HW3 Problem 1

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March 2021

1

RatNum(int n) : creator

RatNum(int n, int d) : creator

isNan() : observer

isNegative() : observer

isPositive() : observer

compareTo(RatNum rn) : observer

doubleValue() : creator

intValue() : creator

floatValue() : creator

longValue() : creator

negate() : producer

add(Ratnum arg) : producer

sub(Ratnum arg) : producer

mul(Ratnum arg) : producer

div(Ratnum arg) : producer

hashCode() : producer

equals(Object obj) : observer

toString() : producer

valueOf(string ratStr) : producer

2

Because the Ratnum that we are working on must have been given either a value NaN or contain a numerator and a denominator in the constructor, but a null value can be applied in the parameters, which is why it is required that that parameter Ratnum != null.

3

gcd(int a, int b) is a static method because the method can be used only with 2 ints rather than requiring an object. In my mind a static method is one that can be made and used outside of the class. An alternative is just hard coding the gcd method every time it is needed, this is not a good alternative, but an alternative nonetheless.

4

This new negate would not return anything and would instead modify the existing Ratnum object. To make this new negate function applicable there would need to be an @modifies and @effects specifications that specify the changes that are being made to the current Ratnum object.

5

None of the methods within the class modify the object and in every method adding and subtracting etc. a new object in constructed and then the checkRep is called, effectively checking each object on creation and satisfying the class.