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Algorithm Explanation

In this assignment, I want to calculate and draw several functions'(1st, 2nd, and 3rd-degree polynomials) zero derivative points. In other words, where the derivative of the function f is zero.

I loaded functions from an input text file (They contains polynomial coefficients) and I set a canvas of 700*700 with x range [-10, 10] to show how the functions look like. If the file is not found, the user will see an error message. I stored all given functions in an array list that named polynomial. To calculate the derivative of a function at a point x, I used the general definition of the derivative. I remained faithful to the UML diagram. According to the this diagram Polynomial is a superclass for Polynomial 1D, Polynomial 2D, Polynomial 3D. So I used "extends" when I create the classes. (Like public class Polynomial1D extends Polynomial).

Evaluation of The Outputs

Program outputs for functions1.txt :
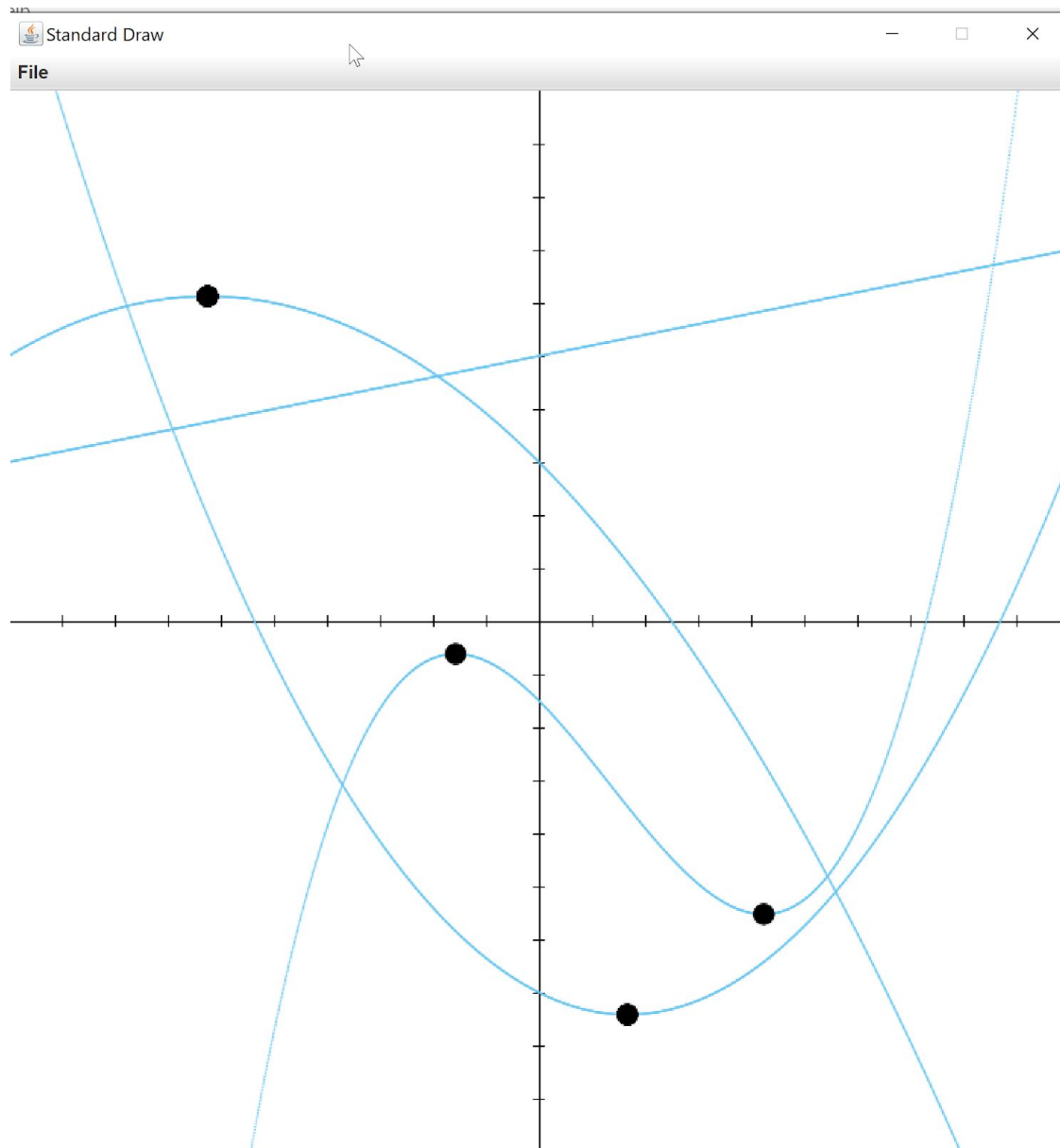
Function: (0.15)x^2 + (-0.5)x^1 + (-7.0)
Points with zero derivatives:
1. x: 1.66, y: -7.42
2. x: 1.67, y: -7.42

