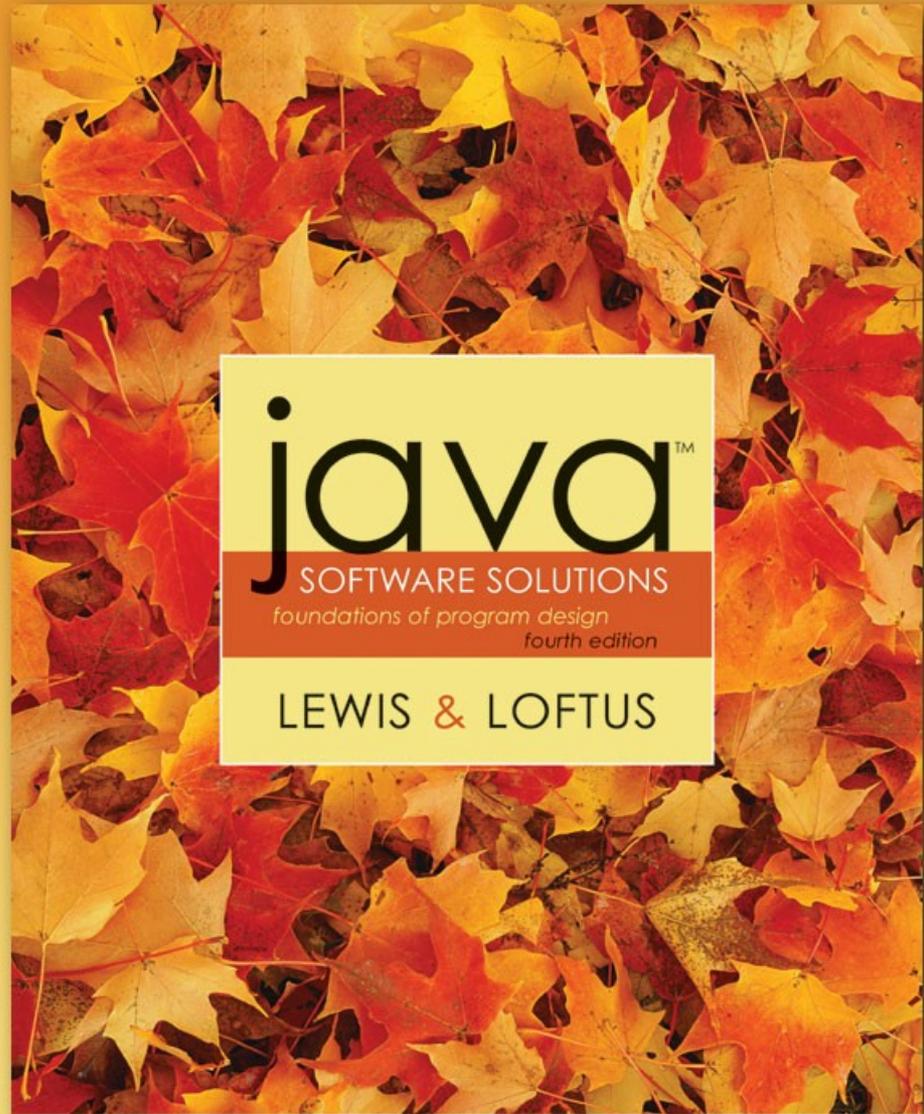
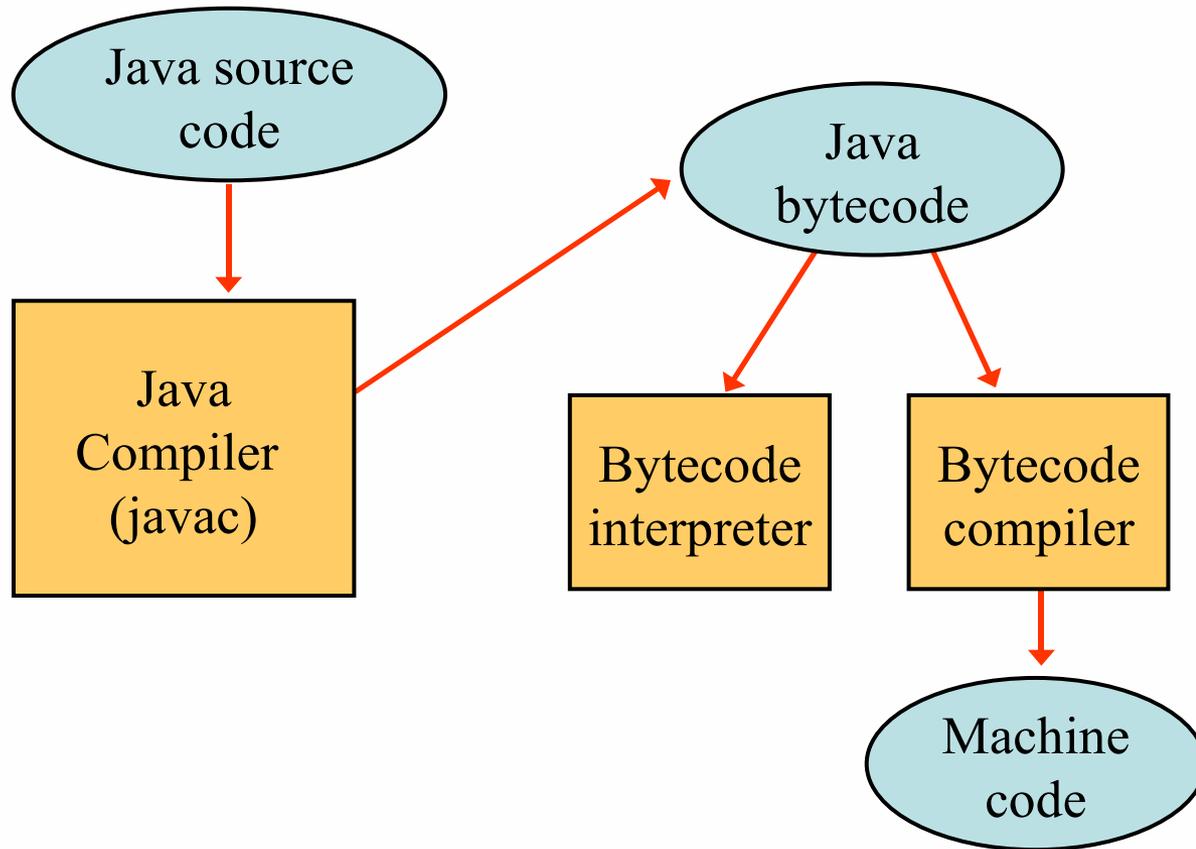


