Set Calculator – Project Description

<u>Interface: Element</u>

Calculates add action for two elements.

Calculates multiply action for two elements.

Create a clone of an Element.

<u>Abstract class: Numerator (implements Element)</u>

Server of: Real, Rational.

Converts a cational number/ real number into double.

<u>Class: Real (extends Numerator)</u>

Implements: transformAdd, transformMul, clone.

Server of: Set, Calculator, Rational.

Add & multiply two real numbers.

Add & multiply real and rational numbers.

Verify String is a legal input and converts it to a Real object.

<u>Class: Rational (extends Numerator)</u>

Implements: transformAdd, transformMul, clone.

Server of: Set and Calculator.

Client of: Real.

Add & multiply two rational numbers.

Verify String is a legal input and converts it to a Rational object.

<u>Class: Set (implements Element)</u>

Implements: transformAdd, transformMul, clone.

Client of: Set, Rational, Real.

Server of: Calculator.

Inserts Element to set.

Removes Element from set.

Returns set size.

Calculates unification of two sets.

Calculates intersection of two sets.

Calculates difference of two sets.

Calculates power of a set.

Verifies if a set contains an element

Verifies if an element exists in a set or it's elements.

Calculates add between all the set's elements with a number.

Calculates multiply between all the set's elements with a number.

Clones set into a new set.

Verify String is a legal input and converts it to a Set object.

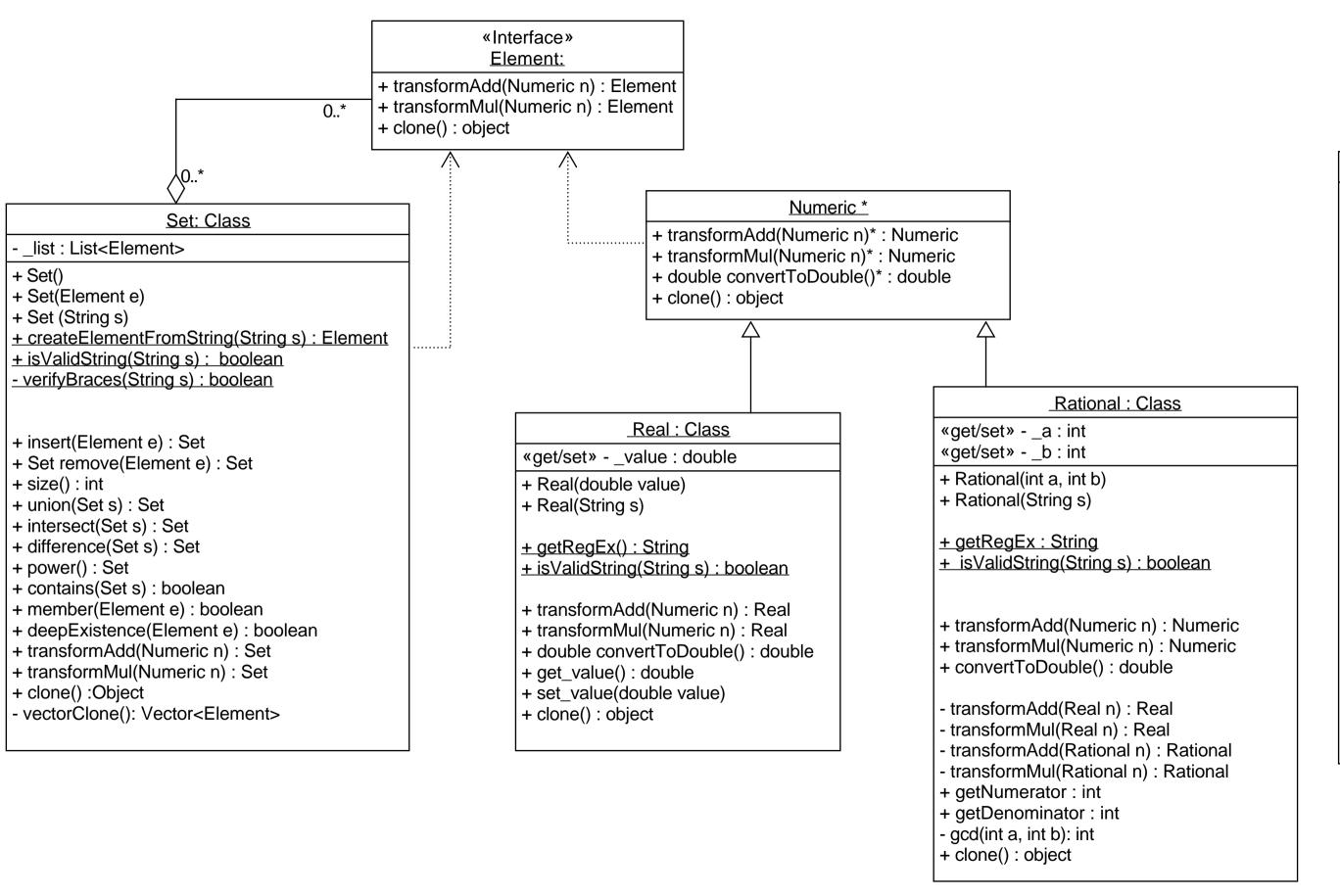Class: Calculator (Main)
Client of: Set, Rational, Element.
Receives user input.
Verifies legality of user input.
Preform insert, remove, unify, intersect, difference, power, member, deep existence, size, transformAdd, transformMul actions on a set.
Preforms transformAdd, transformMul on numbers (real and rational).

