Practice Problems for Midterm

Problem 1) Write a Java program to break an integer into a sequence of individual digits.

Problem 2) Write a program in Java to make such a pattern like right angle triangle with a number which will repeat a number in a row. The pattern is as follows

1
22
333
4444

Problem 3) Given a string and a non-negative int n, we'll say that the front of the string is the first 3 chars, or whatever is there if the string is less than length 3. Return n copies of the front;

frontTimes("Chocolate", 2) → "ChoCho"
frontTimes("Chocolate", 3) → "ChoChoCho"
frontTimes("Abc", 3) → "AbcAbcAbc"

Problem 4) Given a day of the week encoded as 0=Sun, 1=Mon, 2=Tue, ...6=Sat, and a Boolean indicating if we are on vacation, return a string of the form "7:00" indicating when the alarm clock should ring. Weekdays, the alarm should be "7:00" and on the weekend it should be "10:00". Unless we are on vacation -- then on weekdays it should be "10:00" and weekends it should be "off".

alarmClock(1, false) → "7:00"
alarmClock(5, false) → "7:00"
alarmClock(0, false) → "10:00"

Problem 5) Write a Java program to print an array after changing the rows and columns of a given two-dimensional array.

Problem 6) Write a Java program to find the k largest elements in a given array. Elements in the array can be in any order.

Problem 7) Write a Java program to reverse the content of a sentence (assume a single space between two words) without reverse every word.

Problem 8) Create a hierarchy based on an abstract class “Car” with abstract subclasses “ChargeableCar” and “NonChargeableCar” cars. Using this hierarchy, implement more classes for ElectricCar, HybridCar, & GasBurningCar.

You should be able to drive all cars (i.e., all cars must be able to use drive() method).
ElectricCar and HybridCars are both Chargeable and others are not. All chargeable cars must implement an interface “Chargable” which has an abstract method charge().

GasBurningCar and HybridCar should be fillable with gas (i.e., must implement interface called "GasFillable" which has an abstract method fillGas().

Provide all class definitions and define other instance variables as needed while keeping the design and coding to the minimum. Write a test program (or main method) that (1) creates an array of 3 cars (with one electric, one hybrid and one gasfilled car); (2) charges/fills them, and then (3) drives each of them.

Most of these problems with their solutions are available on the following websites:

https://www.w3resource.com/java-exercises/
https://codingbat.com/java