Function: (-0.08)x^2 + (-1.0)x^1 + (3.0)
Points with zero derivatives:
1. x: -6.26, y: 6.12
2. x: -6.24, y: 6.12

Function: (0.05)x^3 + (-0.2)x^2 + (-1.0)x^1 + (-1.5)
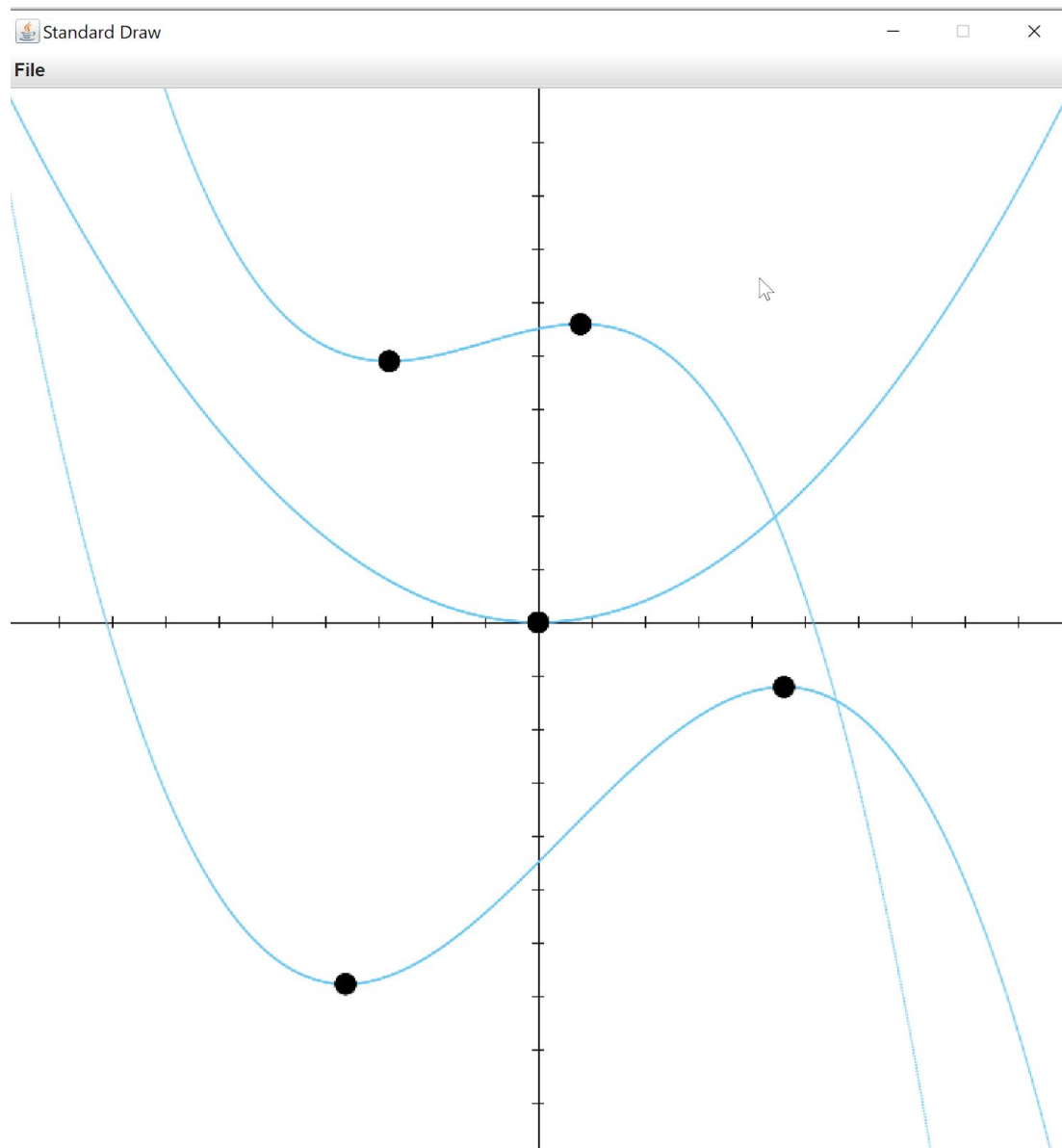Points with zero derivatives:
1. x: -1.57, y: -0.62
2. x: 4.24, y: -5.52

Function: (0.2)x^1 + (5.0)
Points with zero derivatives:
There are no points with zero derivative in the range.

