6.092

Lecture 8
Java I/O
Testing & Debugging 101

iapjava-staff@mit.edu

Assignment 7 Review

- What is an interface?
  - In its most common form, an interface is a group of related methods with empty bodies
  - Similar to an abstract class where everything is abstract
  - A *contract* that binds the interface and any class implementing it

```
public interface SocialEntity {
    public String getName ();
    public long getId ();
}
```

Assignment 7 Review

- Classes
  - Always write the constructor first
  - Do not expose underlying structure; define methods to manipulate member variables

```
ArrayList<Network> networks;
....
public void addNetwork (Network n) {
    networks.add (n);
}
```

Assignment 7 Review

- All objects must have a type & be created using *new()*

```
ArrayList<Network> networks;

....

public MyClass () {
    Networks = new ArrayList<Network>();
}
```

Assignment 7 Review

- *this* still confusing for some
  - *this* is a reference to the *current object*
  - Use it in constructors

```
String name;
long iid;

public Person (String name, long iid) {
   this.name = name;
   this.iid = iid;
}
```

Refresher

Intro/Overview

- compilation, execution• Java Basics:
- Structure & Syntax, Variables, Types, & Operators

Control Flow

- Methods & Conditionals, Loops & Arrays

Object-oriented Programming (OOP):

- Objects & Classes
- Inheritance & Abstraction:

Collections

Exceptions

Brief Intro to Software Design

Outline

- Java I/O
- Testing & Debugging 101
  - Assertions
  - Eclipse debugger

Java I/O

- Package for input / output operations
- Focuses on *streams* of data
- You can Read from (input) and Write to (output) a stream

Java I/O

- Ways to access data
  - Streams
  - Network
  - File
  - Etc.
- Output
  - System.out
  - System.err
  - Network

Java I/O

- Different ways to access data
- Streams

```
int nextInt = mystream.read()
```

- Readers / Writers
  - Special classes to read / write *char[ ]*
- These can also be *buffered*

Java I/O: A Tour

java.sun.com/javase/6/docs/api/index.html?java/io/package-summary.html

Java I/O: Example

- Reading text from a file

```
try {
   BufferedReader in =
     new BufferedReader(newFileReader("infilename"));
   String str;
   while ((str=in.readLine()) != null) {
      process(str);
   }
   in.close();
} catch (IOException e) {
   // handle the potential exception
  e.printStackTrace();
}
```

Testing & Debugging 101

- Include simple tests to check that your program is running as it is supposed to run

- Debugging tools allow to run your code step by step, check the state of the variables etc.

Java Assertions

- Assertions allow you to test your assumptions about your program
- Each assertion contains a boolean expression that you believe will be true when the assertion executes. If it is not true, the system will throw an error

```
assert booleanExpression;
```

