**Project #2**

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# **UML Diagram**

Diagram

Description automatically generated

# **Test Plan**

|  |  |
| --- | --- |
| **Test Case # 1** | |
| **Description** | Polynomials are strongly and weekly sorted |
| **Input** | File Name = P2\_2\_Input\_1.txt  4.0 3 2.5 1 8.0 0  4.5 4 5.7 2 8.6 0  5.0 4 5.0 3 |
| **Expected Output** | Print polynomials expressions and also print whether polynomials are strongly and weekly sorted or not |
| **Actual Output** | 4x^3 + 2.5x + 8  4.5x^4 + 5.7x^2 + 8.6  5x^4 + 5x^3  Polynomials are Weakly Ordered = true  Polynomials are Strongly Ordered = true |
| **Pass** | **Pass** |
| **Screenshots** |  |

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| **Test Case # 2** | |
| **Description** | Polynomials are neither strongly nor weekly sorted |
| **Input** | File Name = P2\_2\_Input\_2.txt  4.0 3 2.5 1 8.0 0  5.0 4 5.0 3  4.5 4 5.7 2 8.6 0 |
| **Expected Output** | Print polynomials expressions and also print whether polynomials are strongly and weekly sorted or not |
| **Actual Output** | 4x^3 + 2.5x + 8  5x^4 + 5x^3  4.5x^4 + 5.7x^2 + 8.6  Polynomials are Weakly Ordered = false  Polynomials are Strongly Ordered = false |
| **Pass** | **Pass** |
| **Screenshots** |  |

|  |  |
| --- | --- |
| **Test Case # 3** | |
| **Description** | Polynomials are strongly sorted but weekly not sorted |
| **Input** | File Name = P2\_2\_Input\_3.txt  7.0 2 2.5 1 8.0 0  8.5 4 5.0 3  9.2 4 5.7 2 1.6 0 |
| **Expected Output** | Print polynomials expressions and also print whether polynomials are strongly and weekly sorted or not |
| **Actual Output** | 7x^2 + 2.5x + 8  8.5x^4 + 5x^3  9.2x^4 + 5.7x^2 + 1.6  Polynomials are Weakly Ordered = false  Polynomials are Strongly Ordered = true |
| **Pass** | **Pass** |
| **Screenshots** |  |

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| --- | --- |
| **Test Case # 4** | |
| **Description** | Polynomials are not strongly sorted but weekly sorted |
| **Input** | File Name = P2\_2\_Input\_4.txt  6 2 2.5 1 8.0 0  8 4 5.0 2  7.2 4 5.7 3 1.6 0 |
| **Expected Output** | Print polynomials expressions and also print whether polynomials are strongly and weekly sorted or not |
| **Actual Output** | 6x^2 + 2.5x + 8  8x^4 + 5x^2  7.2x^4 + 5.7x^3 + 1.6  Polynomials are Weakly Ordered = true  Polynomials are Strongly Ordered = false |
| **Pass** | **Pass** |
| **Screenshots** |  |

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| --- | --- |
| **Test Case # 5** | |
| **Description** | Polynomials are having negative exponent |
| **Input** | File Name = P2\_2\_Input\_5.txt  6 **-2** 2.5 1 8.0 0  8 4 5.0 2  7.2 4 5.7 3 1.6 0 |
| **Expected Output** | Error message with "Negative exponent is not allowed, please enter a valid polynomial" |
| **Actual Output** | Popup Error message with "Negative exponent is not allowed, please enter a valid polynomial" |
| **Pass** | **Pass** |
| **Screenshots** |  |

|  |  |
| --- | --- |
| **Test Case # 6** | |
| **Description** | Polynomials are having invalid data type |
| **Input** | File Name = P2\_2\_Input\_6.txt  **A** 0 2.5 1 8.0 0  8 4 5.0 2  7.2 4 5.7 3 1.6 0 |
| **Expected Output** | Error message with "Coefficients or exponents of an improper type, please enter a valid polynomial" |
| **Actual Output** | Popup Error message with "Coefficients or exponents of an improper type, please enter a valid polynomial" |
| **Pass** | **Pass** |
| **Screenshots** |  |

|  |  |
| --- | --- |
| **Test Case # 7** | |
| **Description** | Polynomial exponent should be in descending order |
| **Input** | File Name = P2\_2\_Input\_7.txt  5 **0** 2.5 **1** 8.0 0  8 4 5.0 2  7.2 4 5.7 3 1.6 0 |
| **Expected Output** | Error message with "Exponents should be in decreasing order, please enter a valid polynomial" |
| **Actual Output** | Popup Error message with "Exponents should be in decreasing order, please enter a valid polynomial" |
| **Pass** | **Pass** |
| **Screenshots** |  |

# **Lesson Learned**

Throughout the completion of Project 2 which focused greatly on how to create different polynomial equations using the Java IDE, I got to learn a lot more about the important different data structures which I had implemented within this project overall. In fact, I got to learn about using the Iterator which produced the iterator which was used significantly within the Polynomial class overall. Also, I learned more about using the Linked List of the Java programming language and using directly the customized singly linked list for the nested classes throughout various classes created for this project itself. Moreover, I learned about the Iterable and Comparable interfaces and how they really worked throughout the classes I implemented for this project overall. Also, I learned about the custom OrderedList with the implication of the generic method of using the overloading of the checkSorted method itself. I learned about overriding a lot of methods within this project and how overloading really works in the Java Programming Language. I learned about the JFileChooser class which really had to be used directly in the main method class of this project overall. I got to learn extensively on creating different checked and unchecked exception classes from the experience I gained in project 1 into the implementation of project 2, and within creating the InvalidPolynomialSyntax exception class I really got my mind working towards creating these exception classes, so for future projects I can without trouble create exception classes which could potentially be needed for the implementation to be working as efficiently as possible. Custom Error handling now has come to be easier for me due to my hands on experience with the implementation of this project overall. This project has been very helpful to me in so many ways as I got to learn various things about the Java programming language in more depth. I really hope to carry the extensive knowledge that I gained from the completion of project 2 into project 3 and onwards which will make me a more confident Java programmer soon.