

**Joshua Camacho**  
**CS 301**  
**Professor Raheja**  
**Project 2**

**IDE:** NetBeans IDE 8.2 (Build 201609300101)  
**Java:** 1.8.0\_121

**Requirements**

Cs301Project2.java – implementation

Polynomial.java – polynomial class for adding / multiplying / displaying polynomials

Real\_Number.java – class for dividing / multiplying / adding fractions

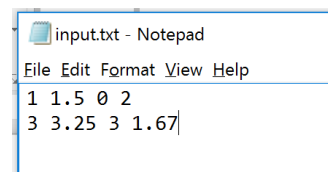
Input.txt – containing an even number of ( x, f(x) ) pairs

**Notes**

Accepts decimal values in input.txt and converts to a fractional representation (closest estimate)

**EXAMPLES**

**Example 1: Provided Input**




```
run:
      x      f[]      f[, ]      f[, , ]      f[, , , ]
      1          3
              1/2
      3/2      13/4          1/3
              1/6          -2
      0          3          -5/3
              -2/3
      2          5/3
```

Interpolating polynomial is:  
 $3 + 1/2(x-1) + 1/3(x-1)(x-3/2) - 2(x-1)(x-3/2)x$

Simplified polynomial is:  
 $-2.0000x^3 + 5.3333x^2 - 3.3333x + 3.0000$   
BUILD SUCCESSFUL (total time: 0 seconds)

## Example 2: Exam 4 Problem 1

 input.txt - Notepad

File Edit Format View Help

```
-2 -1 0 1 2  
2 14 4 2 2
```

run:

x	f[]	f[,]	f[, ,]	f[, , ,]	f[, , , ,]
-2	2				
		12			
-1	14		-11		
		-10		5	
0	4		4		-3/2
		-2		-1	
1	2		1		
		0			
2	2				

Interpolating polynomial is:

$2 + 12(x+2) - 11(x+2)(x+1) + 5(x+2)(x+1)x - 3/2(x+2)(x+1)x(x-1)$

Simplified polynomial is:

$-1.5000x^4 + 2.0000x^3 + 5.5000x^2 - 8.0000x + 4.0000$

BUILD SUCCESSFUL (total time: 0 seconds)

### Example 3: Exam 4 Problem 2



input.txt - Notepad

File Edit Format View Help

```
1 3 -2 4 5
2 6 -1 -4 2
```

run:

x	f[]	f[,]	f[, ,]	f[, , ,]	f[, , , ,]
1	2				
		2			
3	6		1/5		
		7/5		-7/10	
-2	-1		-19/10		37/70
		-1/2		99/70	
4	-4		13/14		
		6			
5	2				

Interpolating polynomial is:

$2+2(x-1)+1/5(x-1)(x-3)-7/10(x-1)(x-3)(x+2)+37/70(x-1)(x-3)(x+2)(x-4)$

Simplified polynomial is:

$0.5286x^4-3.8714x^3+3.1857x^2+18.4429x-16.2857$

BUILD SUCCESSFUL (total time: 0 seconds)