Program outputs for functions2.txt :

Function: (-0.02)x^3 + (0.03)x^2 + (1.0)x^1 + (-4.5)
Points with zero derivatives:
1. x: -3.61, y: -6.78

2. x: 4.61, y: -1.21

Function: (-0.03)x^3 + (-0.09)x^2 + (0.2)x^1 + (5.5)
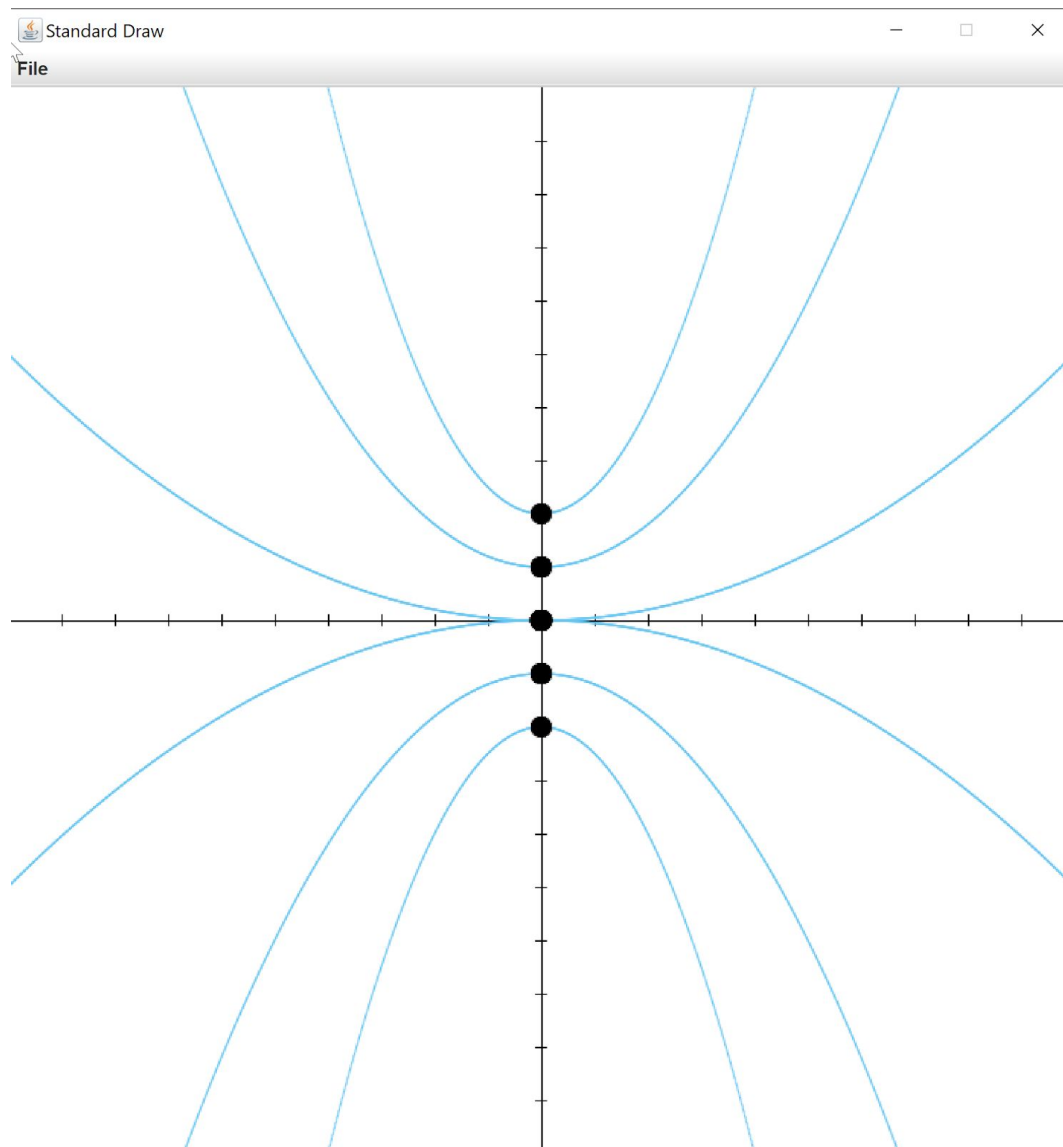Points with zero derivatives:
1. x: -2.8, y: 4.89
2. x: 0.8, y: 5.59

Function: (0.1)x^2 + (0.0)x^1 + (0.0)
Points with zero derivatives:
1. x: -0.01, y: 0.0

Program outputs for functions3.txt :

Function: (0.5)x^2 + (0.0)x^1 + (2.0)
Points with zero derivatives:

1. x: -0.0, y: 2.0

Function: (0.2)x^2 + (0.0)x^1 + (1.0)
Points with zero derivatives:
1. x: -0.0, y: 1.0

Function: (-0.2)x^2 + (0.0)x^1 + (-1.0)
Points with zero derivatives:
1. x: -0.0, y: -1.0

Function: (-0.5)x^2 + (0.0)x^1 + (-2.0)
Points with zero derivatives:
1. x: -0.0, y: -2.0

Function: (0.05)x^2 + (0.0)x^1 + (0.0)
Points with zero derivatives:
1. x: -0.01, y: 0.0

Function: (-0.05)x^2 + (0.0)x^1 + (0.0)
Points with zero derivatives:
1. x: -0.01, y: -0.0

Program outputs for MyFunction.txt: