CS 303
Project 1

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We completed project 1B for this assignment

Assumptions:

- Assumed user might enter an unsimplified polynomial
    - Polynomial class has an addTerm function that sorts and simplifies polynomial as terms are added.

- Assumed user might enter polynomials with multiple variables
    - Term class stores variable then compares it when doing addition.

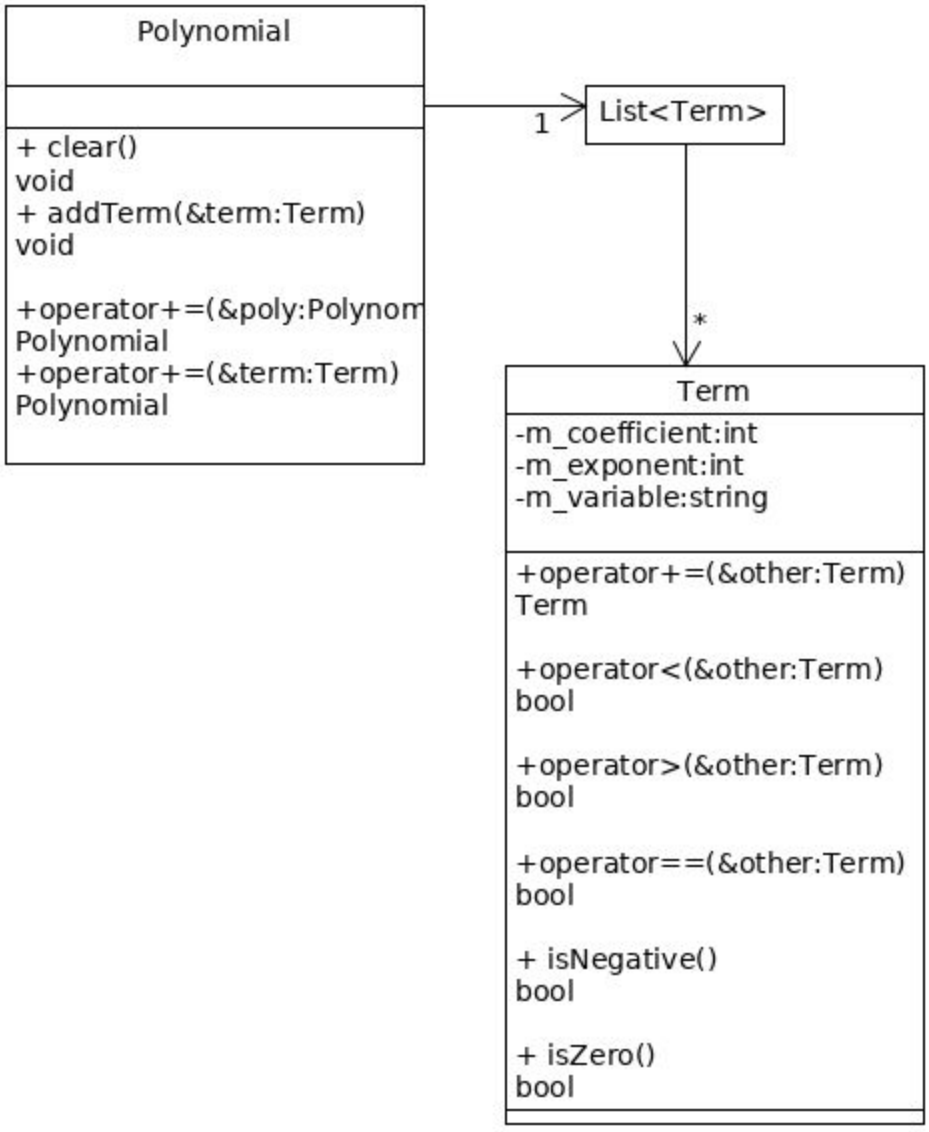
- Assumed user might enter polynomial with spaces
    - Term class handles spaces when parsing

- Assumed user could enter incorrect polynomial
    - Term class throws an exception and prints error message

- Assumed user might make an incorrect selection in main menu
    - Switch statement default handles that error

- Assumes user wants to add multiple of sets of two polynomials
    - Menu make up allows for multiple entries.

UML Diagram


Polynomial
+ clear()
void
+ addTerm(&term:Term)
void
+operator+=(&poly:Polynom
Polynomial
+operator+=(&term:Term)
Polynomial
1
List<Term>
*
Term
-m_coefficient:int
-m_exponent:int
-m_variable:string
+operator+=(&other:Term)
Term
+operator<(&other:Term)
bool
+operator>(&other:Term)
bool
+operator==(&other:Term)
bool
+ isNegative()
bool
+ isZero()
bool

Efficiency of Algorithms

void Polynomial::addTerm(const Term &term)

O(n)

Iterates over the entire polynomial (List<Terms>) one time and compares a given input term to each of the terms in the polynomial.

Polynomial& Polynomial::operator+=(const Polynomial &poly)

$O(n^2)$

Function iterates over the right hand polynomial, which would be a O(n) loop. This loop calls another O(n) function (addTerm). All together this makes big O, $O(n^2)$.

istream& operator>>(istream &in, Polynomial &poly) / ostream& operator<<(ostream &out, Polynomial &poly)

O(n)

Loop executes one time for each of the terms in the stream.

bool operator<(const Term &other) const / bool operator>(const Term &other)

O(1)

Executes one boolean comparison operation.

References:

- Linux Man Pages (a copy can be found here : https://linux.die.net/)
- http://www.cplusplus.com/reference
- https://www.tutorialspoint.com/cplusplus/