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6.092 Introduction to Software Engineering in Java
January (IAP) 2009

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6.092

Lecture 8

Java I/O

Testing & Debugging 101

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(new FileReader("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

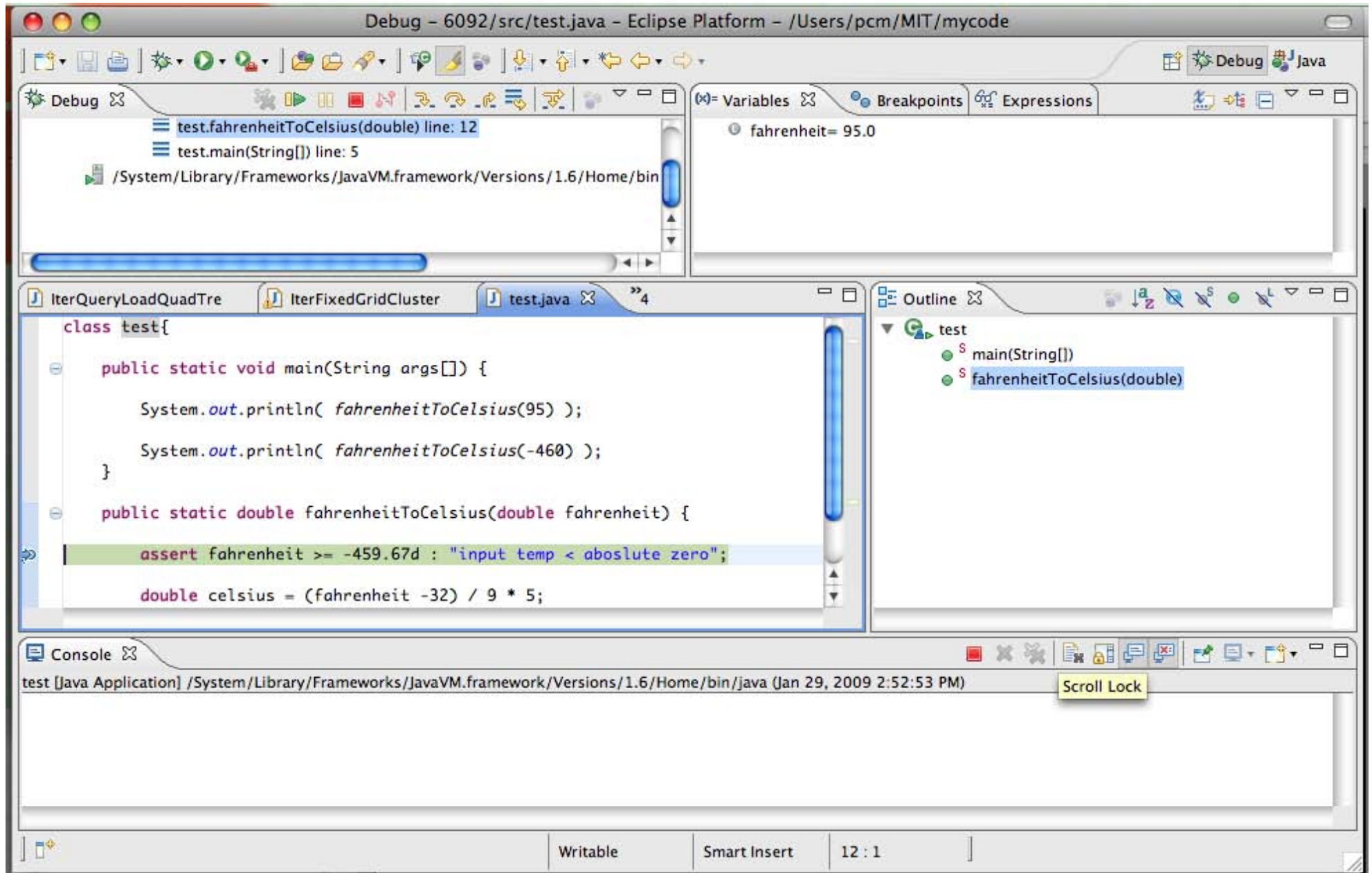
```
public static double fahrToCelsius(double fahr) {  
    assert fahr >= -459.67d : "temp < abs zero";  
    double celsius = (fahr - 32) / 9 * 5;  
    return celsius;  
}
```


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



Courtesy of The Eclipse Foundation. Used with permission.

Assignment 8

- Magic squares!

2	7	6	→15	
9	5	1	→15	
4	3	8	→15	
↙15	↓15	↓15	↓15	↘15

- 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!