Computer Graphics

Homework 3

Name	Ranime Ahmed Elsayed Shehata
ID	21010531

Problem Statement:

Drawing Free Curves (Bezier Technique)

1. Using 4 Bezier Curves, as indicated below, Write an OpenGL program to draw a circle with center at (100,100) and radius=90, where P0= (100, 10), P1= (150, 10), P2= (190, 50), P3=P4= (190, 100), P5= (190, 150), P6= (150, 190), P7= P8= (100, 190), P9= (50, 190), P10= (10, 150), P11=P12= (10, 100), P13=(10, 50), P14=(50, 10), P15= P0.

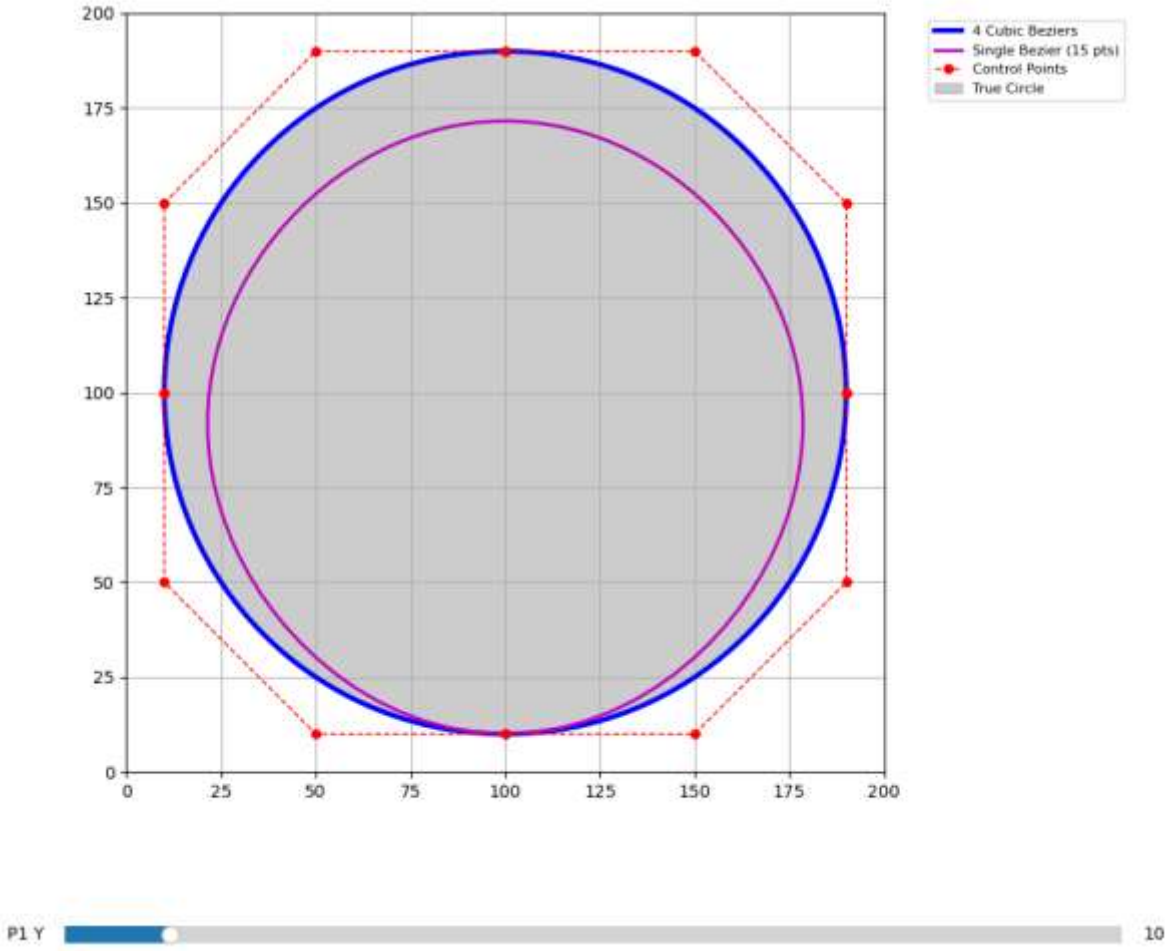
I. Using one single Bezier Curve defined by 13 control points (note that First Control Point = Last Control Point).

II. Compare the above circles with a circle (of different color) drawn using high level commands (in the programming language you are using).

III. Move point P1 vertically (up and down) and observe the effect on the drawings in cases a) and b) above. What do you conclude?

Code Snippet:

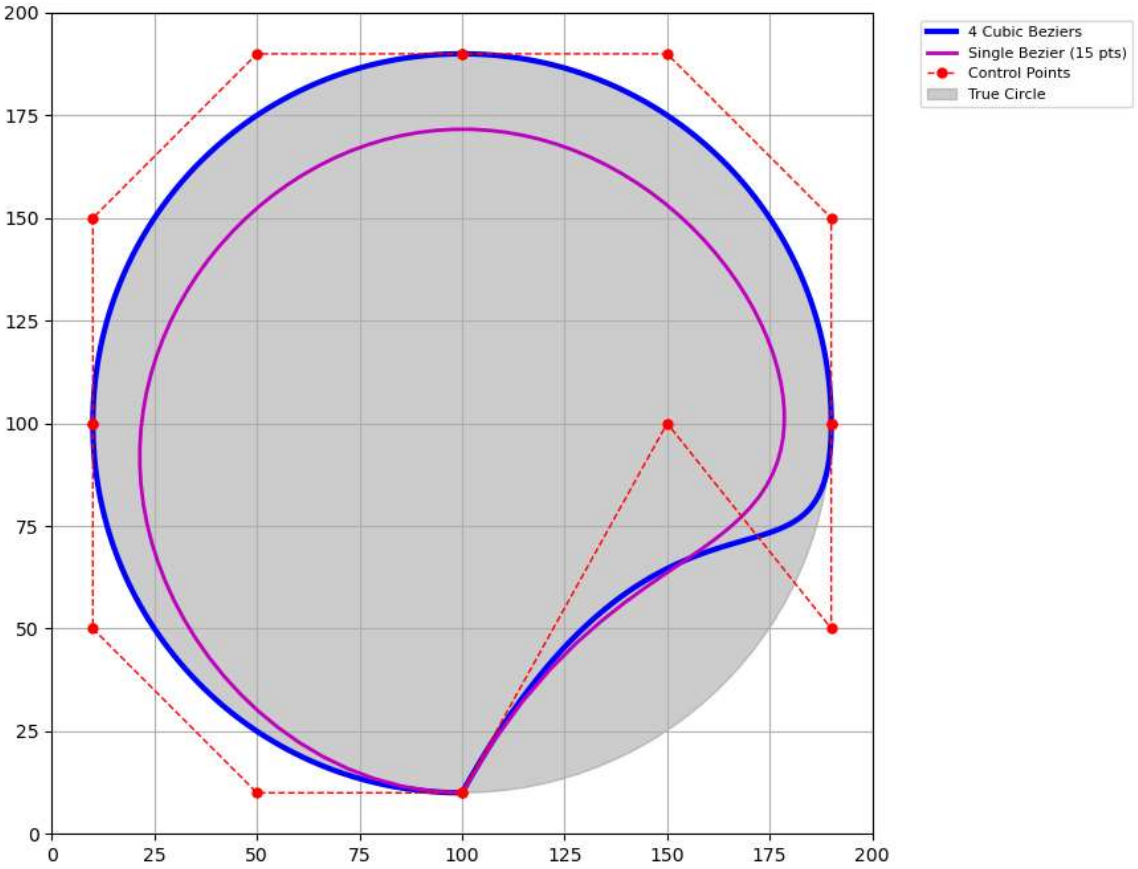
Solution:



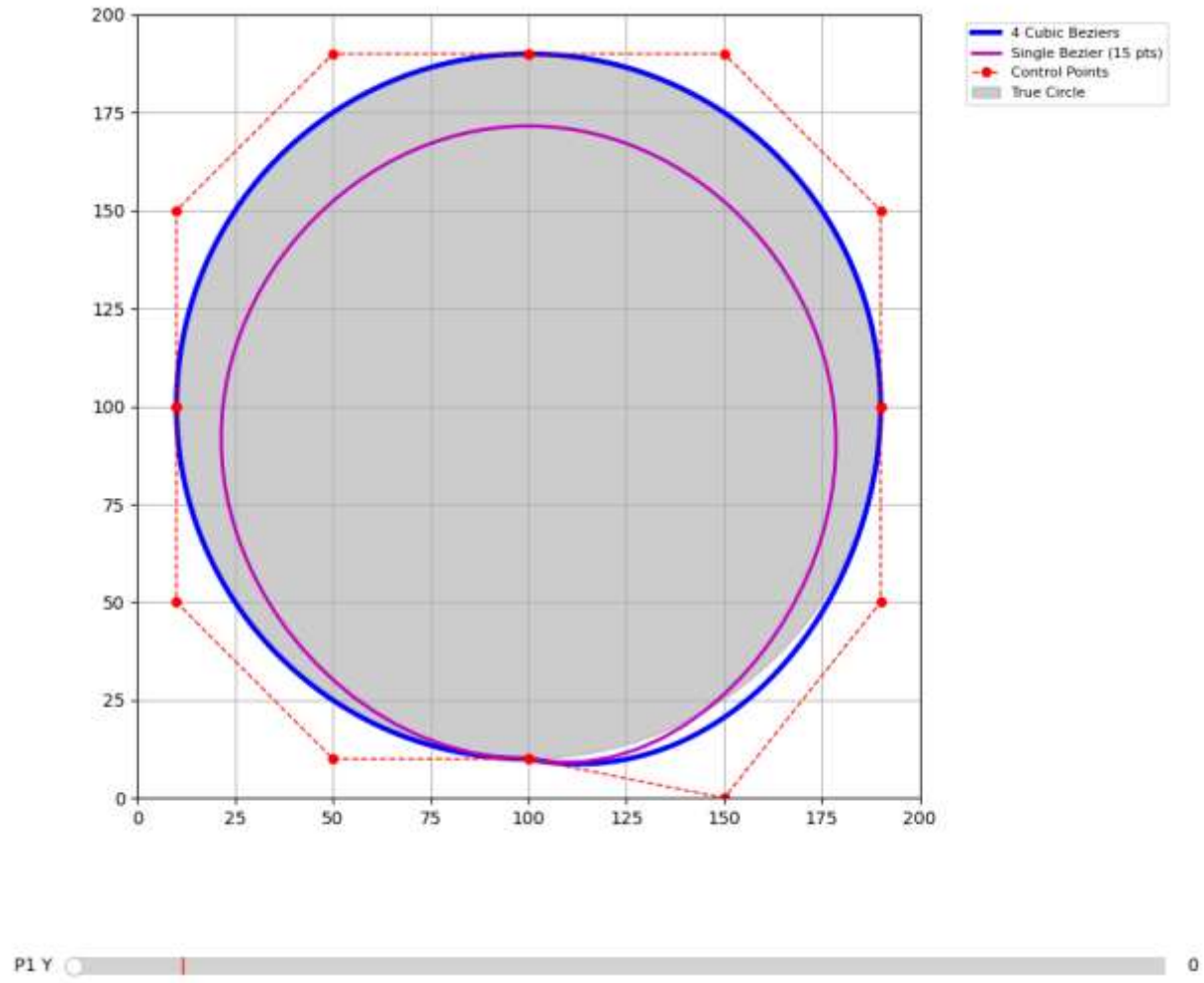
- Red circles are the control points.
- Blue circle is the 4 piecewise Bezier curves.
- Magenta circle is the 1 single Bezier curve.
- Gray shading represents the circle drawn using high level commands using built in function.

I. Move point P1 vertically (up and down) and observe the effect on the drawings in cases a) and b) above. What do you conclude?

➔ **When increasing the y coordinate of P1 (moving up):**



➔ **When decreasing the y coordinate of P1 (moving down):**



Conclusion:

- Higher order Bezier curve has no local control.
- To solve this → 4 piecewise Bezier Curves.

Note that → The circle with 4 piecewise Bezier curves is more accurate and closer to the original circle than the circle with one single Bezier Curve because it passes through the 4 main points that passes through the radius.
