1.00/1.001

Introduction to Computers and Engineering Problem Solving

Recitation 1
Java and Eclipse
Data Types, Variables, Logical Operators

February 13, 2012

Outline

- Administrative
- Java and Eclipse
- Data Types
- Variables
- Logical Operators
- Homework 1

Reminders

Office Hours

- Wednesday 5pm - 10pm
- Thursday 5pm - 10pm

2 Friday Quizzes: March 9 & April 13

Review session before all quizzes and finals.

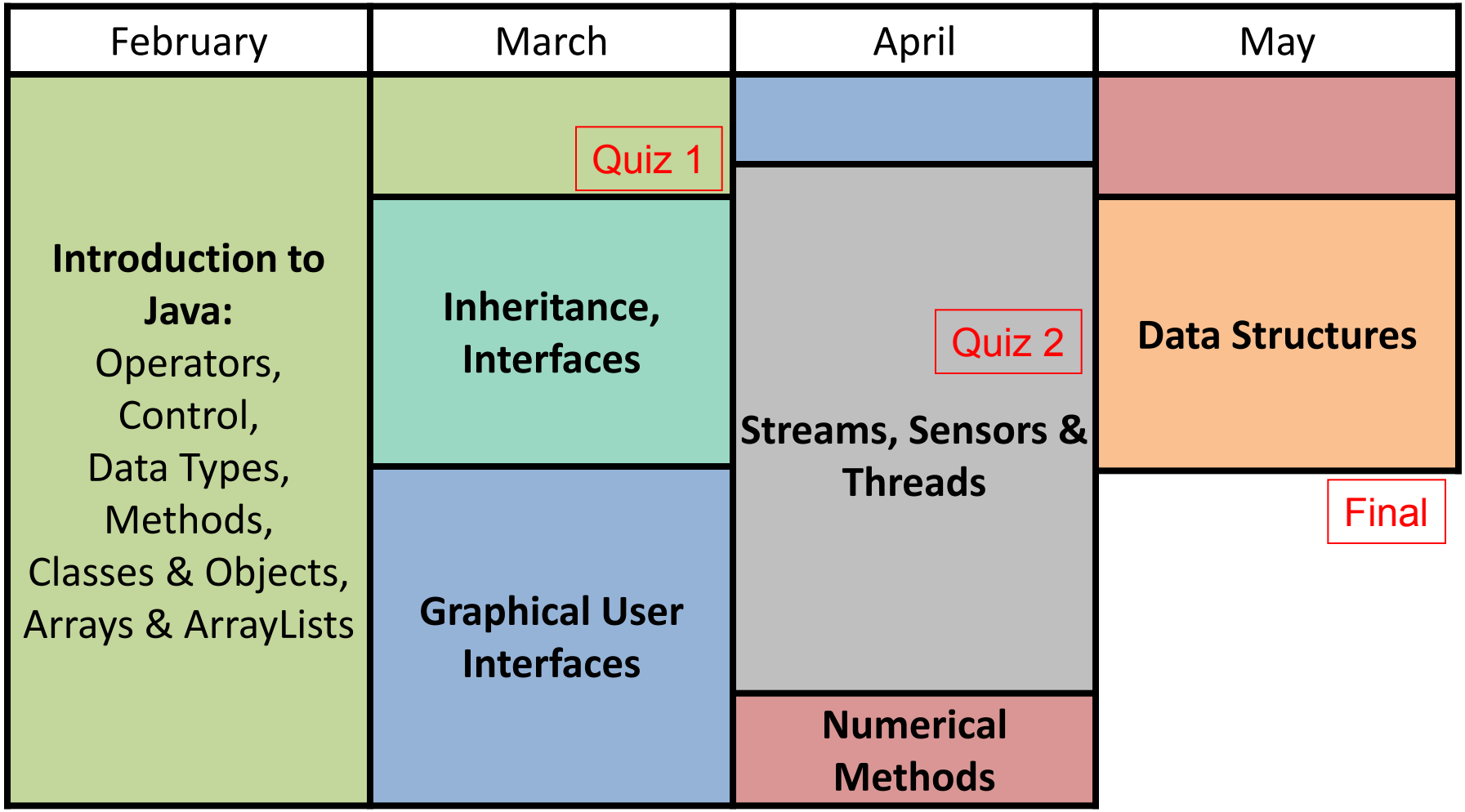
- Wed. March 7 7pm - 9pm
- Wed. April 11 7pm – 9pm
- Wed. May 16 7pm – 9pm

Academic Honesty Form – Read it! Sign it!

