DATE:17.11.14

**ASSIGNMENT NO.8**

->PROBLEM STATEMENT:

Write a program in C for fitting a straight line through a set of points(, i=1…….n

The straight line equation is y=mx+c

And the values of m and c are given

Y=

**->ALGORITHM:**

**Step 1:-**Initialise the arrays,x[26],y[26]

**Step 2:-**Initialise total\_x←0,total\_y←0,total\_xy←0,total\_square\_x←0,ch←’A’

**Step 3:-**Input the value of n where 2<=n<=26

**Step 4:-**For i←0 to n

1. Input the value of x of point ch,,x[i]
2. Input the value of y of point ch ,y[i]
3. Increament ch by 1

**Step 5:-**Again initialize ch=’A’

**Step 6:-**For i←0 to n

1. Print ch,x[i],y[i]
2. Increament ch by 1

**Step 7:-**For i←0 to n

1. total\_x=total\_x+x[i]
2. total\_y=total\_y+y[i]
3. total\_xy=total\_xy+(x[i]\*y[i])
4. total\_square\_x=total\_square\_x+(x[i]\*x[i])

**Step 8:-**Initialise numerator=((n\*total\_xy)-(total\_x\*total\_y))

**Step 9:-**Initialise denominator=(n\*total\_square\_x)-(total\_x\*total\_x)

**Step 10:-** If(NOT denominator= 0)Then

1. m←numerator/denominator
2. temp←m\*total\_x
3. c←((total\_y-temp)/(n))
4. Print the value of m and c

**Step 11:-**Else

**Step 12:-** 1.Print that the straight line is not possible with the following points

[End of If **…**Then….Else structure of 11]

**Step 13:-**End

->CODE:

/\*\*\*\*\*\*A PROGRAM FOR FITTING A STRAIGHT LINE THROUGH A SET OF POINTS(xi,yi),i=1,..,n.THE STRAIGHT LINE EQUATION IS y=mx+c\*\*\*\*\*\*/

#include<stdio.h>

#include<conio.h>

void main()

{

/\*Declaration of variables\*/

int x[26],y[26],i,n;

float total\_x=0,total\_y=0,total\_xy=0,total\_square\_x=0,m,c,numerator,denominator,temp;

char ch='A';

clrscr();

printf("\n Enter the value of n :");

scanf("%d",&n);//Value of n must be greater than 2

for(i=0;i<n;i++)

{

printf("\n Enter the x word of point %c :",ch);

scanf("%d",&x[i]);

printf("\n Enter the y word of point %c :",ch);

scanf("%d",&y[i]);

ch++;

}

ch='A';

for(i=0;i<n;i++)

{

printf("\n Coordinate of point %c(%d,%d)",ch,x[i],y[i]);

ch++;

}

for(i=0;i<n;i++)

{

total\_xy = total\_xy + (x[i]\*y[i]);

total\_x = total\_x + x[i];

total\_y = total\_y + y[i];

total\_square\_x=total\_square\_x + (x[i]\*x[i]) ;

}

numerator=((n\*total\_xy)-(total\_x\*total\_y));

denominator=(n\*total\_square\_x)-(total\_x\*total\_x);

if(denominator!=0)

{

m=numerator/denominator; //m is the slope of the straight line

temp=m\*total\_x;

c=((total\_y-temp)/(n));//c is the intercept of the straight line

if(m!=(float)0)

{

if(c>=(float)0)

{

printf("\n The equation of the straight line is \n");

printf("\n y=%fx+%f",m,c);

}

else

{

printf("\n The equation of the straight line is \n");

printf("\n y=%fx%f",m,c);

}

}

else

{

if(c!=(float)0)

{

printf("\n The equation of the straight line is \n");

printf("\n y=%f",c);

}

else

printf("\nThe straight line is the x-axis itself\n");

}

}

else

{

printf("\n The equation of the straight line is not possible with the following points.");

}

getch();

}

**->OUTPUT**

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*OUTPUT\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*1ST RUN\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Enter the value of n :3

Enter the x word of point A :-7

Enter the y word of point A :9

Enter the x word of point B :-2

Enter the y word of point B :0

Enter the x word of point C :-4

Enter the y word of point C :-2

Coordinate of point A(-7,9)

Coordinate of point B(-2,0)

Coordinate of point C(-4,-2)

The equation of the straight line is

y=-1.947368x-6.105263

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*2ND RUN\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Enter the value of n :3

Enter the x word of point A :12

Enter the y word of point A :11

Enter the x word of point B :34

Enter the y word of point B :1

Enter the x word of point C :-9

Enter the y word of point C :3

Coordinate of point A(12,11)

Coordinate of point B(34,1)

Coordinate of point C(-9,3)

The equation of the straight line is

y=-0.049748x+5.613554

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*3RD RUN\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Enter the value of n :4

Enter the x word of point A :-1

Enter the y word of point A :1

Enter the x word of point B :2

Enter the y word of point B :1

Enter the x word of point C :3

Enter the y word of point C :1

Enter the x word of point D :4

Enter the y word of point D :1

Coordinate of point A(-1,1)

Coordinate of point B(2,1)

Coordinate of point C(3,1)

Coordinate of point D(4,1)

The equation of the straight line is

y=1.000000

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\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*4TH RUN\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Enter the value of n :3

Enter the x word of point A :-9

Enter the y word of point A :0

Enter the x word of point B :5

Enter the y word of point B :0

Enter the x word of point C :12

Enter the y word of point C :0

Coordinate of point A(-9,0)

Coordinate of point B(5,0)

Coordinate of point C(12,0)

The straight line is the x-axis itself

/**->DISCUSSION:**

Every straight line can be represented by an equation: y = mx +c . The coordinates of every point on the line will solve the equation if you substitute them in the equation for x and y. The [slope](http://www.math.com/school/subject2/lessons/S2U4L2GL.html) *m* of this line -its steepness, or slant - can be calculated like this:  
                     *m* = change in y-value  
                                                   change in x-value

The equation of any straight line, called a [linear equation](http://www.math.com/school/subject2/lessons/S2U4L2GL.html), can be written as: y = *m*x + c, where *m* is the slope of the line and c is the y-intercept.

In this program,we have used two arrays namely x[],y[],where x[] holds integer values of x word of a point and y[] holds integer values of y word of the same point.Next we have calculated the summations which are required to find out the slope and y\_intercept of the straight line.