Midterm Review

Following slides are
borrowed from the
book's free supplement
Presentation Slides,
<http://duke.csc.villanova.edu/jss1/>



Java Translation – Q2



the machine language for the Intel processor

Data Conversion – Q3

- Conversion happens whenever two operands of an operation have different data type.
- **Widening conversions** happen automatically when converting from a small data type to a larger one. (such as short to int, int to double, ...)
 - **assignment conversion**
 - **arithmetic promotion**
 - **2007-Q3. (3).** You assign to a variable of type double the value of a variable of type int. `double d=5;`
- **Narrowing conversions** happened when converting from a large data type to a smaller one. (such as an int to a short) **Must use casting explicitly.**
 - **Casting** (must use explicitly)
 - **2007-Q3. (4)** You assign to a variable of type int the value of a variable of type double.
 - **2006-Q5. (c)** `int i = 4 / 5.0;`

Assignment Conversion & Promotion

- Between variables/constants of Primitive Data Type
- Assignment conversion occurs when a value of one type is assigned to a variable of another

2006-Q5. (b) `double d = 4 / 5;`

- Promotion happens automatically when operators in expressions convert their operands

2006-Q5. (d) `double d = 4 / 5.0;`

Casting – Q3

- To cast, the type is put in parentheses in front of the value being converted
- Both widening and narrowing conversions can be accomplished by explicitly casting a value.
- If we want a floating point result when dividing two integers, `int total, count;`
 - `result = (float) total / count; // OR`
 - `result = total / (float) count;`
- 2006-Q5. (c) `int i = 4 / 5.0;`
 - `int i = 4 / (int) 5.0;`
 - `int i = (int) (4 / 5.0);`
 - `int i = (int) 4 / 5.0; // This is wrong`

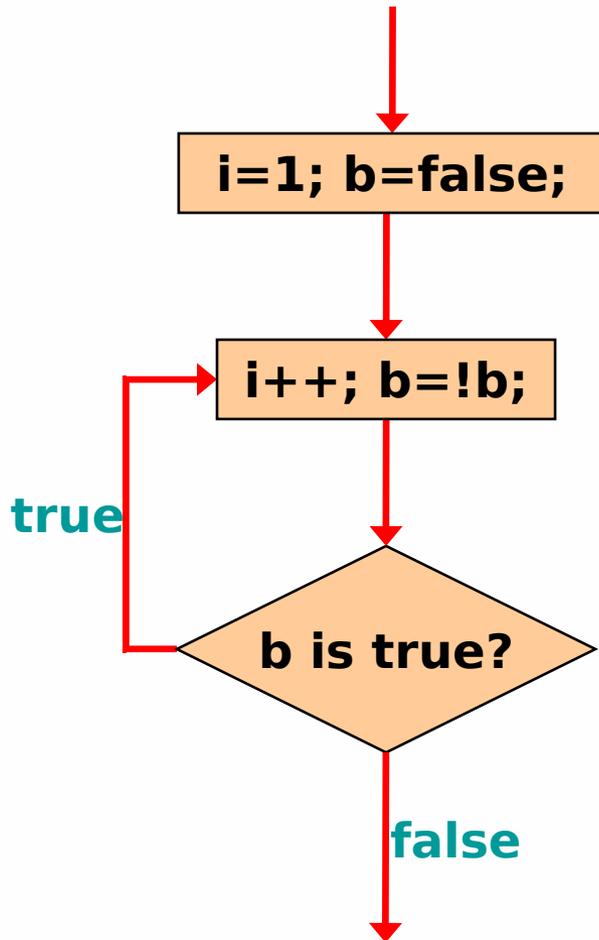
Question 5

- **double d = (int) 3.0/4 + 6;**
- **double d = 3/4 + 6 = 0 + 6 = 6 = 6.0**
 - a) Arithmetic promotion and casting
 - b) **Casting and assignment conversion**
 - c) Assignment conversion and arithmetic promotion
 - d) Casting, arithmetic promotion and assignment conversion
- **3 / 2 * 2.0 + 1 = 1 * 2.0 + 1 = 2.0 + 1 = 3.0**
- **What the result will be if x and y are integers?**

```
int x = 3;    double y = 9;
```

```
((y+1) / x*2+x*3/y) = (9.0+1) / 3*2+3*3/9.0 =  
10.0/3*2+9/9.0=7.6666666666666667
```

Logic of do Loop - Q-10



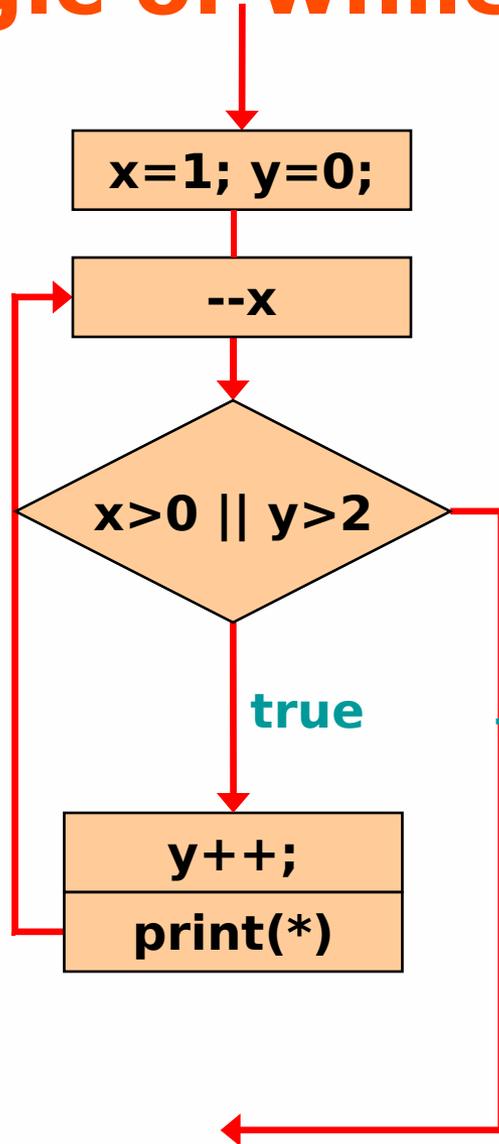
Iteration

#	b	i
initial	false	1
1	true	2
2	false	3

condition

b
--
true
false
end of loop

Logic of while loop – Q-11



	<i>Outside loop condition</i>		<i>Inside loop</i>	
#	x	x>0 y>2	y	print()
Init	3		0	
1	2	true	1	*
2	1	true	2	*
3	0	false		
		end of loop		**

Let's try PART B, Q-2.

2006 Section-2 Q-3

```
// miss import
public class TaxCalculator {
    double tax; // <9> Error: it is useful?
    public double calculateTax (float salary) {
        // <5> Error: 1) should be static,
        //                2) parameter type changed to double,
        if (salary <= 40000)
            double tax = salary * 0.3F; // <6> Error: tax small scope of if
        else //                BTW, what is 0.3F
            if ((salary > 40000) && (salary <= 60000))
                tax = salary * 0.45;
            else {
                double tax = salary * 0.5; // <7> Error: redefine tax in another scope
                return tax; // <8> Error: not all branches have return
            }
    }
    public static main(String args[ ]) { // <1> Error: 1) miss void, 2) (String[] arg)
        System.out.print ("Enter a number: ");
        double salary = Keyboard.readDouble();
        // <2> Error: 1) no Keyboard class & method readDouble();
        //                2) we only know Scanner, and it needs import java.util.Scanner
        float tax = calculateTax(salary); // <3> calculateTax() needs float,
        // <4> Error: 1) From main(), allow to call static method,
        //                2) return type is double
        //                3) which tax we want to use ?
        System.out.println ("Calculated tax : " + tax);
    }
}
```

2006 Section-2 Q-3

```
import java.util.Scanner;          // fix: add import
public class TaxCalculator {
    // double tax;                // fix: remove it
    public static void calculateTax (double salary) {
        // fix: (1) change to static,
        //      (2) parameter type changed to double,
        double tax;                // fix: declare in the scope of method
        if (salary <= 40000)
            tax = salary * 0.3F;    // fix: remove redefine
        else
            if ((salary > 40000) && (salary <= 60000))
                tax = salary * 0.45;
            else {
                tax = salary * 0.5;    // fix: remove redefine
                // return tax;        // fix:
            }
        return tax;                // fix: return for the method
    }
    public static void main(String[] args) { // fixed
        System.out.print ("Enter a number: ");
        Scanner scan = new Scanner(System.in); // using Scanner class
        double salary = scan.nextDouble();
        double tax = calculateTax(salary);    // fix: double type
        System.out.println ("Calculated tax : " + tax);
    }
}
```

2006 Section-2 Q-1

```
Line #
1  n=3
2  true // enter while
3  n=9
2  true // enter while
3  n=81
2  false // exit while
4  d=40.0
5  Result: 8140.0
6  n=24
7  d=0.0
8  true // enter while
9  true
10 d=6.0
11 n=23
8  true // enter while
9  false // go to else
12 d=7.0
13 n=18
8  true // enter while
9  false // go to else
12 d=9.0
13 n=13
8  true // enter while
9  false // go to else
12 d=13.0
13 n=8
8  true // enter while
9  true
10 d=19.0
11 n=7
8  true // enter while
9  false // go to else
12 d=33.0
13 n=2
8  true // enter while
9  false // go to else
12 d=61.0
13 n=-3
8  false //exit while
14 58.0 == result
```