/152 Name: _____ Period: _____

APCS Problem Set 7: More Iterative Statements

3.2 Rewriting `while()` using `do-while()`

Download the code for class `DoWhile` from http://feromax.com/apcs/problemsets/PS07/downloads/ and import into a new Eclipse project called `ps7a`. Run the class so you are familiar with how it works. Then, make edits so that the class uses `do-while()` rather than `while()`.

Teacher's Initials: _____ (10pts)

5 Book Questions Involving Loops

For the problems that follow, place the programs you write in your `ps7a` project.

1. Ch. 7, #6, *Population of Mexico*. This is *first* a math problem! **Do not attempt to write a program to solve the problem** until you understand how to solve the problem using a pencil, paper, and calculator.

   Teacher's Initials: _____ (20pts)

2. Ch. 7, #8, `addOdds()`: Make sure you follow Livtin's requirements: (a) exactly one `for()` loop, (b) no other iterative or `if()-else` statements, and (c) no use of a formula for computing the sum in a single step.

   Teacher's Initials: _____ (20pts)

3. Ch. 7, #9, printed sum from 1 to `n`: Pay close attention to the formatting of the printed output; you will not get a sign-off if your printed output doesn't match the appearance of the book's example.

   Teacher's Initials: _____ (25pts)

6 Nested Loops

1. Write down the printed output that you **predict** will be produced when the nested `for()` loops are run. (Note that your answer to question #3 will appear here too!) (8pts)

6.2 Book Questions Involving Nested Loops

1. **We'll work on this problem together in class:** Ch. 7, #20.

   Knowing where to start with this problem might be difficult. *Advice: Start with simple cases!* In the space below, draw triangles of n rows for each given value of n. (5pts)

$n = 1$	$n = 2$	$n = 3$	$n = 4$
*			

   Now you need to see what patterns are present. In particular, you should look at the following for each row of the triangles you sketched:

   - the row #
   - the # of leading spaces (i.e., # of spaces before *s)
   - the # of *s printed

   For each of the cases in $n = \{1, 2, 3, 4\}$, construct a table like this one:

n	row #	# spaces	# *s
4	1	3	1
4	2	2	3
...	...	...	...

   (Note that you need to construct **4 tables!**) Use the values in your tables to determine *formulae* that will allow you to predict, given n and the current row, how many leading spaces and *s you need to print. (3pts/table)

Once you have a working program, demonstrate for a sign-off.

Teacher's Initials: _____ (30pts)

2. **Bonus Problem #1:** For extra credit, solve Ch. 7, #25, *Quarters, Dimes, Nickels, and Pennies.*

   Teacher's Initials: _____ (+4pts)

3. **Bonus Problem #2:** For extra credit, finish the partially completed `IsosTriangleRec` class provided at `http://feromax.com/apcs/problemsets/PS07/downloads/IsosTriangleRec/` so that the `isosTriangle()` method prints an isosceles triangle of the specified height. The helper methods `isosTriangleHelper()` and `printChars()` must be recursive for credit.

   Teacher's Initials: _____ (+4pts)

7 Perfect Numbers Lab

5. Improve the code so that each time it finds a factor, it adds its value to a running sum. When all factors have been found, test to see if that sum equals `n`, and report `n` as a perfect number when appropriate.

   Teacher's Initials: _____ (30pts)