Grading

Homework (10)	40%
Active Learning Exercises	10%
Quiz 1 (March 9)	12%
Quiz 2 (April 13)	12%
Final Exam (TBA)	20%
Recitation Participation	6%

Schedule


February
March
April
May
Introduction to Java:
Operators, Control, Data Types, Methods, Classes & Objects, Arrays & ArrayLists
Quiz 1
Inheritance, Interfaces
Graphical User Interfaces
Quiz 2
Streams, Sensors & Threads
Numerical Methods
Data Structures
Final

Homework

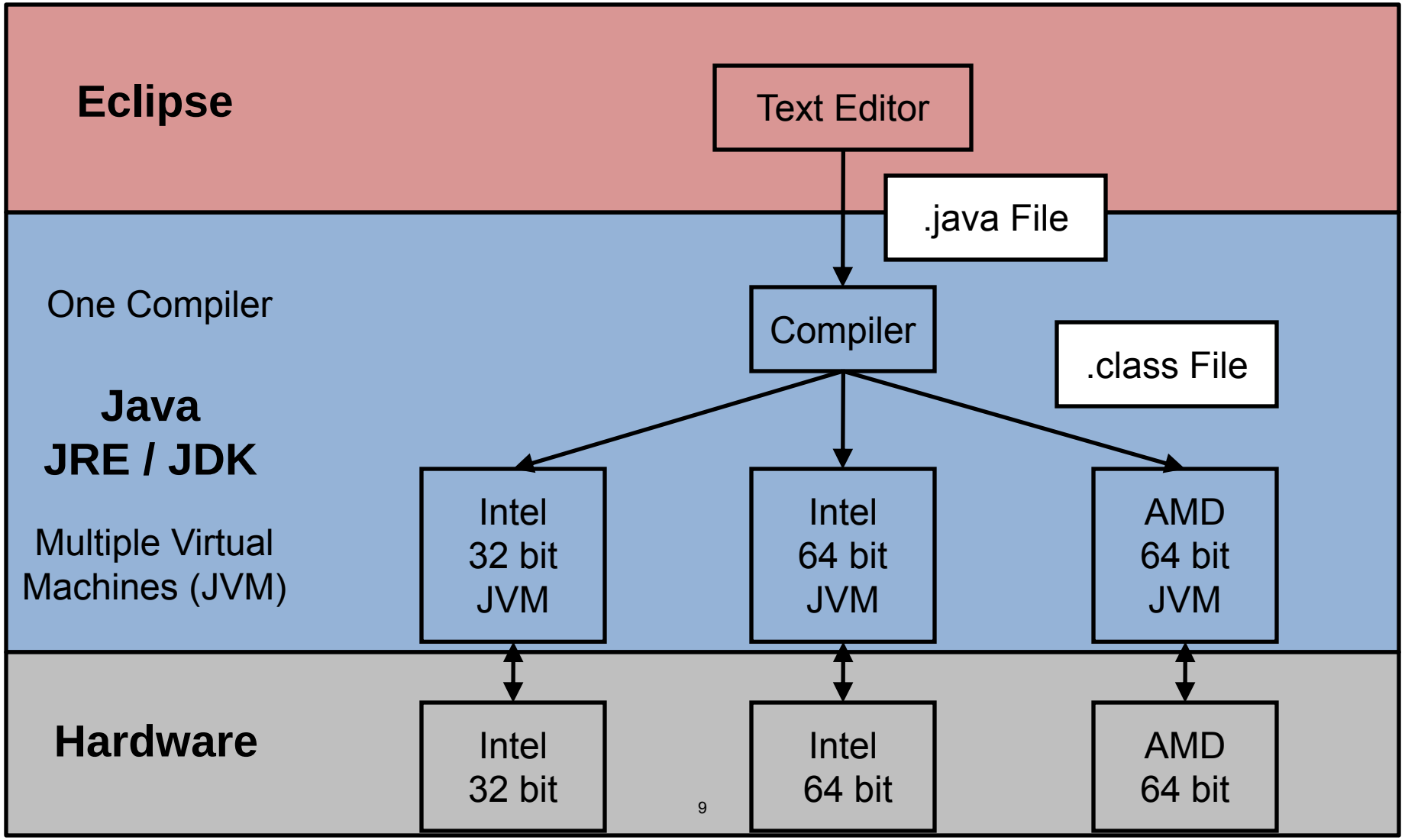
- Hard copy available in lecture a week before due date (2 weeks if quiz)
- Electronic copy available a week before the hard copy
- Due on Friday at 12 noon.
- Submissions accepted until 12 noon on Monday, with a 30-point penalty
- 1 no-penalty late submission (still before Monday 12 noon) – You still must turn in your pset!
- A submission is considered late if it has a ***late*** tag on the website
- Make sure you submit your .java files, and not your .class files
- Group multiple files in a .zip folder
- Every .java file must start with your name, MIT email and section number
- We do not omit your lowest problem set.

```
// Tim B. Ver
// Student's e-mail address
// 1.00 Problem Set 1 - Terminal Velocity
// 9-15-2011
// TA:
// Section No. R11
```

