First Exam Review, Thursday, February 6, 2014
Note: Do not hand in this lab; but use it for review.
Review all materials from notes, slides, examples and labs. Here is an **overview of topics** with some example questions in italics.

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;
   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!"; }
a. *For what range of values for salary will the bonus message be given?*
b. *Give an equivalent "if then else" statement that uses a comparison with &&*

7. For loop: Multiples of n: *Write the code that first sets a variable number to a value, such as 7, and then uses a for loop to calculate and print the first 10 multiples of that number*
    Answer:

```
int number = 7, multiple;
for (int index = 1; index <= 10; index++)
{
        multiple = number * index;
        System.out.println("multiple is " + multiple);
}
```

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().
    Be able to write code to get the text that a user types into a TextField, convert it to an integer or double, and assign it to a variable.

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 Blackboard system.
    No materials allowed, No other browser window open, No cell phones

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 with two declarations and two if statements:

```
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 Loop

Write the code for that first sets a String variable *text* to the empty string, "", and then uses a for loop to append/catenate a string "?" to the *text* variable for a total of 7 times.

Exercise 5. Understanding Loop Values

For the following code, write the values of the variables "result" and "index" at the end of each iteration of the loop, and say what value will be printed out by the System.out.println function.

```
int result = 0;
for ( int index = 1;  index <= 5; index++)
{
        if (index <= 2) {
                result = result + 1;
        }
        else {
                result = result + 5;
        }
}
System.out.println(result);
```

Exercise 6. Writing a Program

Problem Statement:
Suppose that we have a form in which a customer can check out cell phone plans. They can type in the number of minutes that they typically use in a month and type in the code "2G" or "4G" for which data plan they think that they want. The button on this form will compute their monthly fee for that plan.
The monthly fee is computed as follows:
> All customers pay a basic monthly fee of $10.00 plus 1 cent per minute.
> The "2G" plan adds $5.00 to this monthly fee, but the "4G" plan adds $15.00 to this monthly fee.

a. Write a sequence of steps in English to solve this problem. This sequence should have 4-6 items..

b. Write the code for the button on the form to solve this problem. Declare the following variables:
> double totalFee;   int numMinutes; String dataPlan;

The value of the data plan can be "2G" or "4G" and is typed into jTextField1. The value of the number of minutes is typed into jTextField2.
The total monthly fee should be displayed in a label called jLabel1.

Please check that your curly brackets "{" and "}" are correct and matching.