«Interface» Element:

+ transformAdd(Numeric n) : Element
+ transformMul(Numeric n) : Element
+ clone() : object

0..*

0..*

Set: Class

- _list : List<Element>

+ Set()
+ Set(Element e)
+ Set (String s)
+ createElementFromString(String s) : Element
+ isValidString(String s) : boolean
- verifyBraces(String s) : boolean

+ insert(Element e) : Set
+ Set remove(Element e) : Set
+ size() : int
+ union(Set s) : Set
+ intersect(Set s) : Set
+ difference(Set s) : Set
+ power() : Set
+ contains(Set s) : boolean
+ member(Element e) : boolean
+ deepExistence(Element e) : boolean
+ transformAdd(Numeric n) : Set
+ transformMul(Numeric n) : Set
+ clone() :Object
- vectorClone(): Vector<Element>

Numeric *

+ transformAdd(Numeric n)* : Numeric
+ transformMul(Numeric n)* : Numeric
+ double convertToDouble()* : double
+ clone() : object

Real : Class

«get/set» - _value : double

+ Real(double value)
+ Real(String s)

+ getRegEx() : String
+ isValidString(String s) : boolean

+ transformAdd(Numeric n) : Real
+ transformMul(Numeric n) : Real
+ double convertToDouble() : double
+ get_value() : double
+ set_value(double value)
+ clone() : object

Rational : Class

«get/set» - _a : int
«get/set» - _b : int

+ Rational(int a, int b)
+ Rational(String s)

+ getRegEx : String
+ isValidString(String s) : boolean

+ transformAdd(Numeric n) : Numeric
+ transformMul(Numeric n) : Numeric
+ convertToDouble() : double

- transformAdd(Real n) : Real
- transformMul(Real n) : Real
- transformAdd(Rational n) : Rational
- transformMul(Rational n) : Rational
+ getNumerator : int
+ getDenominator : int
- gcd(int a, int b): int
+ clone() : object

Calculator: Main

+ main(String[] args)
+ calc(String instructions) : String

+ insert(String [] input) : String
+ remove((String [] input)) : String
+ size(String [] input) : String
+ union(String [] input) : String
+ intersect(String [] input) : String
+ difference(String [] input) : String
+ power(String [] input) : String
+ contains(String [] input) : String
+ member((String [] input) : String
+ deepExistence(String [] input) : String
+ transformAdd(String [] input) : String
+ transformMul(String [] input) : String
+ equals (String [] input): String
+ help (String [] input): String
+ bonus (String [] input): String
+ exit (String [] input): String
- print (String s) : String
- isSet (String s): boolean
- isElement (String s): boolean
- isNumeric (String s): boolean
- createSet (String s): Set
- createNumeric (String s): Numeric
- createElement (String s): Element