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CS150L – Data Structures and Algorithms
September 3, 2017

Lab Report 1

1. Introduction
   - Problem 1: Create a simple calculator that reads user's input numbers and choice of operation, calculates and displays the result.
   - