COP 3804
Intermediate Java Programming

Examination 1

Name: _____

SAMPLE

This exam has 2 additional pages with 2 questions.

1. **[50 pts]**

   Implement a very minimal `BigComplex` complete class. A `BigComplex` stores a real part and an imaginary (as `BigIntegers`). For the purposes of this exam, you may assume that there are no negative components and you do not have to check for these conditions. For this question you need to provide the data representation and the following methods.

   - A constructor that takes two `BigIntegers` as parameters, representing the real and imaginary parts. The constructor must be implemented.
   - A constructor that takes no parameters and results in a `BigComplex` that represents zero. The constructor must be implemented.
   - A constant `BigComplex` named `ZERO`.
   - `add`, which returns a new `BigComplex` representing the sum of this `BigComplex` and another `BigComplex`.
   - `equals`

2. [**50 pts**] Assume that in addition to valid `toString` and `equals` methods, a `BigRational` class contains the following members:

```
public BigRational( String rat );          // construct new BigRational
public BigRational add( BigRational rhs ); // return this+rhs
```

(a) Method `readFile` reads the specified `Scanner`, which contains one rational number per line, and returns an `ArrayList` containing the rational numbers it encounters. You do not have to handle any exceptions or provide any import directives. Implement `readFile`. The signature is:

```
public static ArrayList<BigRational> readFile( Scanner scan )
```

(b) Method `sum` returns the sum of all the rationals in its parameter. Implement `sum`. The signature is:

```
public static BigRational sum( ArrayList<BigRational> theList )
```