Active Learning Exercises

- Java files to be downloaded before almost every lecture
- Exercises are included in the lecture notes and often use the downloaded files
- Submit your solutions in the *Homework* section of the website before 8pm. No late submissions allowed.
- Java solutions are released in the *Homework* section
- PDF solutions and lecture notes including the solutions are released in the *In-Class Exercises* section
- You can download the lecture notes and the Java files and submit your exercises a week before lecture
- Complete the exercises for 30 lectures to get full credit (10% of final grade)

What you Installed



.java File

MileConvert.java - Notepad

File Edit Format View Help

```
public class MileConvert {
        public static void main(String[] args)
        {
                double circum = 24859.82 * 5280; // earth circumference in feet
                int minutesInCircle = 360 * 60;
                double nautMile = circum / minutesInCircle;
                System.out.println("1 Nautical Mile = " + nautMile + " feet");
        }
}
```

MileConvert.java

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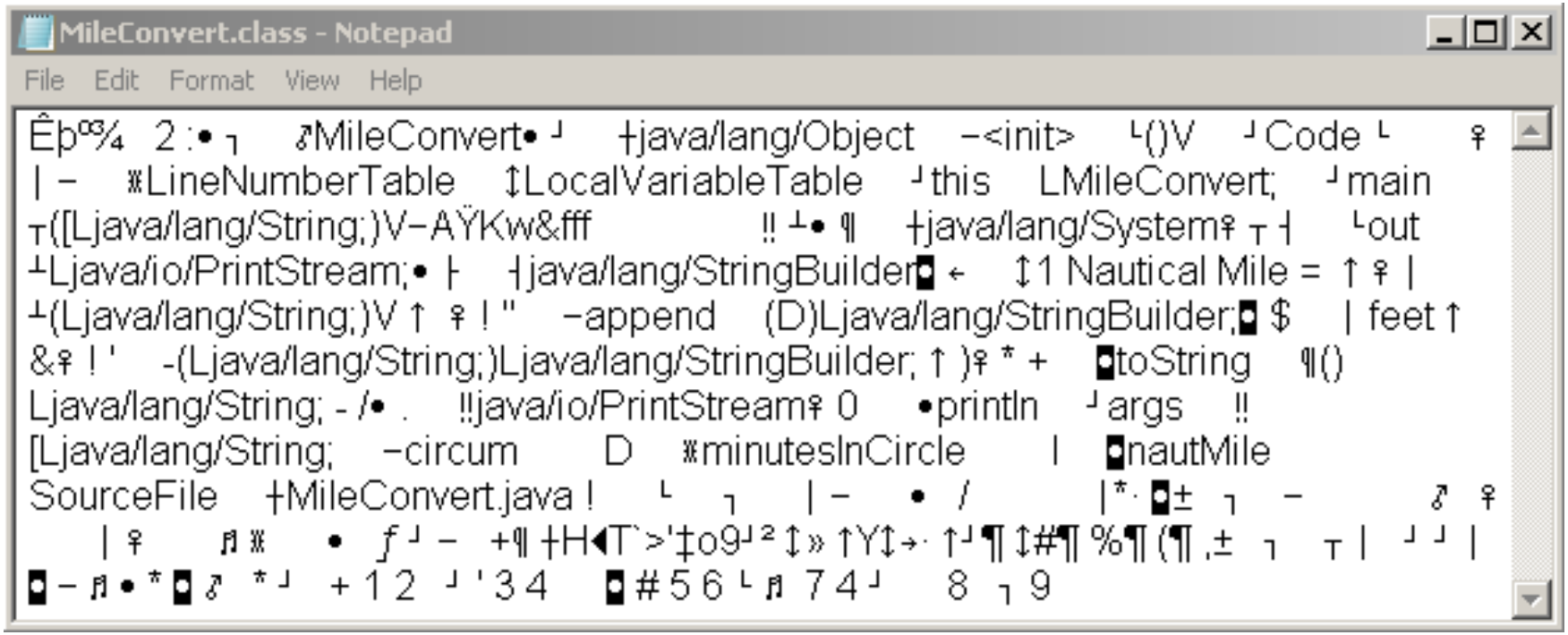
.class File



Don't submit your .class files !

Java Data Types

8 *primitive* data types

Type	Size (bits)	Range
`boolean`	1	
`char`	16	
`byte`	8	
`short`	16	
`int`	32	
`long`	64	
`float`	32	
`double`	64	

Java Data Types

Which data type would you use for:

```
int      studentCount = 142;
char     firstLetter = 'a';
float    weight = 180.6F;
double   area = Math.PI * 5.0 * 5.0;
boolean  enjoy100 = true;
long     theNumberOne = 1L;
double   largeNumber = 1.0E100;
```

Java Data Types

`boolean` `char` `byte` `short`
`int` `long` `float` `double`

In practice, we will mostly use:

`boolean` to represent logic

`int, long` and `double` to represent numbers

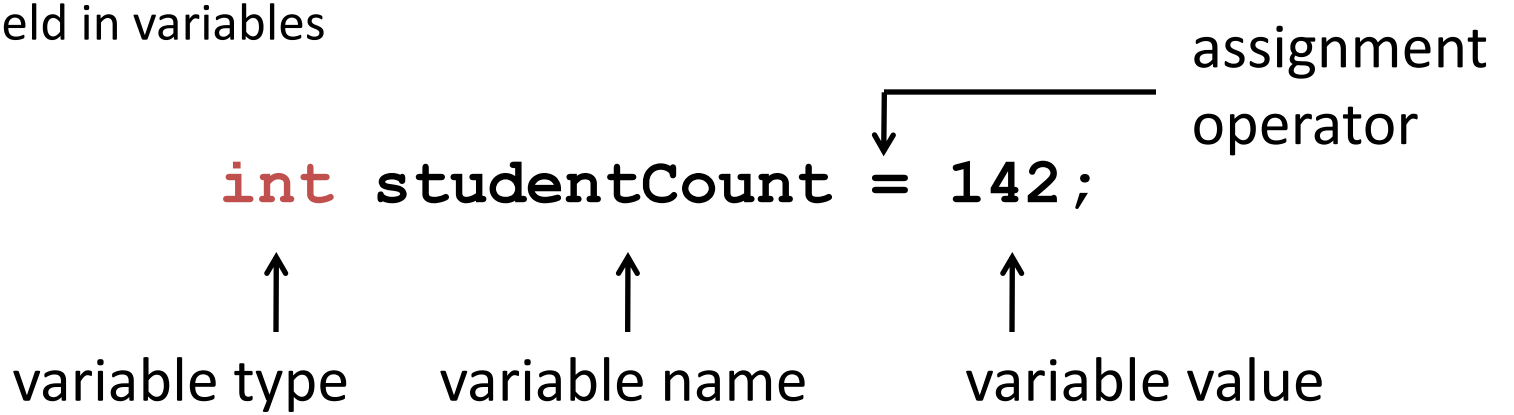
For text, we will use Strings, which are chains of `char`.

