**Expt No. 2 MOMENTS 20/1/14**

Program:

#include<stdio.h>

#include<conio.h>

#include<math.h>

#define MAX 10

#define MIN 3

#define PI 3.142857143

char d[10][10],buffer[80];

double xpos[11],ypos[11],chintu[3][3];

double pritesh[3][3],prits[3][3];

int i,j,k;

double xc,yc,pri\_ang;

int count = 0;

void header()

{

printf("\n\n\t\t Shape analysis of an image using moments\n");

printf("\t\t===============================================");

}

void input()

{

char c;

int col,row;

do{

header();

gotoxy(6,6);

printf("Enter the size of the Image: (min=3x3 max=10x10)");

gotoxy(6,8);

printf("rows= ");scanf("%d",&row);

gotoxy(25,8);

printf("column = ");scanf("%d",&col);

}

while(col>MAX||col<MIN||row>MAX||row<MIN);

gotoxy(6,10);

printf("enter the Bitmap value of the image: (ie 0 or 1)");

gotoxy(6,12);

printf("Binary Code: ");

for(j=1;j<=row;j++)

for(i=1;i<=col;i++)

{

 d[i][j]=getch();

 gotoxy(2\*i+20,j+11);

 if((d[i][j]!='1') && (d[i][j] !='0')) i=i-1;

 else printf("%c",d[i][j]);

 }

 printf("\n\n\tPress any key to continue..");

 getch();

 count=0;

 for(j=1;j<=row;j++)

 for(i=1;i<=col;i++)

 {

 if(d[i][j]=='1')

 {

 xpos[count]=(double)j;

 ypos[count]=(double)i;

 count++;

 }}

 getch();

 }

 void moment()

 {

 for(int i=0;i<3;i++) chintu[i][i]=0;

 for(int k=0;k<count;k++){

 chintu[0][0]++;

 chintu[0][1]=chintu[0][1]+ypos[k];

 chintu[1][0]=chintu[1][0]+xpos[k];

 chintu[0][2]=chintu[0][2]+ypos[k]\*ypos[k];

 chintu[2][0]=chintu[2][0]+xpos[k]\*xpos[k];

 chintu[1][1]=chintu[1][1]+xpos[k]\*ypos[k];

 }}

 void centralmoment()

 {

 xc=chintu[1][0]/chintu[0][0];

 yc=chintu[0][1]/chintu[0][0];

 for(int i=0;i<3;i++) prits[i][i]=0;

 for(int k=0;k<count;k++){

 prits[0][0]++;

 prits[0][1]=prits[0][1]+ypos[k]-yc;

 prits[1][0]=prits[1][0]+xpos[k]-xc;

 prits[0][2]=prits[0][2]+(ypos[k]-yc)\*(ypos[k]-yc);

 prits[2][0]=prits[2][0]+(xpos[k]-xc)\*(xpos[k]-xc);

 prits[1][1] = prits[1][1]+(xpos[k]-xc)\*(xpos[k]-xc);

 }}

 void norm\_cent\_moment(){

 for(i=0;i<3;i++)

 {

 pritesh[i][0]=prits[i][0]/pow(prits[0][0],(i+2)/2);

 pritesh[0][i]=prits[0][i]/pow(prits[0][0],(i+2)/2);

 }

 pritesh[1][1]=prits[1][1]/pow(prits[0][0],2);

 printf("\n%f",pritesh[1][1]);

 }

 void display(){

 header();

 gotoxy(6,6);

 printf("\n TYPE\t MOMENTS\t CENTRAL- MOMENTS\t NORM\_CENT\_MOMENTS");

 printf("\n\n ZEROTH(0,0)");

 printf(" %5.2f\t",chintu[0][0]);

 printf(" %5.2f\t\t",prits[0][0]);

 printf(" %5.3f\t",pritesh[0][0]);

 printf("\n\n FIRST(0,1)");

 printf(" %5.2f\t",chintu[0][1]);

 printf(" %5.2f\t\t",prits[0][1]);

 printf(" %5.3f\t",pritesh[0][1]);

 printf("\n\n FIRST(1,0)");

 printf(" %5.2f\t",chintu[1][0]);

 printf(" %5.2f\t\t",prits[1][0]);

 printf(" %5.3f\t",pritesh[1][0]);

 printf("\n\n SECOND(0,2)");

 printf(" %5.2f\t",chintu[0][2]);

 printf(" %5.2f\t\t",prits[0][2]);

 printf(" %5.3f\t",pritesh[0][2]);

 printf("\n\n SECOND(2,0)");

 printf(" %5.2f\t",chintu[2][0]);

 printf(" %5.2f\t\t",prits[2][0]);

 printf(" %5.3f\t",pritesh[2][0]);

 printf("\n\n PRODUCT(1,1)");

 printf(" %5.2f\t",chintu[1][1]);

 printf(" %5.2f\t\t",prits[1][1]);

 printf(" %5.3f\t",pritesh[1][1]);

 printf("\n\n CENTROID");

 printf(" (%5.2f,%5.2f)",xc,yc);

 printf("\n\n PRINCIPAL");

 printf(" %5.2f degrees",pri\_ang);

}

 void principalangle(){

 pri\_ang=0.5\*atan2(2\*prits[1][1],(prits[2][0]-prits[0][2]));

 pri\_ang=pri\_ang\*180/PI;

}

void main(){

 clrscr();

 input();

 moment();

 centralmoment();

 norm\_cent\_moment();

 principalangle();

 display();

 printf("\n\n\t Press any key to continue...");

getch();

}

Output:

