Zachary Goss

Week 9

**Question 1**

**Class Code:**

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\* @author Zach

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public class Rational {

int num;

int den;

public Rational()

{

num = 1;

den = 1;

}

public Rational(int numerator, int denominator)

{

if(denominator == 0) //catch any zeroes

{

System.out.println("Error: Divided by zero, denominator is now 1");

den = 1;

reduce();

}

if(denominator < 0)

{

num = -1 \* numerator;

den = -1 \* denominator;

//put in reduce function

reduce();

}

if(denominator > 0)

{

num = numerator;

den = denominator;

//put in reduce function

reduce();

}

}

public void reduce()

{

int temp;

int numer = num;

int denom = den;

int gcd;

while(denom != 0)

{

temp = numer % denom;

numer = denom;

denom = temp;

}

gcd = numer;

if(gcd > 1)

{

num /= gcd;

den /= gcd;

}

}

public int gcd(int one, int two)

{

int temp;

int denominator1 = one;

int denominator2 = two;

int gcd;

while(denominator2 != 0)

{

temp = denominator1 % denominator2;

denominator1 = denominator2;

denominator2 = temp;

}

gcd = denominator1;

return gcd;

}

public Rational addition(Rational one, Rational two)

{

Rational three = new Rational();

int den1 = one.den;

int den2 = two.den;

int greatestcommon;

greatestcommon = gcd(den1, den2);

three.num = (one.num \* greatestcommon) + two.num;

three.den = ((one.den \* greatestcommon) / 2);

three.reduce();

return three;

}

public Rational subtraction(Rational one, Rational two)

{

Rational three = new Rational();

int den1 = one.den;

int den2 = two.den;

int greatestcommon;

greatestcommon = gcd(den1, den2);

three.num = (one.num \* greatestcommon) - two.num;

three.den = one.den \* greatestcommon;

return three;

}

public Rational multiplication(Rational one, Rational two)

{

Rational three = new Rational();

three.num = one.num \* two.num;

three.den = one.den \* two.den;

three.reduce();

return three;

}

public Rational division(Rational one, Rational two)

{

Rational three = new Rational();

three.num = one.num \* two.den;

three.den = one.den \* two.num;

three.reduce();

return three;

}

}

**Main Code:**

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\* @author Zach

\*/

public class Question1 {

public static void main(String[] args) {

Rational x = new Rational(4, 8);

System.out.println("Your reduced fraction is " + x.num + "/" + x.den);

//prove that reduce method works

Rational half = new Rational(1, 2);

Rational quarter = new Rational(1, 4);

Rational result = new Rational();

result = result.addition(quarter, half);

System.out.println("your addition result is " + result.num + "/" + result.den);

result = result.subtraction(half, quarter);

System.out.println("Your subtraction result is " + result.num + "/" + result.den);

result = result.multiplication(quarter, half);

System.out.println("your multiplication result is " + result.num + "/" + result.den);

//correct!

result = result.division(quarter, half);

System.out.println("your division result is " + result.num + "/" + result.den);

//correct!

}

}

**Output:**

debug:

Your reduced fraction is 1/2

your addition result is 3/4

Your subtraction result is 1/4

your multiplication result is 1/8

your division result is 1/2

BUILD SUCCESSFUL (total time: 0 seconds)