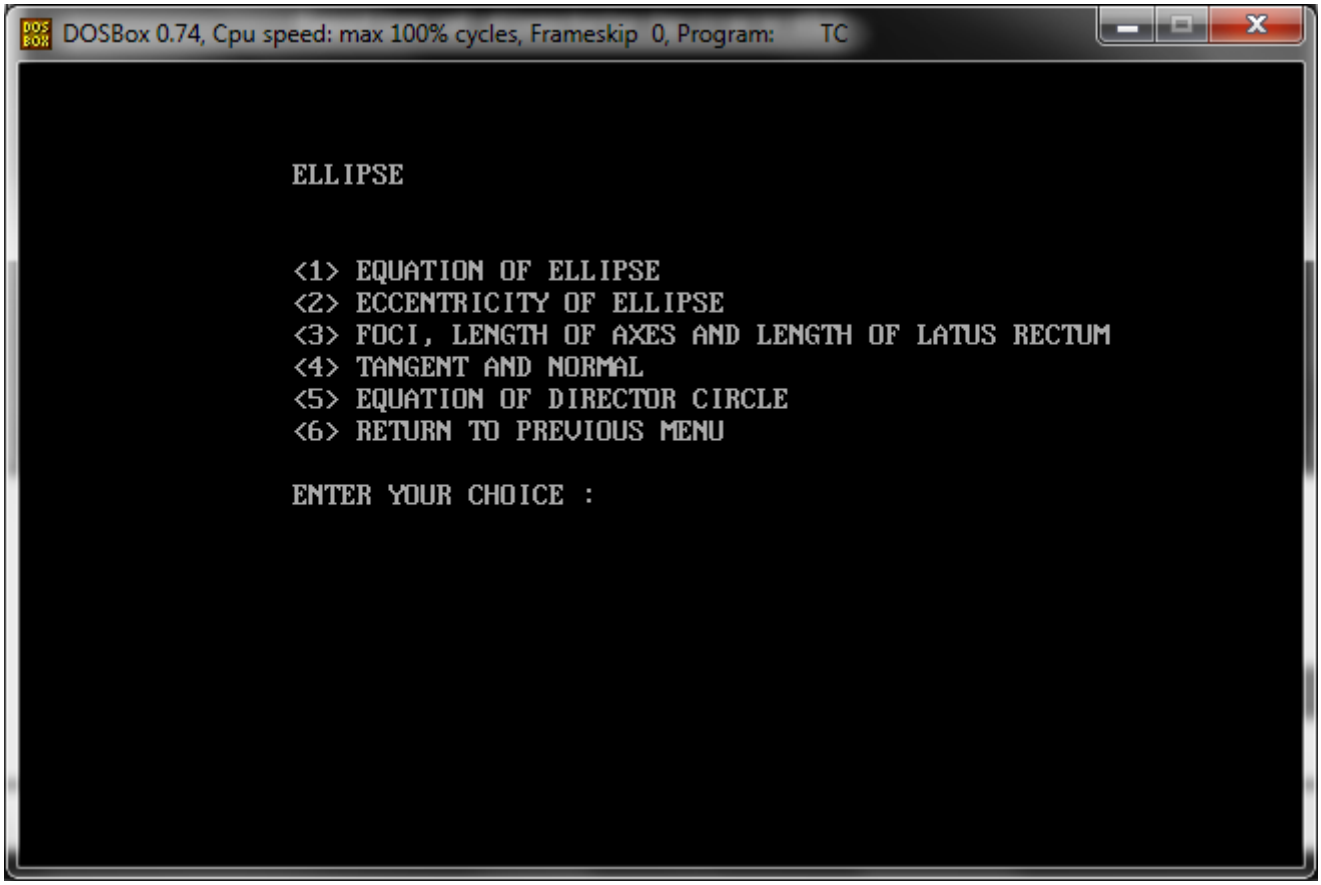

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
EQUATION OF PARABOLA
Form : y^2 = 4 * a * x
Enter the value of a : 4
Equation of the parabola is : y^2 = 16.x
Do you want to continue(y/n)?_

