Rational Number ADT continued

Goal: Program consists of communicating objects

⇒ Create natural types of objects for the application
Example: Rational Number ADT (immutable)

<table>
<thead>
<tr>
<th>Method Name</th>
<th>Parameters</th>
<th>Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>(constructor)</td>
<td>numerator, denominator, rational number r</td>
<td>init.</td>
</tr>
<tr>
<td>plus</td>
<td></td>
<td>new rational, this + r</td>
</tr>
<tr>
<td>minus</td>
<td></td>
<td>new rational, this - r</td>
</tr>
<tr>
<td>times</td>
<td></td>
<td>new rational, this * r</td>
</tr>
<tr>
<td>divide</td>
<td></td>
<td>new rational, this / r</td>
</tr>
<tr>
<td>negate</td>
<td></td>
<td>-this</td>
</tr>
<tr>
<td>invert</td>
<td></td>
<td>1/this</td>
</tr>
<tr>
<td>toString</td>
<td></td>
<td>String: &quot;3/4&quot;, for ex.</td>
</tr>
</tbody>
</table>
Using `toString`:
    System.out.println((new Rational(2, 3)).
Output: 2/3

The rep:
public class Rational {
    private int n;  // numerator
    private int d;  // denominator

    // constructor  // REQUIRE: denom ≠ 0
    public Rational(int numer, int denom) {
        n = numer;
        d = denom;
    }

    // for now, ignore the problem of zero denom.
public Rational plus(Rational r) {
    return new Rational((n*r.d + r.n*d), d*r.d);
}

public Rational negate() {
    return new Rational(-n, d);
}

public Rational minus(Rational r) {
    // this - r
    return plus(r.negate());
}

< result of this call becomes "garbage"
public String toString() {
    return n + " / " + d;
}

System is a built-in class
System.out is a static variable that refers to a print stream
static — modifier that means "part of the class itself, not part of each instance"

public static final double PI = 3.1415927;

Math.PI
\[ 31,100 \div 2 \text{ sem} = 15,500 \text{ /sem} \]
\[ \div 15 \text{ weeks} = 1,036 \text{ /week} \]
\[ \div 7 \text{ days} = 148 \text{ /day} \]
\[ \div 14 \text{ hrs} = 10.58 \text{ /hr} \]
Educational Models:

- Work
- Results
- Reward

Organizations

Research Groups

You are here

Library

Activities
Think of WV as a health club