MathBoy3000

Stephen Iskander and Nicholas Esposito

The Team

Nicholas Esposito

- ➔ Sophomore
- ➔ Software Engineering Major

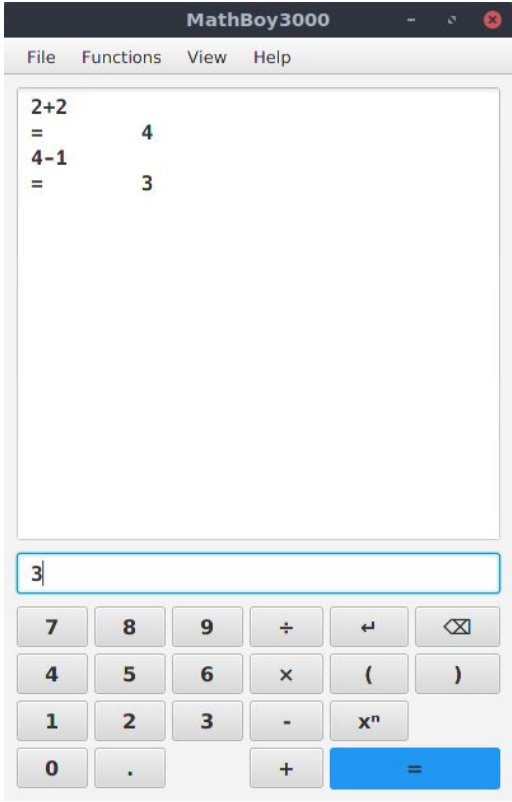
Stephen Iskander

- ➔ Junior
- ➔ Computer Science Major

The Project

The MathBoy3000 is a calculator with various mathematical applications

- Simple Expressions
- Matrix Multiplication
- Definite Integrals and Derivatives



The code

- JavaFX GUI
  - Written in Java without FXML
- Parsing
  - Uses regex to parse commands, matrices, and polynomials
  - Shunting yard algorithm to generate reverse Polish notation from infix notation
    - (modified to better support negative numbers)
- Exact numerical representation
  - Rational numbers are represented by a class containing a pair of BigInteger objects
  - Integrals and derivatives are calculated by symbolic manipulation of polynomials

Requirements

Identifier	Priority	Description
REQ1	10	Parsing user input into an expression.
REQ2	10	Provide an interface for user to input expressions and see result.
REQ3	10	Evaluate expression parse tree into numerical answer.
REQ4	8	Evaluate calculus operations numerically.
REQ5	7	Evaluate calculus operations symbolically.
REQ6	7	Parse a matrix entered in text format ([[x y z] [a b c]])
REQ7	7	Calculate matrix multiplication of two matrices

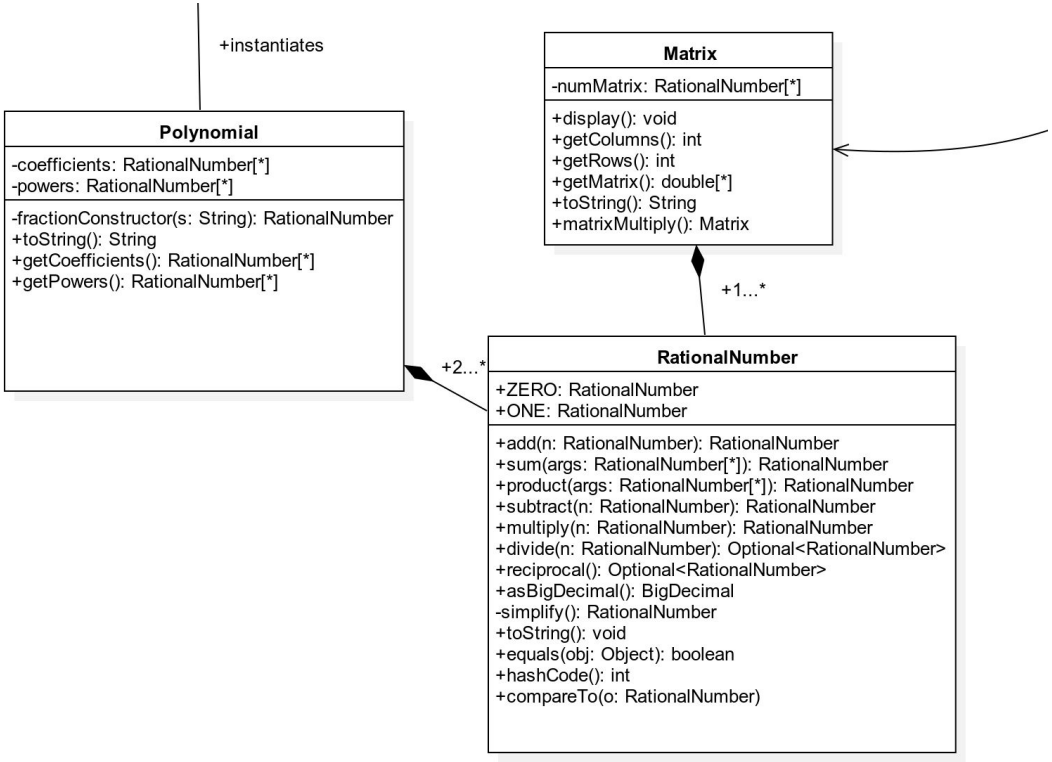
User Stories

Identifier	Size	Description
ST-1	3 pts	As a user, I can evaluate an expression by typing in the input field.
ST-2	4 pts	As a user, I can evaluate an expression containing calculus operations numerically.
ST-3	4 pts	As a user, I can input a matrix in a text format.
ST-4	5 pts	As a user, I can perform matrix multiplication.

Traceability Matrix

	UC-1	UC-2	UC-3	UC-4	UC-5	UC-6
REQ1	X	X				
REQ2	X					
REQ3	X					
REQ4			X	X		
REQ5			X	X		
REQ6					X	
REQ7						X

Class Diagram



Use Case Diagram