Homework 3

Deadline: 2015/04/10 09:00

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Problem Description

- Given a mathematical equation that are written using letters.
- Each letter can be a digit from 0 to 9, but no two letters can be the same. The first letter of each term cannot be 0.
- For example, a solution to the equation

  ```
  SEND + MORE = MONEY
  ```

  is S = 9, R = 8, O = 0, M = 1, Y = 2, E = 5, N = 6, D = 7.
- Write a program that finds a solution to such equation, and output the values for the letters that satisfy the equation.
- Your output should be **exactly** in the form:

  $(c_1,d_1);\ (c_2,d_2);\ (c_3,d_3);\ \ldots$

  where c_n is a capital character and d_n is a solution to c_n. Sort the characters in alphabetical order.

A Simple Technique for Finding a Solution

Given another example:

```
TOO + TOO + TOO + TOO = GOOD
```

Your program should output

```
(D,6); (G,1); (O,9); (T,4);
```

A simple technique for finding the solution is to use a nested loop for each unique letter (in this case T, O, G, D). The loops would systematically assign the digits from 0 to 9 to each letter. For example, it might first try T=0, O=0, G=0, D=0, then T=0, O=0, G = 0, D = 1, then T = 0, O = 0, G = 0, D = 2, etc., up to T = 9, O = 9, G = 9, D = 9. In the loop body, test that each variable is unique and that the equation is satisfied.

Sample Input and Output

- The input data will be given from a text file "file.txt".
- There are 4 lines in the file, and each of line indicates an equation to solve.

Input	QQ + OO = TOT TOO + TOO + TOO + TOO = GOOD TAKE + A + CAKE = KATE EAT + THAT = APPLE
Output	(O,2); (Q,9); (T,1); (D,6); (G,1); (O,9); (T,4); (A,9); (C,2); (E,1); (K,6); (T,3); (A,1); (E,8); (H,2); (L,3); (P,0); (T,9);

Scoring Criteria

- Correctness: 80%
  - 20% for each test case
- Coding standards: 20%
- Plagiarism is strictly forbidden

Submission

- Please upload your source code to Moodle
- The file name should be {STUDENT_ID}_hw3.java
- Deadline: 2015/04/10 09:00
- No late submission is accepted

If you have any problem about this homework,
please email to: t824675951535@hotmail.com（林宥辰）

Hints

- http://docs.oracle.com/javase/8/docs/api/java/lang/Integer.html
- http://docs.oracle.com/javase/8/docs/api/java/text/DecimalFormat.html
- http://docs.oracle.com/javase/8/docs/api/java/util/TreeMap.html
- http://docs.oracle.com/javase/8/docs/api/java/util/HashSet.html
- http://docs.oracle.com/javase/8/docs/api/java/util/Arrays.html