**Computer Science 112 Spring 2013**

Lab 5

**Due by in class one week from today.**

Put the answers to the questions 1 and 2 in separate block comments at the top of the java file for part 3. This java file should be zipped together and submitted on moodle under “assignment 5.”

1. True or False

* 1. The for loop is a pre-test loop
  2. The do-while loop is a pre-test loop

* 1. Any task which can be accomplished with a for loop can be accomplished with a while loop
  2. The following two lines of code end with the same value of j (where i=3):

j = i++ - --i;

j = i++ - i--;

* 1. The following will compile

for(int i=5; int j=0; j<10; j++){System.out.println(j);}

* 1. The following code prints 10 times:

int i=0;

while (i<10){

int j = i++;

System.out.println(j);

i = i+1;

}

1. Short Completion: write lines of code to accomplish each task.
   1. Write a for loop to print the numbers 0, 10, 20, 30, 40, ..., 1000
   2. Accomplish the same using a while loop (bonus: explain how to turn any for loop into an equivalent while loop)
   3. Write nested loops to draw this pattern:

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#\_###

##\_##

###\_#

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Bonus - Write nested loops to print this pattern:

# # # #

# # # #

# # # #

# # # #

# # # #

* 1. Write a do-while loop asking the user to enter a number, computing and printing a running sum of all values entered so far, and ending the loop when they input 0.
  2. Write a single for loop with two variables and draw the following:

00

1002

210024

32100246

4321002468

* 1. Write a program which gets two integers A and B from the user and then uses a while loop to print A random integers from the range [0,B].

1. We will be writing a program that gets a number, n, from the user, computes the factorial n!, keeps a running sum and average of all such n! values computed so far, and continues this process until the user tells it to stop. In particular, the program should utilize a do-while loop which gets an answer to the question "Using lowercase letters, is this the last time?" The program will execute until the answer is “yes,” i.e. as long as the answer is “no.”

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Within this do-while loop the program should utilize a JOptionPane to get an integer n from the user and validate that n is strictly between 0 and 10.

The program then computes n! via a for loop, then prints the input n, the value n!, the sum of all the n! values seen so far, and the average of all n! values seen so far. There should be no limit on how many times this process can take place. At any given moment the average could be for a few n! values or for a large number of such values.

After printing should come the test for whether or not the user answered “yes” or “no” and then, if they answered “no” the program should return to the command below the stars and get a value for n with which to repeat this process.

Here is sample output from the program:

Using lowercase letters, is this the last time? no

The number is: 3

The factorial is: 6

The sum of the factorials given so far is: 6

The average of the factorial given so far is: 6

Using lowercase letters, is this the last time? no

The number is: 2

The factorial is: 2

The sum of the factorials given so far is: 8

The average of the factorial given so far is: 4

Using lowercase letters, is this the last time? yes

The number is: 9

The factorial is: 362880

The sum of the factorials given so far is: 362888

The average of the factorial given so far is: 120963