CSCI 1101 – Winter 2013
Laboratory No. 6

This lab is divided into two sessions. The first session will be a tutorial on using and creating Java Docs. The tutorial will be presented by one of the TAs.

Attendance to the tutorial is important. The TAs will keep a record of the attendance.

The second session of the lab is on the array data structure and has two exercises for you to complete. Your task is write and compile the class file followed by the tester program. Include all the source codes and sample output runs for each program. Make sure that you test your program for a number of different input scenarios. Please submit on Moodle by Saturday, February 23, 12 noon.

Exercise 1: A teacher has five students who have taken a test. The teacher uses the following grading scale to assign a letter grade to a student, based on the test score:

Test score	Letter grade
90.0-100	A
80.0-89.9	B
70.0-79.9	C
60.0-69.9	D
0-59.9	F

Write a class called Grades that has the following attributes:

- String array to hold the five students' names
- an array of five characters to hold the five students' letter grades,
- and an array of five doubles to hold the five test scores

and the following methods:

- No-args constructor (Note: the arrays are created in the declarations).
- Method setName(String, int) that puts the name in the name array at a given index.
- Method getName(int) that returns the name from the name array from a given index
- Method setScore(double, int) that puts the test score in the scores array at a given index
- Method getScore(int) that returns the score from the scores array from a given index
- Method findGrade(int) that determines the grade given an index and puts it in the grades array.
- Method getGrade(int) that returns the grade from the grades array from a given index.

Demonstrate the class in a program that allows the user to enter each student's name and his or her test score scores. It should then display each student's name, test score and letter grade.

Input validation: Do not accept test scores less than zero or greater than 100.

Exercise 2: Write a Lottery class that simulates a lottery. The class has the following attributes:

- lotteryNumbers: array of five integers
- userArray: array of five integers
- matches: number of matches

and the following methods:

- Constructor: takes in no arguments. It should use the Random class to generate five random numbers in the range of 1 through 9 and puts them in the lotteryNumbers array
  Note: (int)(Math.random()*9+1) generates random numbers in the range 1 through 9.
- Method that accepts an array of five integers that represent a person's lottery picks.

- Method should compare the corresponding elements in the two arrays and finds the number of matches. For example, the following shows the lotteryNumbers array and the user array with sample numbers stored in each. There are two matching digits (numbers 9 and 3). Note that the digits should be in the same position as well.

lotteryNumbers array:

7	4	9	1	3

user array:

4	2	9	7	3

- Method printPrize that prints the lotteryNumbers array, the user array and the prize. The prize is determined according to the following rules:

Grand Prize ($1 million):	all five digits match
$500,000 prize:	four out of five match
$1000 prize:	three out of five match
$10 prize:	two out of five match
$2 prize:	one out of five match
Sorry, nothing for you	none out of five match

Demonstrate the class in a program that asks the user to enter five numbers. The program should display the lotteryNumbers array and the user's array and the number of digits that match. It should also display a message about the prize.
Note: With random numbers, it is really hard to win even a $10 prize.