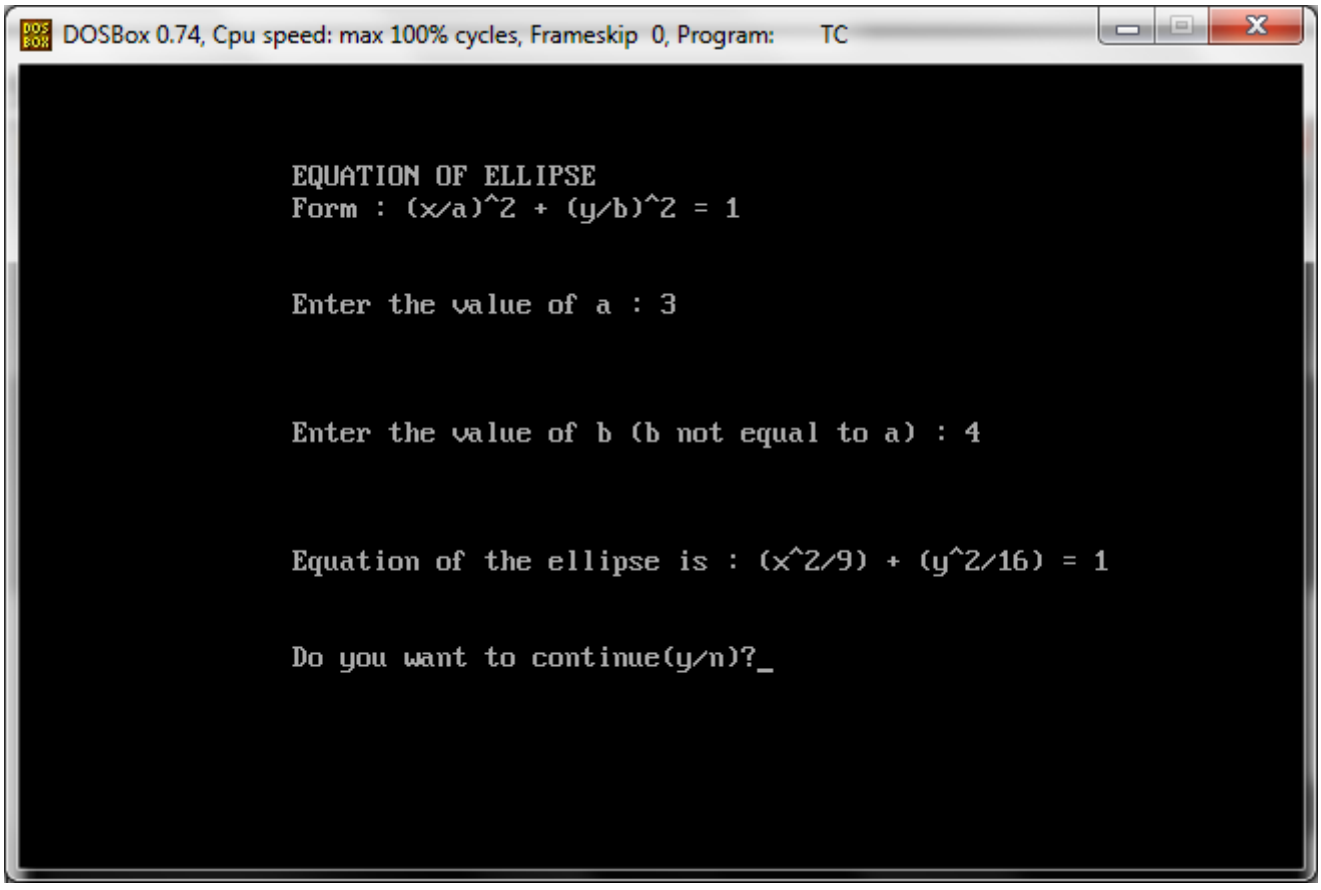

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
FOCUS AND LENGTH OF LATUS RECTUM
Form : y^2 = 4 * a * x
Enter the value of a : 3
The co-ordinates of the Focus are : (3,0)
The Length of the Latus Rectum is : 12
Do you want to continue(y/n)?

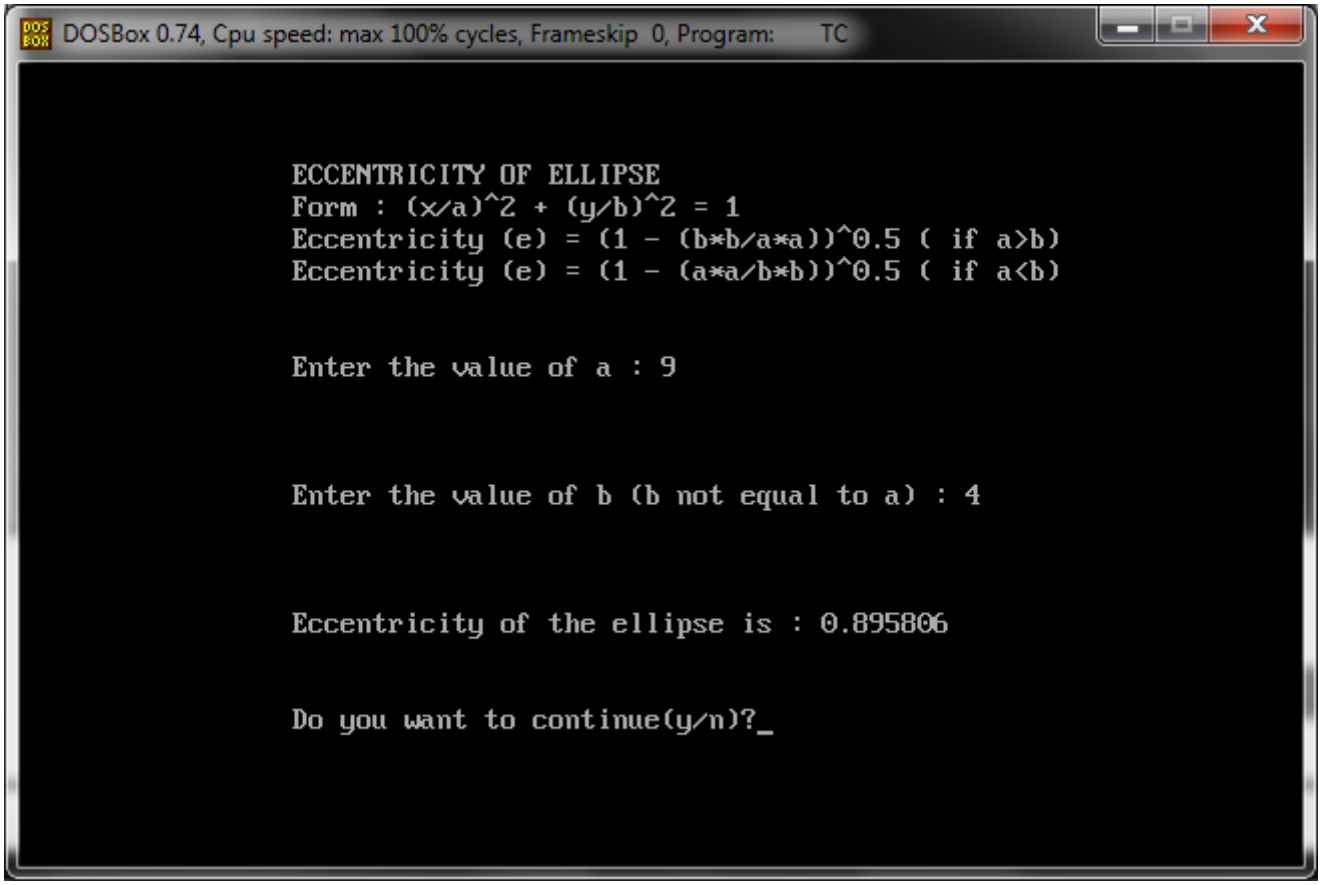

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
TANGENT AND NORMAL
Form : y^2 = 4 * a * x
Enter the value of a : 5
Enter a point (on parabola) : 5 10
Tangent to parabola is : y.10 = 10.(x + 5)
Normal to the parabola is : y - 10 = -1(x - 5)
Do you want to continue(y/n)?_

