2024

Assignment_01 of Computer Graphics and Animation LAB

Submitted by-

Rifah Sajida Deya

Id: B190305004

Date of Submission: 14th May,2024

Submitted to-

Arnisha Akhter

Lecturer, Department of CSE

Jagannath University

1. Program in Python to implement the DDA line algorithm->

```
from matplotlib import pyplot as plt


def DDA(x0, y0, x1, y1):


    dx = abs(x0 - x1)
    dy = abs(y0 - y1)


    steps = max(dx, dy)


    xInc = dx/steps
    yInc = dy/steps


    x = float(x0)
    y = float(y0)


    x_coorinates = []
    y_coorinates = []


    for i in range(steps):
        x_coorinates.append(x)
        y_coorinates.append(y)


        # increment the values
        x = x + xInc
        y = y + yInc
```

```
        plt.plot(x_coorinates, y_coorinates, marker="o",
                                markersize=3)
        plt.show()


if __name__ == "__main__":

        x0, y0 = 13, 53

        x1, y1 = 71, 31

        DDA(x0, y0, x1, y1)
```

2. Program in Python to implement the Midpoint line algorithm->

```
        from matplotlib import pyplot as plt

        def MidPointLine(x0,y0,x2,y2):
          dx=x1-x0
          dy=y1-y0
          #calculating d for finding the E or NE
          d=dy-(dx/2)
          x=x0
          y=y0
          #creating list for the midpoint values
```

```
    x_points=[]
    y_points=[]
    x_points.append(x)
    y_points.append(y)
    print(x,",",y,"\n")
    while(x<x2):
        x=x+1
        if(d<0):
            #select East point
            d=d+dy
        else:
            #select NE point
            d=d+(dy-dx)
            y=y+1
        print(x,",",y,"\n")
        #inserting the new x,y values in the list
        x_points.append(x)
        y_points.append(y)
    #plotting that are visualized in graph
    plt.plot(x_points,y_points,marker="o", markersize=1, markerfacecolor="green")
    plt.show()

x0 = int(input("Enter the value of x of 1st co-ordinate: "))
y0 = int(input("Enter the value of y of 1st co-ordinate: "))
x1 = int(input("Enter the value of x of 2nd co-ordinate: "))
y1 = int(input("Enter the value of y of 2nd co-ordinate: "))
MidPointLine(x0, y0, x1, y1)
```

3. Program in Python to implement the Midpoint Circle algorithm->

```
from matplotlib import pyplot as plt


def plot_circle(x_centre, y_centre, x, y):


    plt.plot(x + x_centre, y + y_centre, 'ro')
    plt.plot(-x + x_centre, y + y_centre, 'ro')
    plt.plot(x + x_centre, -y + y_centre, 'ro')
    plt.plot(-x + x_centre, -y + y_centre, 'ro')
    plt.plot(y + x_centre, x + y_centre, 'ro')
    plt.plot(-y + x_centre, x + y_centre, 'ro')
    plt.plot(y + x_centre, -x + y_centre, 'ro')
    plt.plot(-y + x_centre, -x + y_centre, 'ro')


def midPointCircleDraw(X, Y, r):
    x = r
    y = 0
    x_centre = X
    y_centre = Y
    print("(", x + x_centre, ", ", y + y_centre, ")",  sep = "", end = "")
    plot_circle(X, Y, x, y)


    if (r > 0) :


        print("(", x + X, ", ", -y + Y, ")", sep = "", end = "")
        print("(", y + X, ", ", x + Y, ")", sep = "", end = "")
```

```
    print("(", -y + x_centre, ", ", x + y_centre, ")", sep = "")

P = 1 - r
while x > y:
    y += 1
    if P <= 0:
        P = P + 2 * y + 1
    else:
        x -= 1
        P = P + 2 * y - 2 * x + 1
    if (x < y):
        break

    print("(", x + x_centre, ", ", y + y_centre, ")", sep = "", end = "")
    print("(", -x + x_centre, ", ", y + y_centre, ")", sep = "", end = "")
    print("(", x + x_centre, ", ", -y + y_centre, ")", sep = "", end = "")
    print("(", -x + x_centre, ", ", -y + y_centre, ")", sep = "")
    plot_circle(x_centre, y_centre, x, y)

    if x != y:

        print("(", y + x_centre, ", ", x + y_centre, ")", sep = "", end = "")
        print("(", -y + x_centre, ", ", x + y_centre, ")", sep = "", end = "")
        print("(", y + x_centre, ", ", -x + y_centre, ")", sep = "", end = "")
        print("(", -y + x_centre, ", ", -x + y_centre, ")", sep = "")

plt.axis('equal')
plt.grid()
plt.show()
```

```
X = int(input("Enter the value of horizontal axis(x) of Center: "))
Y = int(input("Enter the value of vertical axis(y) of Center: "))
r = int(input("Enter the value of the Radious: "))
midPointCircleDraw(X, Y, r)
```

---The END---