e.g. `String text = "Welcome to 1.00";`

A String is an *object*, not a *primitive* data type.

Variables

Data is held in variables



- The value on the right is assigned into the left variable name.
- The type of each variable must be declared: Java is a strongly-typed language.
- Variable names typically start with a lowercase letter.
- The variable value must "fit" in the variable type.

Variables

Are these variable declarations acceptable? If yes, are they ideal?

```
boolean b = 1;
```

```
double studentCount = 142;
```

```
byte preRegCount = 110;
```

```
int 2 = facultyCount;
```

Branching: if ... else

- if ... else

```
if (x == 0)
        System.out.println("x is Zero");
else
        System.out.println("x is NonZero");
```

- if ... else if ... else

```
if (x < 0)
        System.out.println("x is Negative");
else if (x == 0)
        System.out.println("x is Zero");
else
        System.out.println("x is Positive");
```

Branching: if ... else

- The `else` statement is not required to terminate branching.

```
// e.g. Take the absolute value of x

if (x < 0)
      x = -x;
```

- Use braces { } to execute multiple statements.

```
// e.g. Take the absolute value and notify the user

if (x < 0){
      x = -x;
      System.out.println("x has been converted");
}
```

Iteration (Loops)

```
while (condition to continue)
{
   // repeat as long as condition = true
}
```

```
do
{
   // run once and repeat as long as condition = true
}
while (condition to continue)
```

```
for (initial statement; condition to continue; increment statement)
{
   // execute initial statement
   // repeat as long as condition = true
   // execute increment statement after each repetition
}
```

Homework 1
Magnetic Inductance
Due: February 17, 2012

Compute magnetic inductance for 3 different types of antennae:

1.Line antenna
2.Coil antenna
3.Rectangular antenna

Also, **if** (hint) the user selects a coil antenna, and or a rectangular antenna, you will calculate the mutual inductance.

Considerations:

- Ask the user which antenna type
- Parse user inputs using input dialog
- Execute the user's desired calculations
- Print inductance value(s)
- Depending on antenna type, you will also be calculating mutual inductance

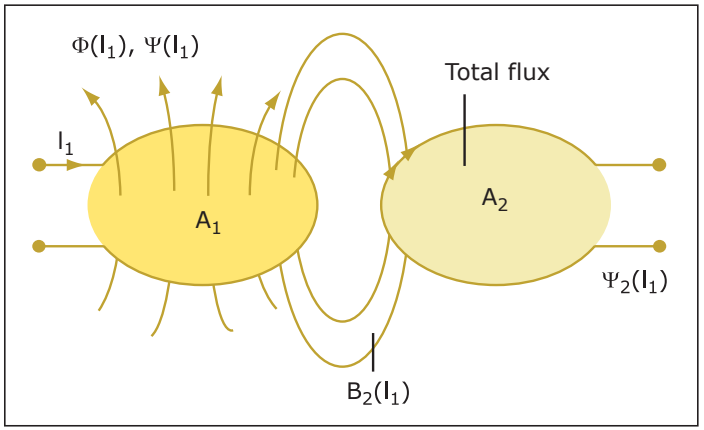


Image by MIT OpenCourseWare. Adapted from Figure 4.8 Finkenzeller, Klaus (2003). RFID Handbook (2nd Edition). Wiley.

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Spring 2012