Lab Report 2

Course title: Computer Graphics Laboratory
Course code: CSE-304
3rd Year 1st Semester

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Submitted to-

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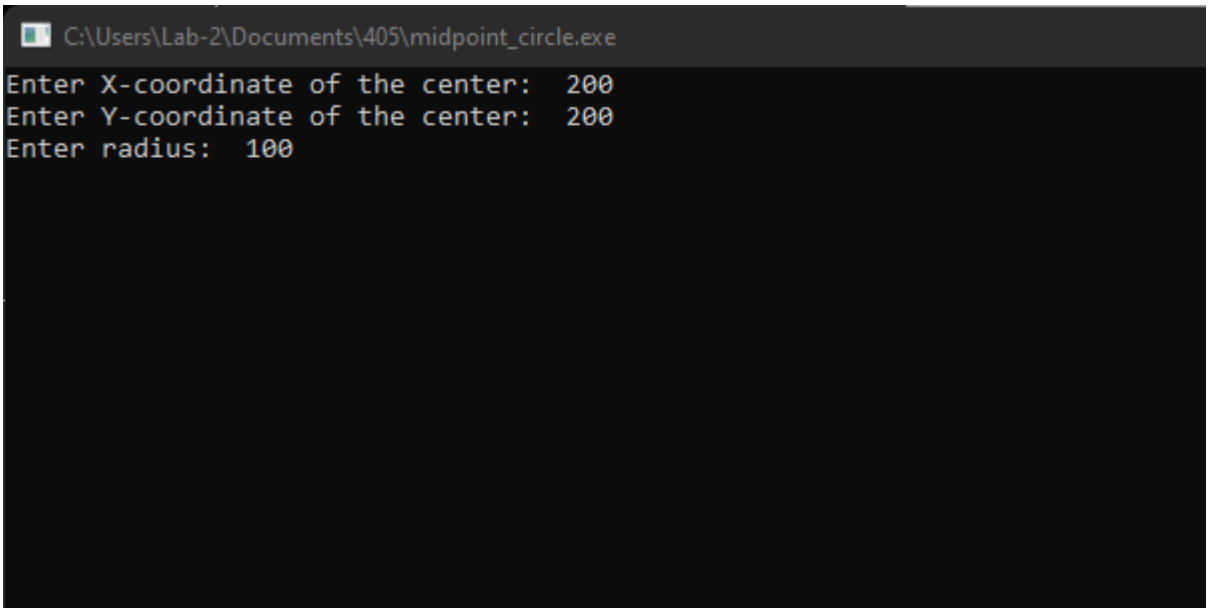
Scanning Circle using Midpoint algorithm:

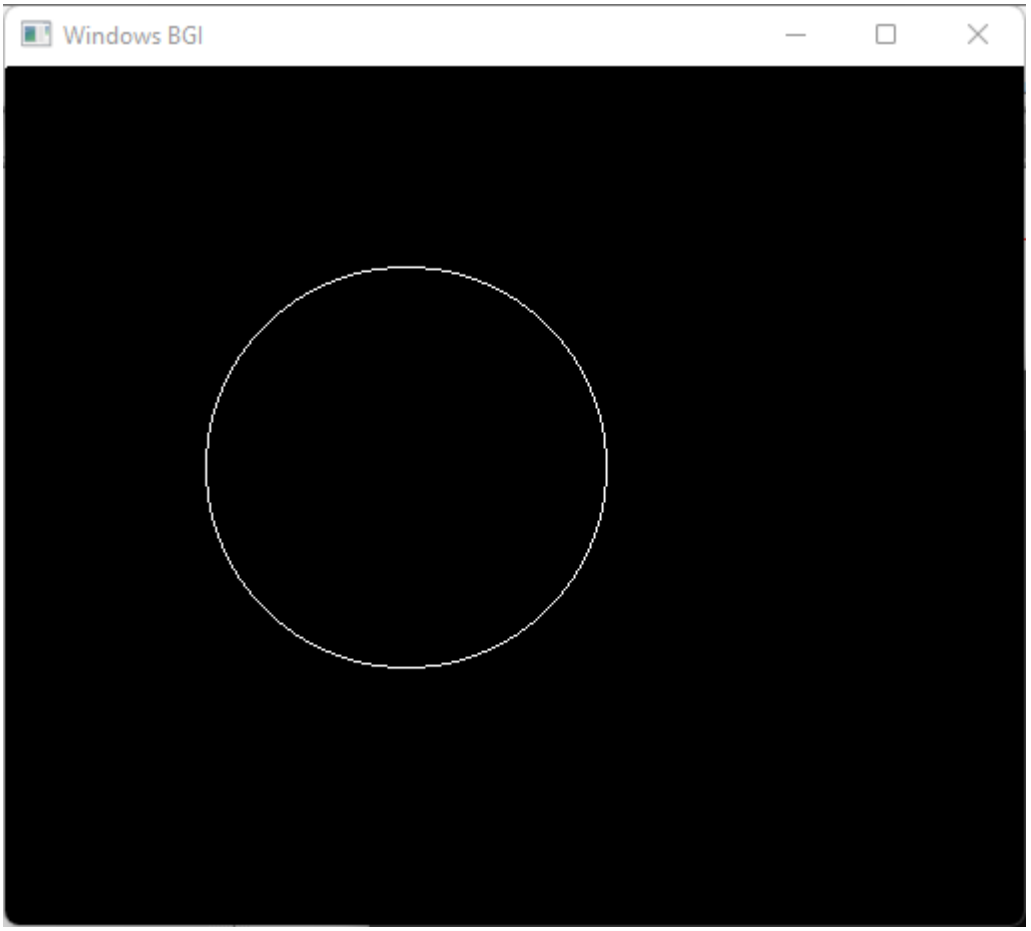
Code:

```
#include <iostream>
#include <graphics.h>

void drawCircle(int xc, int yc, int radius)
{
    int x = 0;
    int y = radius;
    int d = 1 - radius;

    while (x <= y)
    {
        putpixel(xc + x, yc + y, WHITE);
        putpixel(xc + y, yc + x, WHITE);
        putpixel(xc - x, yc + y, WHITE);
        putpixel(xc - y, yc + x, WHITE);
        putpixel(xc + x, yc - y, WHITE);
        putpixel(xc + y, yc - x, WHITE);
        putpixel(xc - x, yc - y, WHITE);
        putpixel(xc - y, yc - x, WHITE);

        if (d < 0)
        {
            d += 2 * x + 3;
        }
        else
        {
            d += 2 * (x - y) + 5;
            y--;
        }

        x++;
    }
}

int main()
{
    int gd = DETECT, gm;
    initgraph(&gd, &gm, "");

    int xc = 250;  // X-coordinate of the center
    int yc = 250;  // Y-coordinate of the center
    int radius = 100;
    printf("Enter X-coordinate of the center:  ");
    std::cin>>xc;
    printf("Enter Y-coordinate of the center:  ");
```

```
    std::cin>>yc;
    printf("Enter radius:  ");
    std::cin>>radius;
    drawCircle(xc, yc, radius);

    delay(5000);
    closegraph();

    return 0;
}
```

Screenshot:




Windows BGI

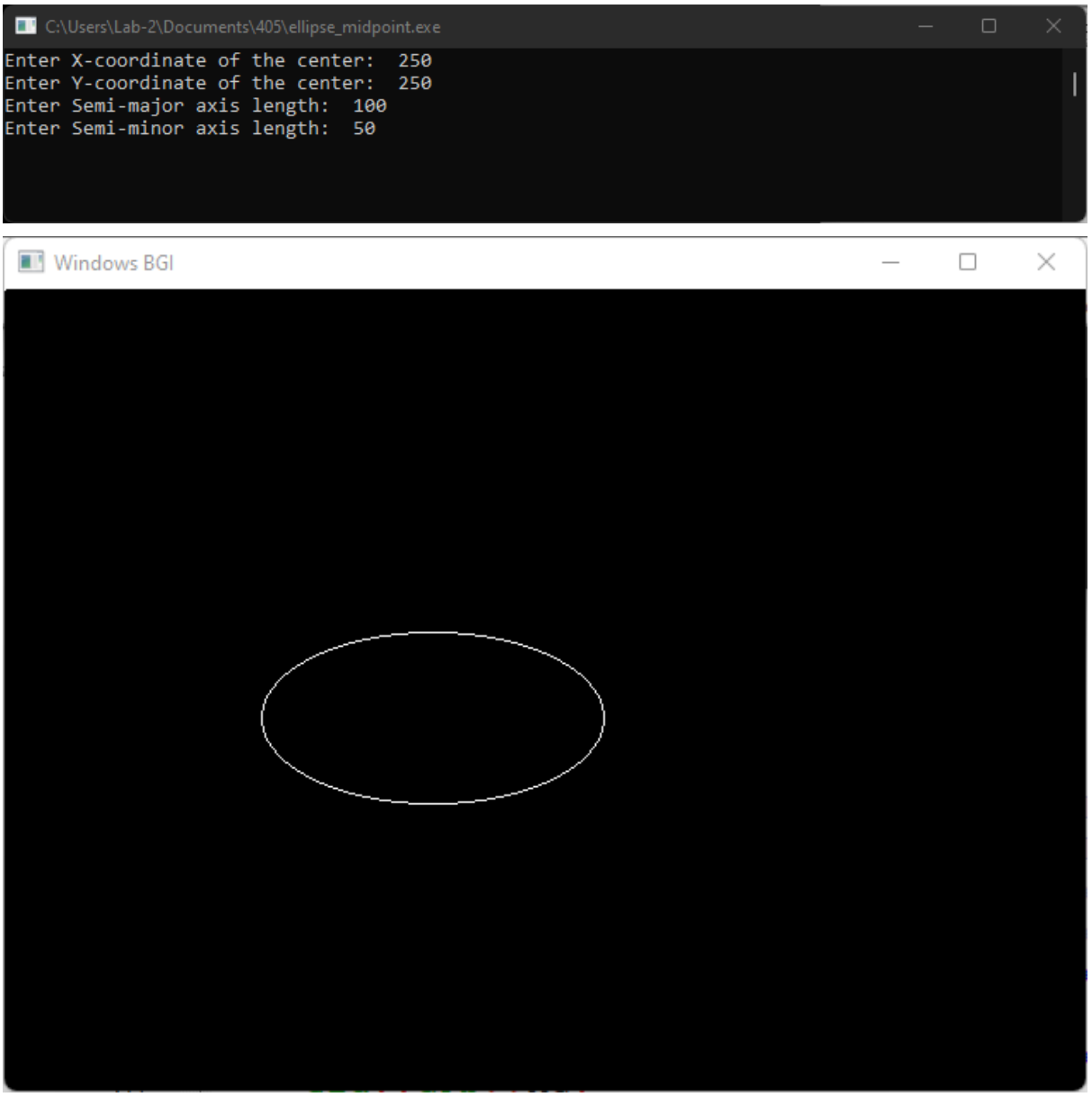
Scanning Ellipse using Midpoint algorithm:

Code:

```
#include <iostream>
#include <graphics.h>
#include <math.h>
void drawEllipse(int xc, int yc, int a, int b)
{
    int x = 0;
    int y = b;
    int aSqrt = a * a;
    int bSqrt = b * b;
    int twoaSqrt = 2 * aSqrt;
    int twobSqrt = 2 * bSqrt;
    int xEnd = round(aSqrt / sqrt(aSqrt + bSqrt));
    int p = round(bSqrt - aSqrt * b + 0.25 * aSqrt);

    while (x <= xEnd)
    {
        putpixel(xc + x, yc + y, WHITE);
        putpixel(xc - x, yc + y, WHITE);
        putpixel(xc + x, yc - y, WHITE);
        putpixel(xc - x, yc - y, WHITE);

        x++;

        if (p < 0)
        {
            p += twobSqrt * x + bSqrt;
        }
        else
        {
            y--;
            p += twobSqrt * x - twoaSqrt * y + bSqrt;
        }
    }

    p = round(bSqrt * (x + 0.5) * (x + 0.5) + aSqrt * (y - 1) * (y -
1) - aSqrt * bSqrt);

    while (y >= 0)
    {
        putpixel(xc + x, yc + y, WHITE);
        putpixel(xc - x, yc + y, WHITE);
        putpixel(xc + x, yc - y, WHITE);
        putpixel(xc - x, yc - y, WHITE);
```

```
        y--;

        if (p > 0)
        {
            p += aSqrt - twoaSqrt * y;
        }
        else
        {
            x++;
            p += twobSqrt * x - twoaSqrt * y + aSqrt;
        }
    }
}

int main()
{
    int gd = DETECT, gm;
    initgraph(&gd, &gm, "");

    int xc = 250;  // X-coordinate of the center
    int yc = 250;  // Y-coordinate of the center
    int a = 100;   // Semi-major axis length
    int b = 50;    // Semi-minor axis length
    printf("Enter X-coordinate of the center:  ");
    std::cin>>xc;
    printf("Enter Y-coordinate of the center:  ");
    std::cin>>yc;
    printf("Enter Semi-major axis length:  ");
    std::cin>>a;
    printf("Enter Semi-minor axis length:  ");
    std::cin>>b;
    drawEllipse(xc, yc, a, b);

    delay(50000);
    closegraph();

    return 0;
}
```

Screen:


C:\Users\Lab-2\Documents\405\ellipse_midpoint.exe
Enter X-coordinate of the center: 250
Enter Y-coordinate of the center: 250
Enter Semi-major axis length: 100
Enter Semi-minor axis length: 50
Windows BGI