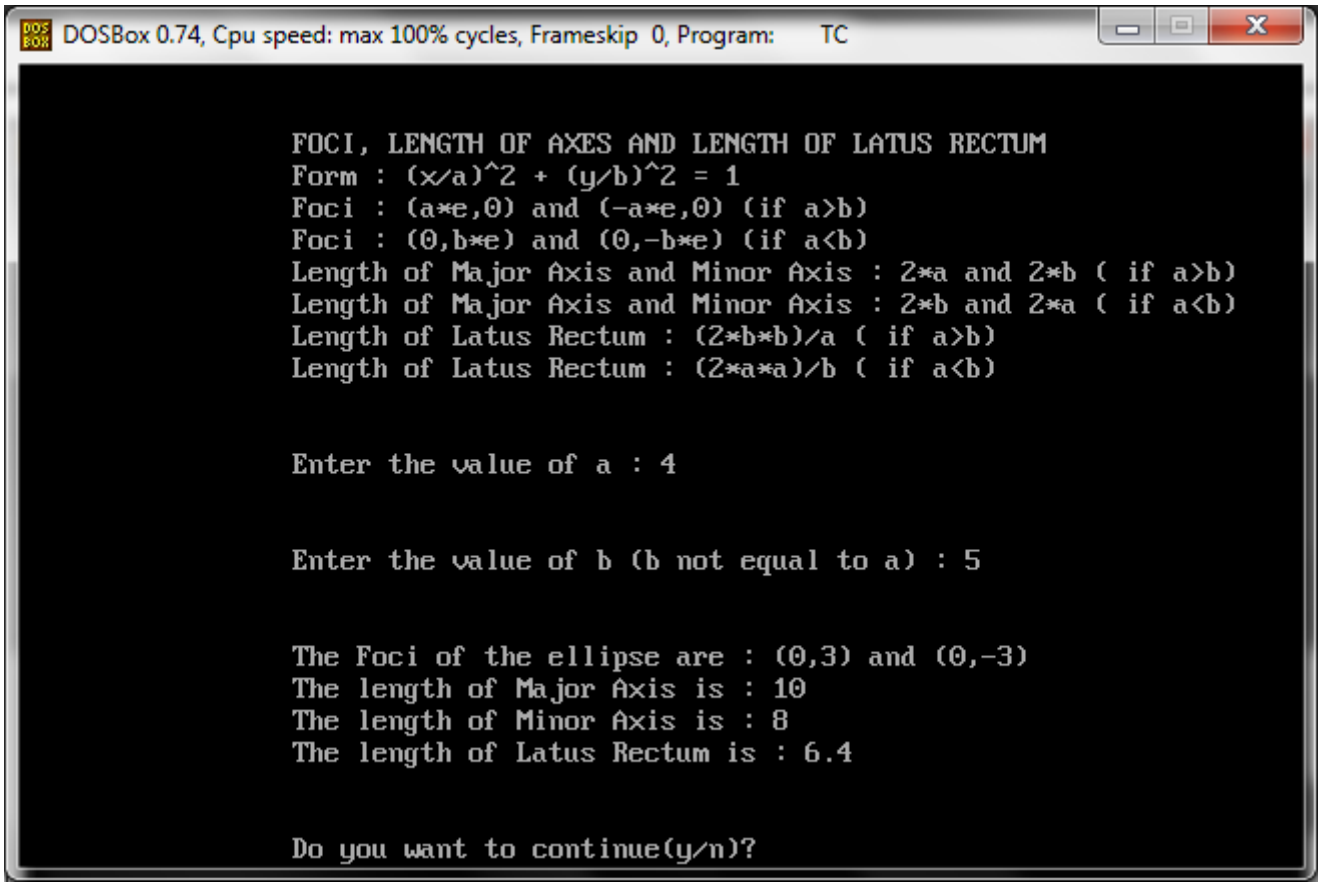

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
EQUATION OF DIRECTRIX
Form : y^2 = 4 * a * x
Enter the value of a : 5
Equation of directrix is : x + (5)
Do you want to continue(y/n)?

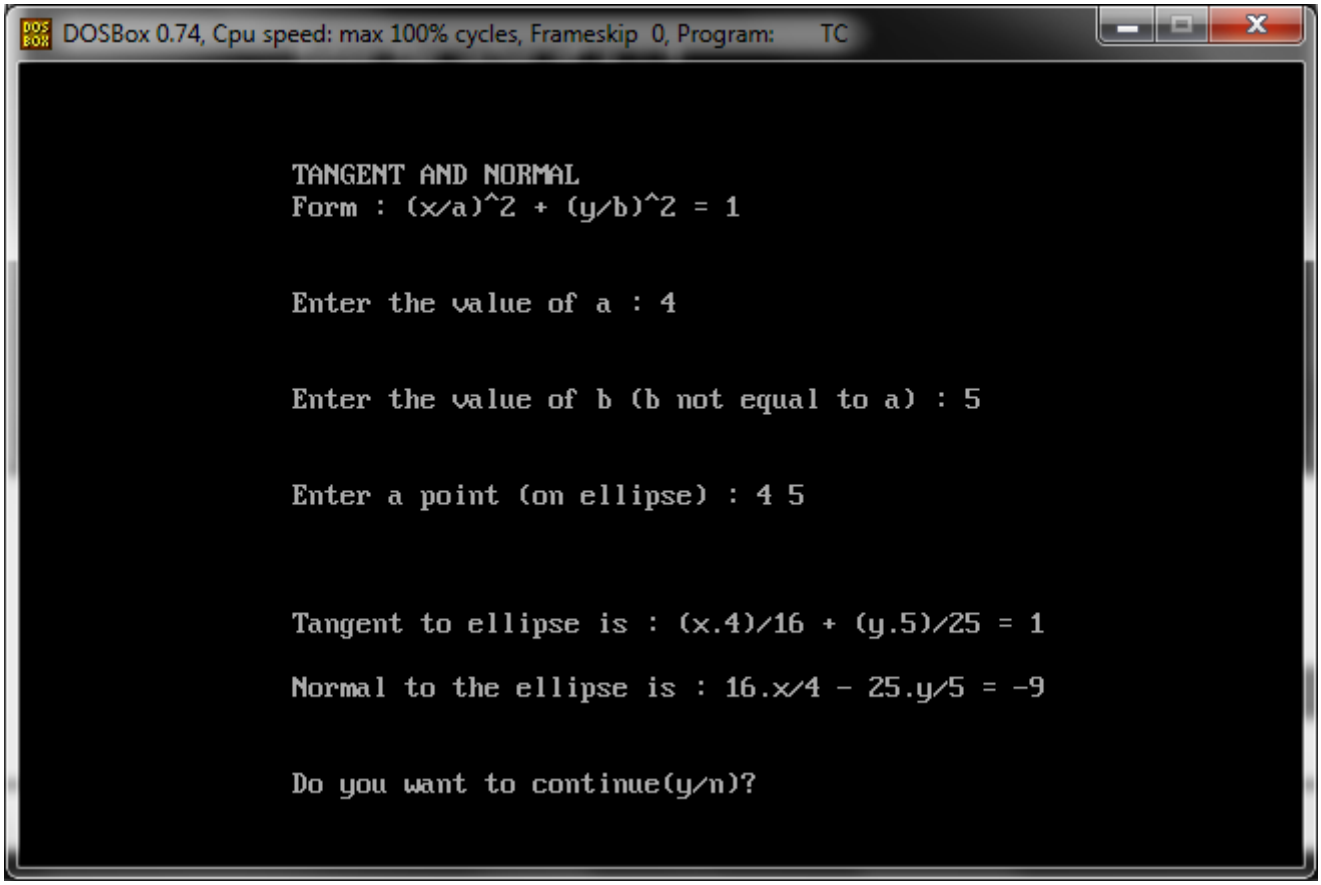
SECTION: ELLIPSE

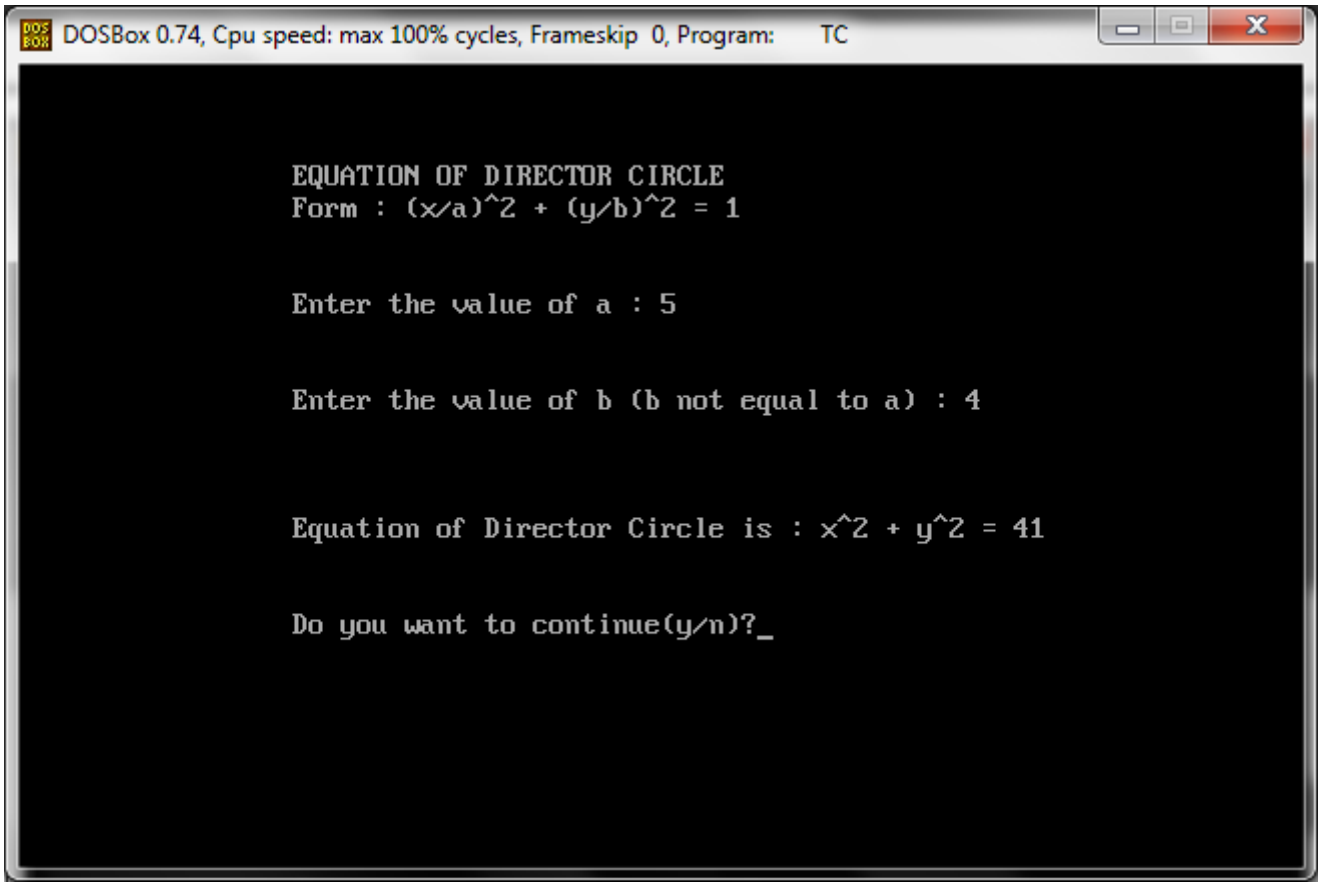




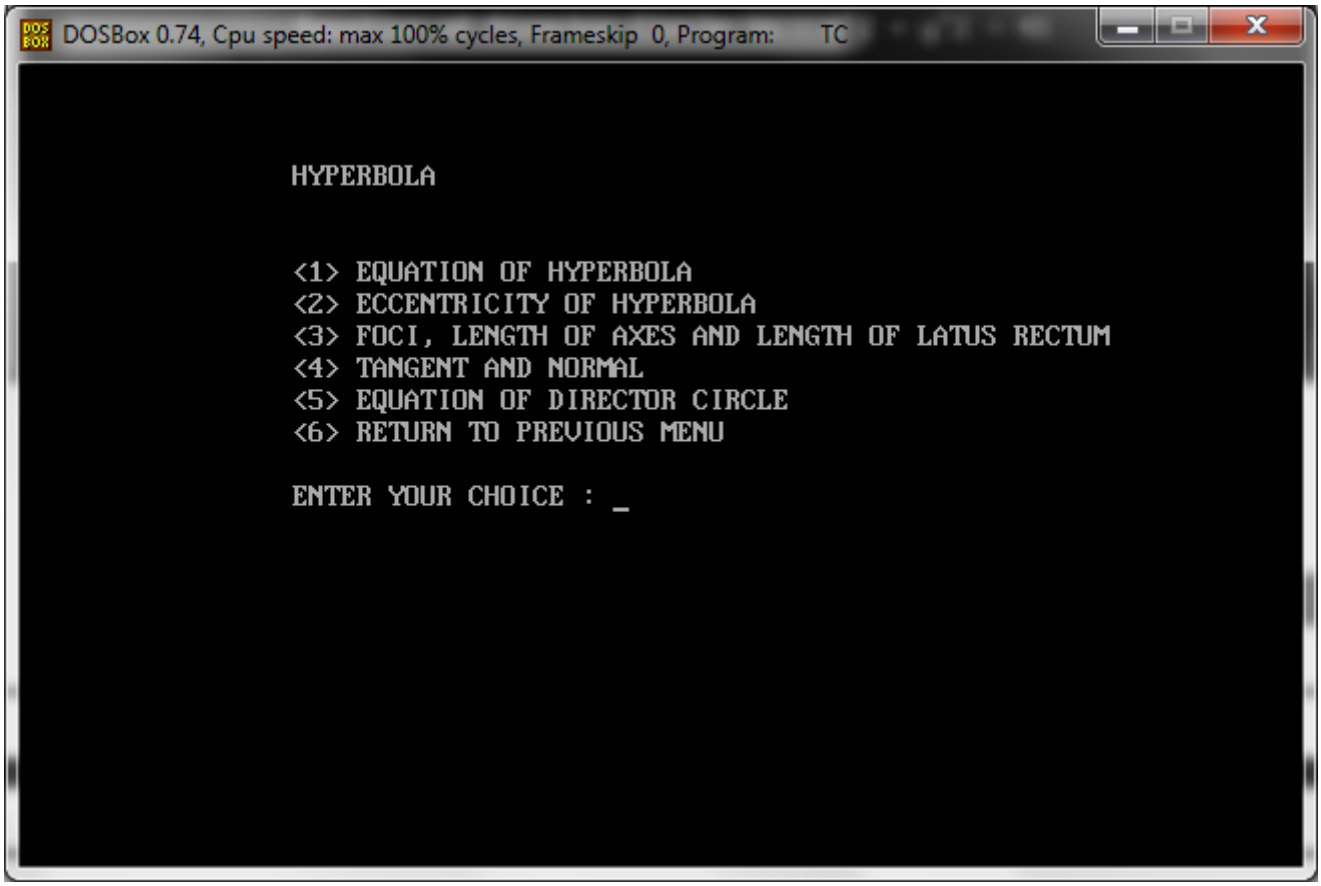

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
ECCENTRICITY OF ELLIPSE
Form : (x/a)^2 + (y/b)^2 = 1
Eccentricity (e) = (1 - (b*b/a*a))^0.5 (if a>b)
Eccentricity (e) = (1 - (a*a/b*b))^0.5 (if a<b)
Enter the value of a : 9
Enter the value of b (b not equal to a) : 4
Eccentricity of the ellipse is : 0.895806
Do you want to continue(y/n)?_

