First Exam Review, Thursday, February 10, 2011
Review all materials from notes, slides, examples and labs. Here is an **overview of topics** with some example questions in italics.
Note: Do not hand in this lab; but use it for review.

1. Identify types of values
    What is the most likely type of these values:
        56, -17, 20.3, 20.0, "hello", "-17", true, false

2. Variable declarations:
    Give an example of a declaration of a variable of type String:
        Answer: String lettergrade;
    Give an example of a variable declared to be an integer with initialization to 0:
        Answer: int total = 0;
    Where do you put declarations?
        Answer: A variable must be declared before the variable is used.

3. Arithmetic Operators, String operator +
    Given an integer variable with the declaration: int num = 7;
    what is the value of the following expression
        num – 4

4. Assignment statements
    Give an assignment statement that sets the value of a variable called total to 20:
        Answer: total = 20;

5. Type conversions
        Examples of converting from String to int or double:
            Integer.parseInt("17")
            Double.parseDouble("21.6")
        Examples of converting from int or double to String:
            String.valueOf(17)
            String.valueOf(21.6)

6. If statement – both "if then" and "if then else" forms, nested if statements, comparisons with && and ||
    Given the following code
        double salary, taxrate, income;
        salary = 2893.20;
        if (salary > 3000)
                { taxrate = 0.16; }
        else
        {   if (salary > 2000) then
                        { taxrate = 0.09; }
                else
                        { taxrate = 0.03; }

```
}
```
What is the value of taxrate?

Given the following code
```
if ((salary < 1000) || (salary > 2000))
        {   message = "Sorry, out of range";  }
else  { message = "You got a bonus!";  }
```
give an equivalent "if then else" statement that uses a comparison with &&

7. For loop: *Write the code that first sets a variable total to 0 and then uses a for loop to add 3 to total 17 times*
   Answer:
```
        int total = 0;
        for (int index = 1; index <= 17; index++)
        {
                total = total + 3;
        }
```

8. While loop: *Write the code that first initializes total to 2 and then uses a while loop to multiply total by 4 until its value is at least 100*
   Answer:
```
        int total = 2;
        while  (total < 100)
        {        total = total * 4;
        }
```

   Briefly explain when you would use a for loop or a while loop.

9. Understanding loops: Give values of variables as a loop is executed

10. Textfields, labels: understand the use of the functions getText() and setText().

11. Given a problem definition, be able to describe a sequence of steps (in English) that you would use to solve the problem.

12. Given a problem definition, be able to write the Java code that would solve that problem.

Exam given in the iLMS system.
        No materials allowed
        No other browser window open

Exam 1 Review Exercises

Exercise 1. Reviewing Variables, Types and Assignment

Suppose that you have the following program:

```
int hours;
double bonus = 50.00;
double payamount, payrate;

hours = 40;
payrate = 20.00;

payamount = hours * payrate;
payamount = payamount + bonus;
```

Find a declaration statement in the program.
        For the one that you chose, what is the type?

        What variable name or names are declared?

        If there is an initialization, what is the value?

Choose an assignment statement. What variable is being assigned to?

Consider the two assignment statements to the variable payamount.
        What value is assigned to payamount in the first assignment?

        What value is assigned to payamount in the second assignment?

Exercise 2. If Statements

Consider the following partial program:

```
int code = 23;
String color;

if ( code < 20 ) {
        color = "red"
}
else  {
        color = "blue"
}

if ( code > 40 ) {
        color = "purple"
}
```

(a) State what the value of the variable *color* is at the end of the first IF statement.

(b) Then state what the value of *color* is at the end of the second IF statement.

Exercise 3. Arithmetic and Assignment

Suppose we have variables Ounces and Mliters and that Ounces is initialized to be the number of fluid ounces in a can of coke:

```
double Ounces, Mliters;
Ounces = 12.0;
```

Write an **assignment statement** that converts ounces to milliliters, by multiplying Ounces by the conversion factor 29.57 and assigning it to Mliters.

Exercise 4. Writing a Program

Problem Statement:
Suppose that we have a form in which a customer can type in their status and their shopping total, and a final total is shown to them that has been given a discount, depending on their status which can be either "common" or "VIP".
The final total is computed based on the following rules:

       If a customer has status "common", they will get 5% off.
       If a "VIP" customer purchases 100 dollars or more, they will get 10% off.
       If a "VIP" customer purchases less than100 dollars, they will get 8% off.

a. Write a sequence of steps in English to solve this problem. This sequence should have 3-4 items and does not need to give the details of the rules for computing the final total.

b. Write the code for to solve this problem. Declare the following variables:
       double   total, finaltotal;
       String   status;
The value of status can be "common" or "VIP" and is typed into jTextField1. The value of the total is typed into jTextField2.
The finaltotal should be displayed in a label called jLabel1.
Please check that your curly brackets "{" and "}" are correct and matching.