Programming Assignment 4 (Arrays and Static Methods)

Due date/time: Thursday, Feb 24th, 11:59 PM. **Total Points: 30 (10 each)**

Part 1: Personal Watercraft [10 Points]:

Design and implement a full Java program that reads a number car records (information) entered by the user and then print them sorted based on their unit price. Each car record information is entered as a set of five fields (pieces of information) as shown below:

Make (String)
Model (String)
Number of Seats (integer)
Backup Camera (boolean)
Car Price (double)

The program is expected to read number of the cars from the user (console) and then the cars' information and then prints the records in the format shown below, sorted in descending order based on the car price:

```
Make            : Ford
Model           : Explorer
Number of seats : 5
Backup camera   : true
Car Price       : $18,125
-------------------------------------
```

Note: The records are entered in the following format (5 lines for each account):

First Line is Car Make
Second Line is Car Model
Third line is Number of Seats
Fourth line is Backup camera
Fifth line is Car price

(Data Entered by The User)	Output:
3 **Ford** **Aerostar** **7** **true** **12,569** **Chevrolet** **Corvette** **2** **true** **57,112** **Toyota** **Sienna** **8** **false** **11,892**	Make : Ford Model : Aerostar Number of seats : 7 Backup camera : true Car Price :12,569 ------------------------------------- Make : Chevrolet Model : Corvette Number of seats : 2 Backup camera : true Car Price :57,112 ------------------------------------- Make : Toyota Model : Sienna Number of seats : 8 Backup camera : false Car Price :11,892 -------------------------------------

✓ **Hint**: Use multiple (5) arrays to hold the record fields and sort them based on the price array.

Part 2: Lottery Game (10 Numbers). [10 Points]

Design and implement a Java program that generates non-repeating 10 random non-repeating positive integer numbers from 1 to 99 (lottery numbers) and takes a single input from the user and checks the input against the 10 lottery numbers. The user wins if her/his input matches one of the lottery numbers.

Static methods you need to implement:

- Define static method **`initialize()`** that takes array **`lotterNumbers[]`** as a parameter and assigns `0` to each element of the array.

  Hint: Array elements are assigned 0, which is outside of lottery numbers' range, to distinguish elements that have not been given lottery numbers yet.
  Passing an array as a parameter and its initialization.

- Define a search static method **`check`**`()` that takes a number and the array **`lotterNumbers`**`[]` as parameters and returns `true` if the number matches one of the elements in the array, or **`false`** if none of the 10 elements do. That is, in the static method, you should write the code that iterates over the array looking for the number passed as the parameter. You may assume that the number that **`check`**`()` is looking for is always positive.

  Hint: Looking for the match is similar to looking for the minimum.

- Define a static method **`generate`**`()` that takes the array `lotterNumbers` as a parameter and fills it with 10 random integers whose values are from 1 to 99. The numbers should <u>not</u> repeat (essential).

  Hint: Use the class Random we studied earlier in class to generate appropriate random numbers from 1 to 99 and fill the array. Before the selected number is entered into the array `lotterNumbers`, call static method `check()` to make sure that the new number is not already in the array. If it is already there, ignore it and select another number.

- Define static method `input()` that asks the user to enter a single number from 1 to 99 and returns this value.
- Define static method `printOut()` that outputs the selected numbers and user input.

The pseudocode your method `main()` should be as follows:

```
Public static void main main(String [] args){
 declare array and other variables

 initialize (...) // fill array with 0
 generate(...)       // select 10 non-repeating random numbers
 input (...)      // get user input
 use check () to compare user input against lottery numbers
```

```
    and output whether user won
    printOut(...)    // outputs seleced lottery numbers
  }
```

Note: A program that processes each element of the array separately (i.e. accesses all 10 elements of the array for assignment or comparison outside a loop) is inefficient and will result in a poor grade.
Note 2: use the Array.length to retrieve the size of your array in the methods.
Make sure your programs adhere to proper programming style (e.g., good identifiers, comments, etc.).

Part 3: Array Programming (Problem-Solving.) [10 Points]

Design and implement a Java program that perform the multiplication between two arrays the first array is x with size 3x4, and the second array is y with size 4x5. Both arrays x and y should be declared as double data type.

1- Write a static method named fillArray() to receive and fill the received array with random double values between 0 and 15. Please use this method to fill both x and y arrays by calling this method two times.
2- Write a static method named multiplyArrays() that accepts two arrays and performing x[][]*y[][] and save the result in a new array z[][].
3- Write a static method named printArray() that accepts and prints the received array. Use the printArray() method to print all arrays by calling it three times.