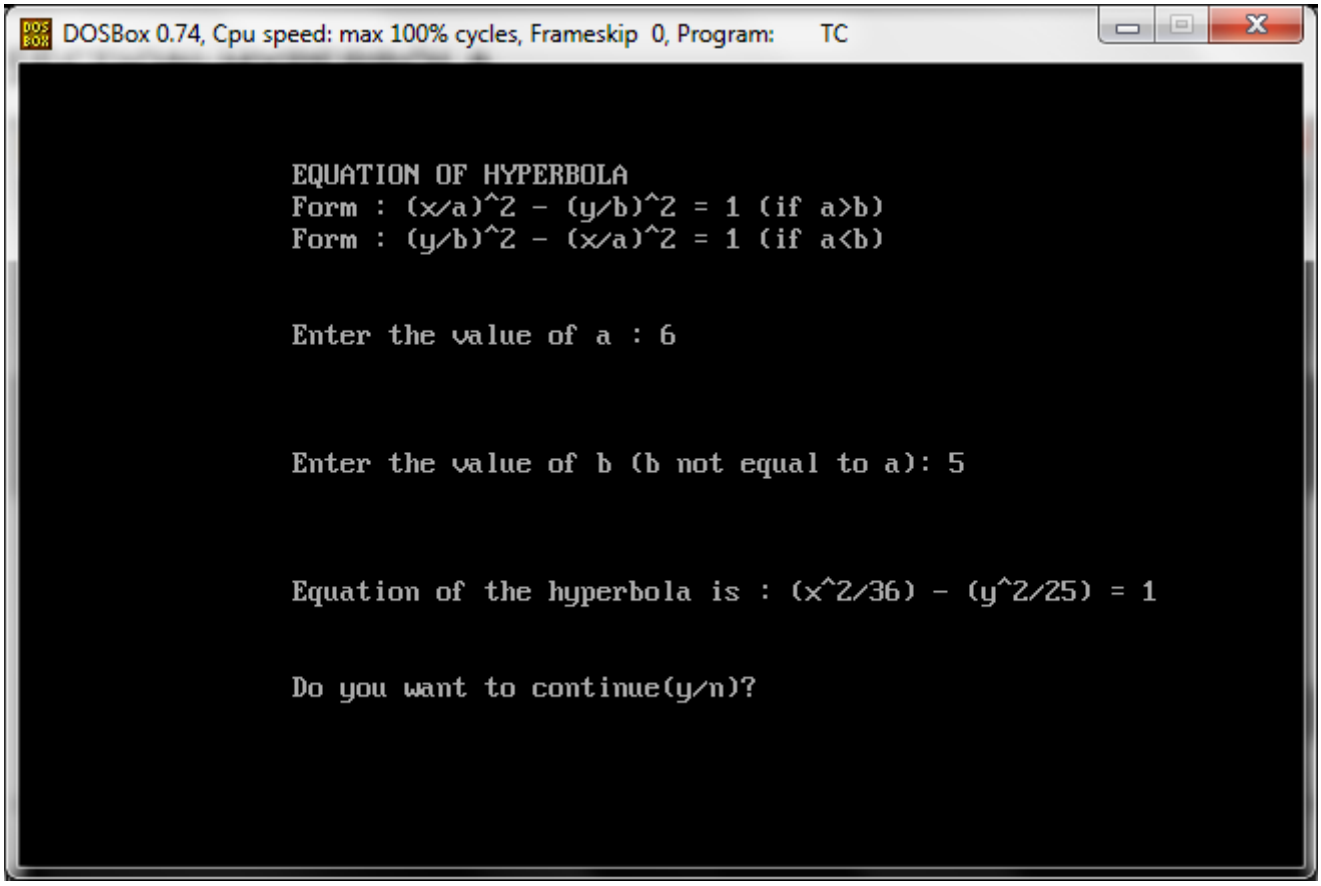

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
FOCI, LENGTH OF AXES AND LENGTH OF LATUS RECTUM
Form : (x/a)^2 + (y/b)^2 = 1
Foci : (a*e,0) and (-a*e,0) (if a>b)
Foci : (0,b*e) and (0,-b*e) (if a<b)
Length of Major Axis and Minor Axis : 2*a and 2*b (if a>b)
Length of Major Axis and Minor Axis : 2*b and 2*a (if a<b)
Length of Latus Rectum : (2*b*b)/a (if a>b)
Length of Latus Rectum : (2*a*a)/b (if a<b)
Enter the value of a : 4
Enter the value of b (b not equal to a) : 5
The Foci of the ellipse are : (0,3) and (0,-3)
The length of Major Axis is : 10
The length of Minor Axis is : 8
The length of Latus Rectum is : 6.4
Do you want to continue(y/n)?

