Assignment #1 – Java Review and Using System Methods

Due Date: _____

Efficiency will be taken into account with these programs.

The first problem is a simple problem that gives you a chance to try some basic input and output while handling exceptions. It also reviews simple loops and calculations.

A. Write a program that enters the name, price and quantity on hand for one or more products. For each product, your program should display the inputted information as well as the total value of each product (quantity × price). After all of the product information has been inputted, your program should display the total value of all the products entered, as well as the product with the highest total value – display both the name of the product and its value. Since the product information is not needed after being displayed, you should not use arrays to solve this problem.

Here is a sample input/output for this assignment. The format of your output should match this.

```
Inventory Management Program

Please enter the name of the next product: Widgets
Please enter the unit price for Widgets: $4.67
How many Widgets do you have on hand?: 10
You have 10 Widgets @ $4.67 for a total value of: $46.70
Do you have any more products? (y/n): y

Please enter the name of the next product: Large Widgets
Please enter the unit price for Large Widgets: $9.67
How many Large Widgets do you have on hand?: 2
You have 2 Large Widgets @ $9.67 for a total value of: $19.34
Do you have any more products? (y/n): n

The total value of all inventory is: $66.04
The item with the highest total value is $46.70 for Widgets.
Thank you for using the Inventory Management Program
```

You must also make sure that I cannot "crash" your program. For example, when entering the price, you should re-ask if the entered amount is a negative number, or not a number at all.

B. If you multiply certain integer numbers by 3, the resulting product is made up of the same digits as the original number. For example, if you triple the number 24714, you get 72441, which contains the same 5 digits ('2', '4', '7', '1' and '4') as 24714.

Write a Java program to find all n digit numbers that satisfy this property, where $1 \leq n \leq 7$. (You will ask the user to enter n.)

Note: 01234 is not a 5 digit number.

C. A palindrome is a string of characters that is the same forwards as it is backwards (e.g. "ABCDDCBA"). Write a Java program that finds the largest palindrome inside a given string.

For example, given the string "ABAABCCBADEFEDGHGDEFEDJKLLKJ", the largest palindrome starts with the 10th character and is 13 characters long ("DEFEDGHGDEFED").

Your program should read the string to check from a text file. You should output the starting position and the length of the largest palindrome. You should also output the longest palindrome. If there is more than one palindrome with the longest length, you should output the one that appears first. You can assume that the input file will contain only the letters 'A' to 'Z' with no more than 100,000 characters. Here is another example:

```
File input:
    BCDRADAREFRADARGHI
Screen Output:
    Finding the largest palindrome
    Largest palindrome: RADAR
    Starting position: 4
    Length: 5
Program is complete
```

FINAL REMINDERS:

✓ Don't forget your comments in each program.
  (Introductory, method, and internal comments)

✓ #B, C: You must write methods in both programs.

✓ #B, C: Must read in input from text files. Make sure it can read in multiple lines of input.

✓ #C: Efficiency is important! (ie. The program cannot run forever when there are more than 1000 characters in the input string.)