**Program 16(a)**

**Write a program to implement fractal tree design.**

#include<stdio.h>

#include<stdlib.h>

#include<graphics.h>

#include<math.h>

#define ROUND(a) ((int)(a+0.5))

void ddaline(int x1, int y1, int x2, int y2)

{

float xsteps, ysteps, x=x1, y=y1;

int dx = x2-x1;

int dy = y2-y1;

int steps,k=1;

if(abs(dx)>=abs(dy))

steps=abs(dx);

else steps=abs(dy);

xsteps= dx/(float)steps;

ysteps= dy/(float)steps;

putpixel(ROUND(x),ROUND(y),15);

while(k<=steps)

{

x+=xsteps;

y+=ysteps;

putpixel(ROUND(x), ROUND(y),15);

k++;

}

}

void tree (int x1, int y1, int x3, int y3, float a, float alpha, float beta)

{

int x2= x1+ (a\*(x3-x1));

int y2= y1+ (a\*(y3-y1));

int x3b = x2+ (x3-x2)\*cos(beta) - (y3-y2)\*sin(beta);

int y3b = y2+ ((x3-x2)\*sin(beta) + (y3-y2)\*cos(beta));

int x3a = x2+ ((x3-x2)\*cos(alpha) + (y3-y2)\*sin(alpha));

int y3a = y2+ ((y3-y2)\*cos(alpha) - (x3-x2)\*sin(alpha));

if((x3-x2)\*(x3-x2)+(y3-y2)\*(y3-y2)<16) return;

ddaline(x1, y1, x2, y2);

tree(x2, y2, x3a, y3a, a, alpha, beta);

tree(x2, y2, x3b, y3b, a, alpha, beta);

}

int main()

{

int x1,y1,x3,y3;

float a,alpha,beta;

int gdriver = DETECT, gmode, errorcode;

initgraph(&gdriver, &gmode, "..\\");

errorcode = graphresult();

if (errorcode != grOk)

{

printf("Graphics error: %s\n", grapherrormsg(errorcode));

printf("Press any key to halt:");

getch();

exit(1);

}

printf("Enter base point\n");

scanf("%d %d", &x1, &y1);

printf("Enter top point\n");

scanf("%d %d", &x3, &y3);

printf("Enter value for \'a\', alpha and beta\n");

scanf("%f %f %f", &a, &alpha, &beta);

tree(x1, y1, x3, y3, a, alpha, beta);

getch();

closegraph();

return 0;

}