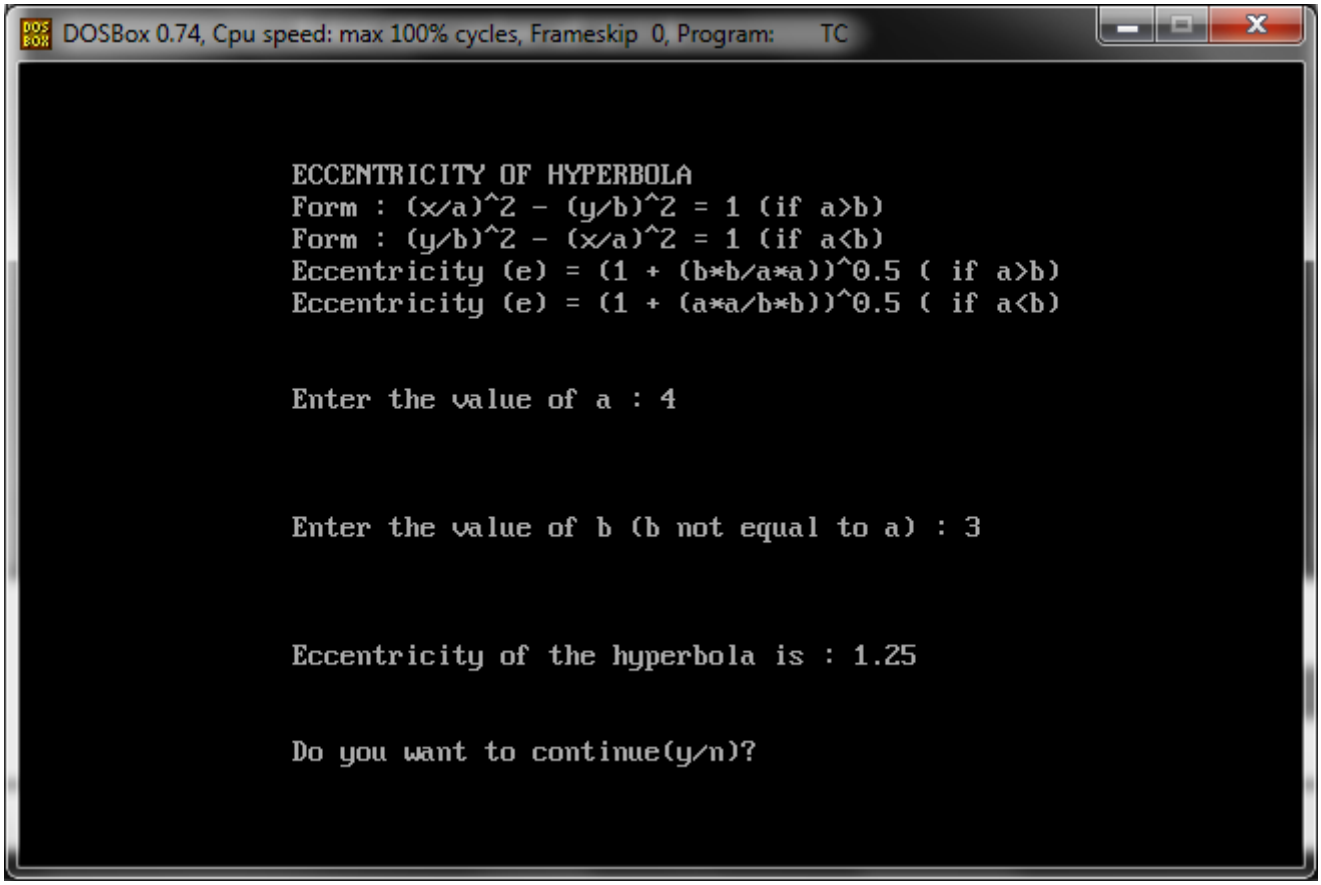

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
TANGENT AND NORMAL
Form : (x/a)^2 + (y/b)^2 = 1
Enter the value of a : 4
Enter the value of b (b not equal to a) : 5
Enter a point (on ellipse) : 4 5
Tangent to ellipse is : (x.4)/16 + (y.5)/25 = 1
Normal to the ellipse is : 16.x/4 - 25.y/5 = -9
Do you want to continue(y/n)?

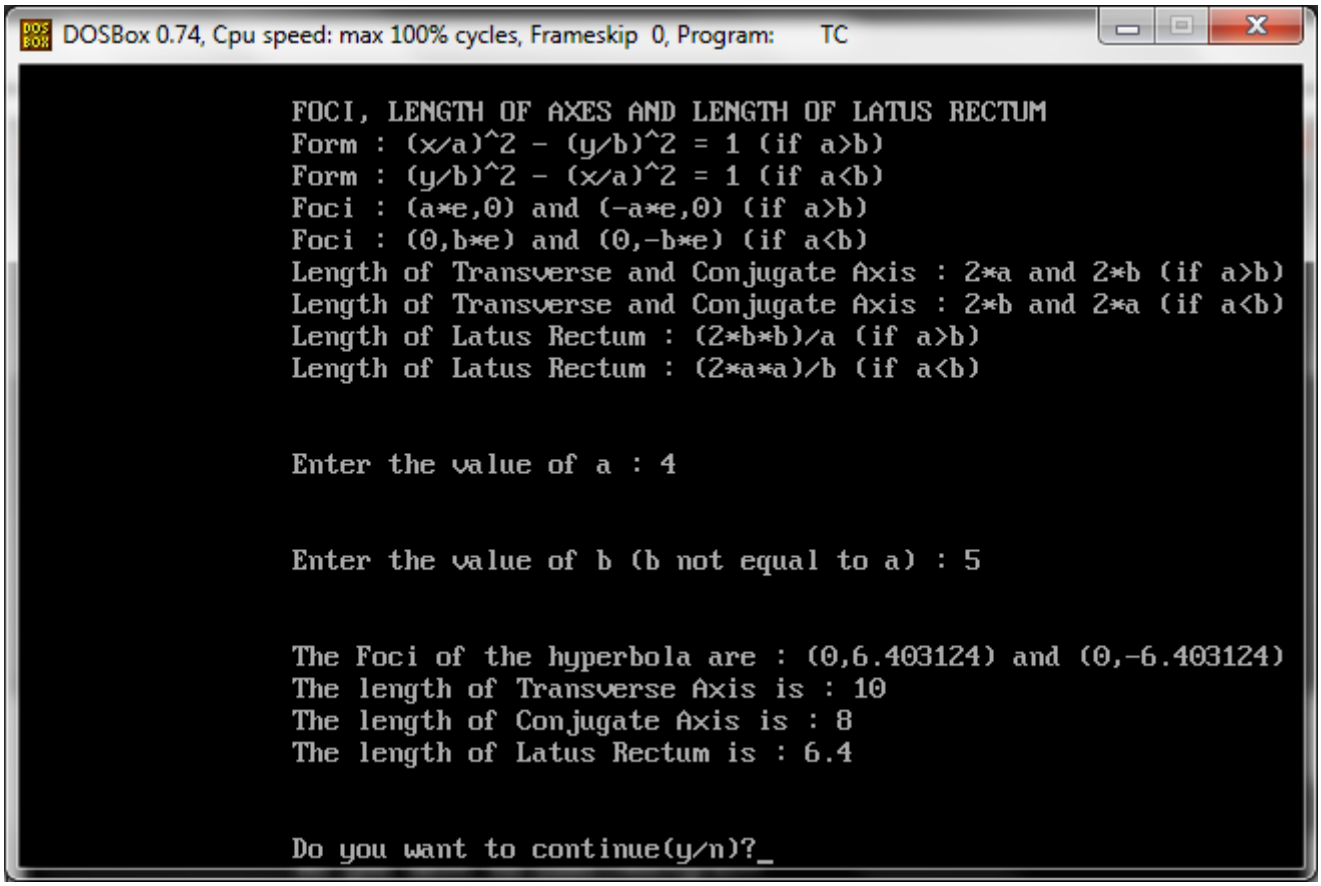

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
EQUATION OF DIRECTOR CIRCLE
Form : (x/a)^2 + (y/b)^2 = 1
Enter the value of a : 5
Enter the value of b (b not equal to a) : 4
Equation of Director Circle is : x^2 + y^2 = 41
Do you want to continue(y/n)?_

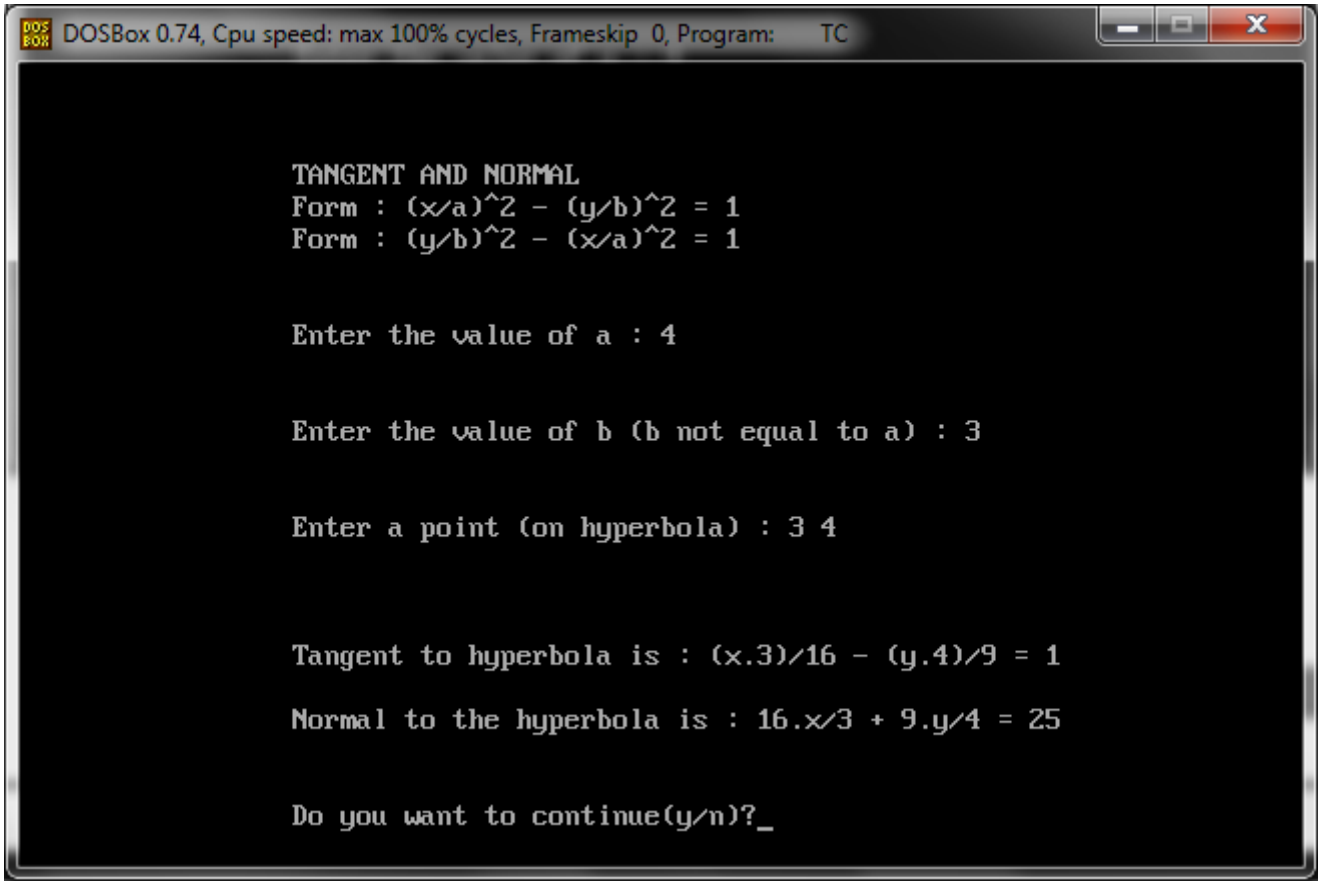
SECTION: HYPERBOLA

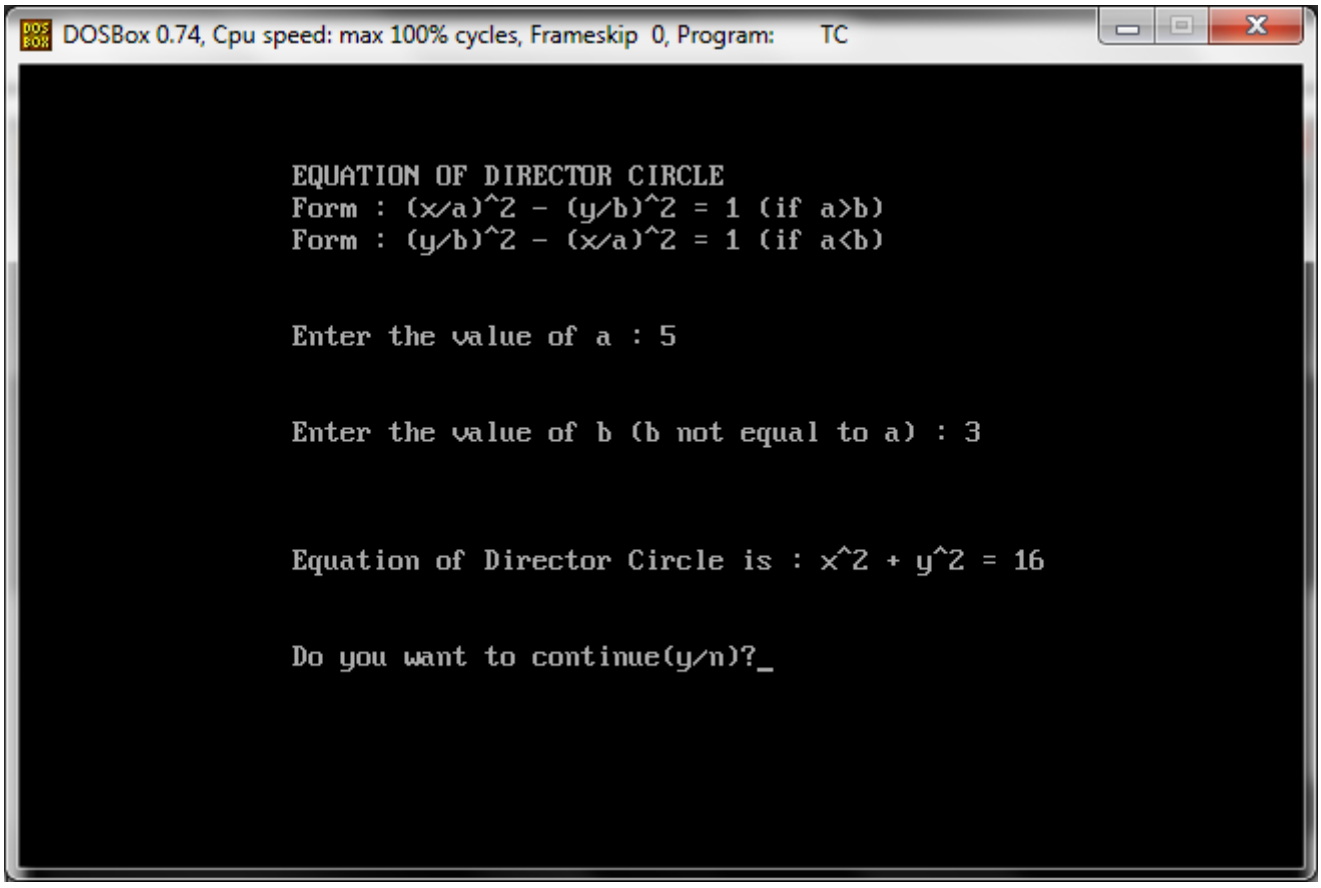




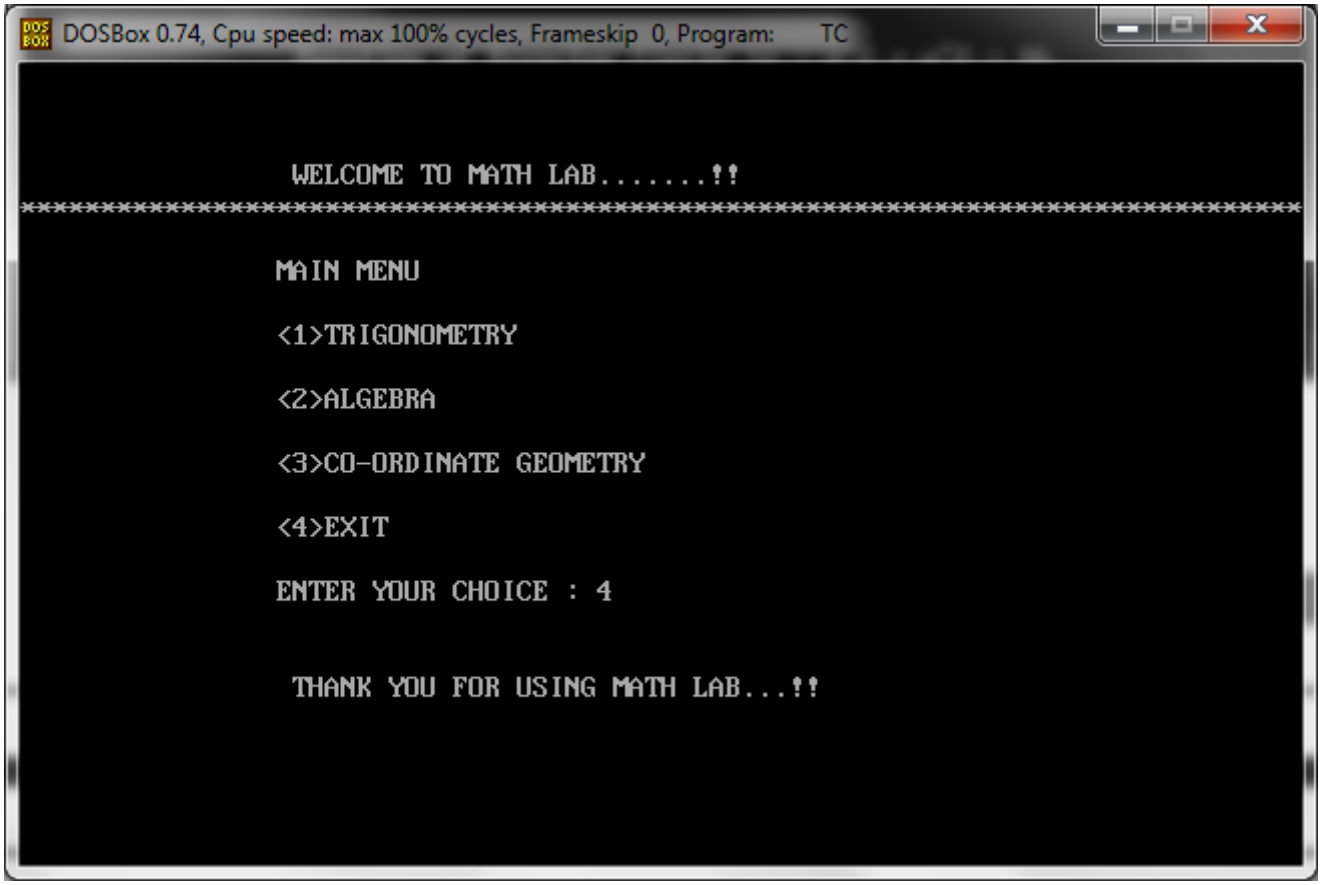

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
ECCENTRICITY OF HYPERBOLA
Form : (x/a)^2 - (y/b)^2 = 1 (if a>b)
Form : (y/b)^2 - (x/a)^2 = 1 (if a<b)
Eccentricity (e) = (1 + (b*b/a*a))^0.5 (if a>b)
Eccentricity (e) = (1 + (a*a/b*b))^0.5 (if a<b)
Enter the value of a : 4
Enter the value of b (b not equal to a) : 3
Eccentricity of the hyperbola is : 1.25
Do you want to continue(y/n)?


DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
FOCI, LENGTH OF AXES AND LENGTH OF LATUS RECTUM
Form : (x/a)^2 - (y/b)^2 = 1 (if a>b)
Form : (y/b)^2 - (x/a)^2 = 1 (if a<b)
Foci : (a*e,0) and (-a*e,0) (if a>b)
Foci : (0,b*e) and (0,-b*e) (if a<b)
Length of Transverse and Conjugate Axis : 2*a and 2*b (if a>b)
Length of Transverse and Conjugate Axis : 2*b and 2*a (if a<b)
Length of Latus Rectum : (2*b*b)/a (if a>b)
Length of Latus Rectum : (2*a*a)/b (if a<b)
Enter the value of a : 4
Enter the value of b (b not equal to a) : 5
The Foci of the hyperbola are : (0,6.403124) and (0,-6.403124)
The length of Transverse Axis is : 10
The length of Conjugate Axis is : 8
The length of Latus Rectum is : 6.4
Do you want to continue(y/n)?_


DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
TANGENT AND NORMAL
Form : (x/a)^2 - (y/b)^2 = 1
Form : (y/b)^2 - (x/a)^2 = 1
Enter the value of a : 4
Enter the value of b (b not equal to a) : 3
Enter a point (on hyperbola) : 3 4
Tangent to hyperbola is : (x.3)/16 - (y.4)/9 = 1
Normal to the hyperbola is : 16.x/3 + 9.y/4 = 25
Do you want to continue(y/n)?_


DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
EQUATION OF DIRECTOR CIRCLE
Form : (x/a)^2 - (y/b)^2 = 1 (if a>b)
Form : (y/b)^2 - (x/a)^2 = 1 (if a<b)
Enter the value of a : 5
Enter the value of b (b not equal to a) : 3
Equation of Director Circle is : x^2 + y^2 = 16
Do you want to continue(y/n)?_

END SCREEN



THANK YOU