OR

```
assert booleanExpression : messageValue;
```

Java Assertions

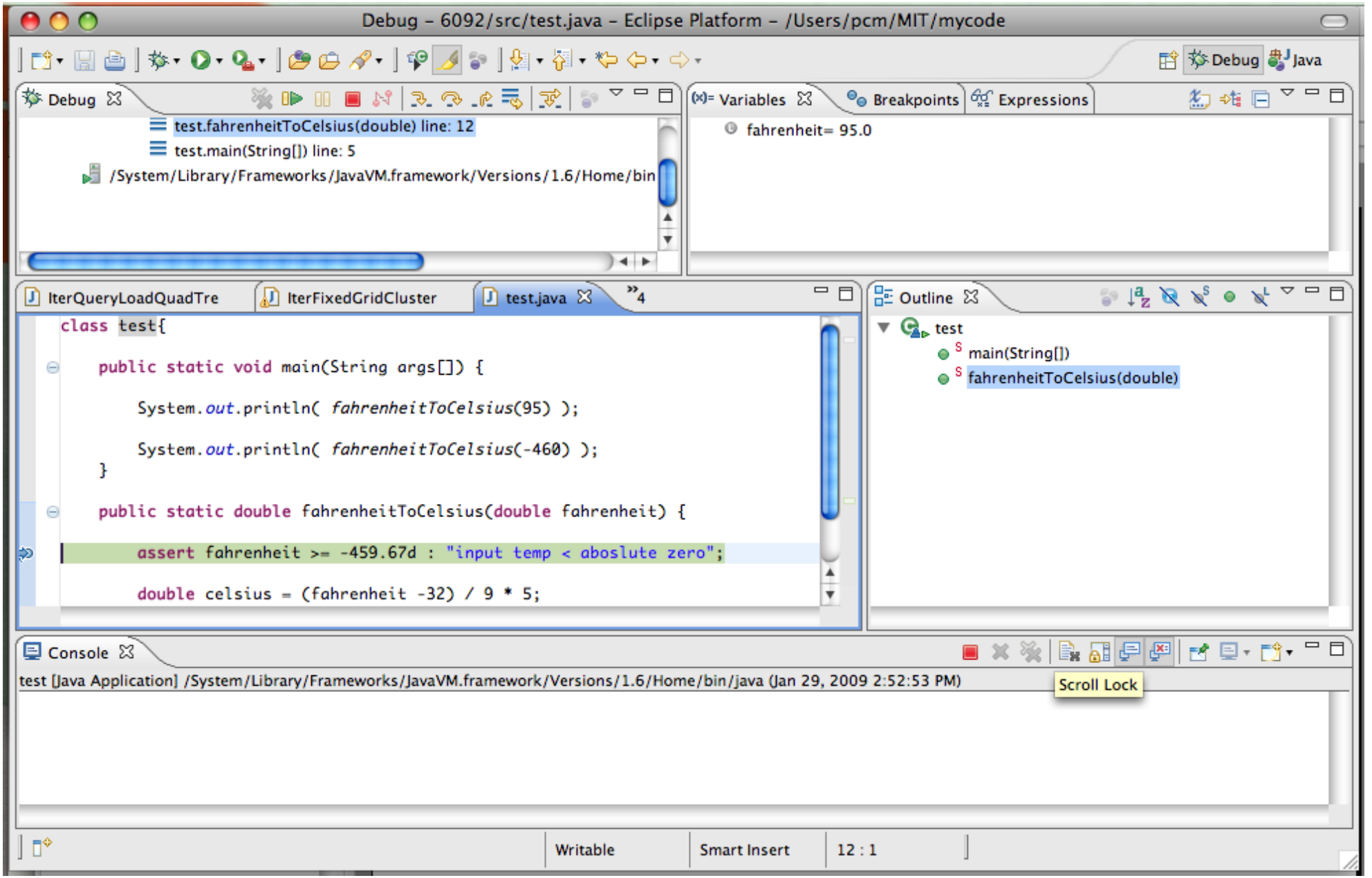
```
public static double fahrToCelsius(double fahr) {
   assert fahr >= -459.67d : "temp < abs zero";
   double celsius = (fahr -32) / 9 * 5;
   return celsius;
}
```

Java Assertions

- Normally not intended for end-users
- By default, assertions are disabled at runtime
- Command-line switch to enable assertions:

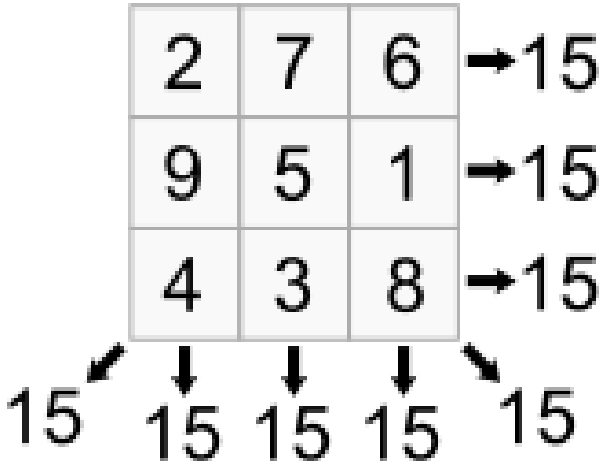
```
-enableassertions or -ea
```

Debugging with Eclipse



Assignment 8

- Magic squares!



- Read two files
- Check that all rows sum to the same constant!

Grades

- Please verify that your assignment grades match what you expect

- Click on *Gradebook* on course webpage

Course Evaluation

- Please evaluate the course to help us make it better in the future:

`http://sixweb.mit.edu/`

- Feedback from people who dropped the course very useful too

Thanks for attending!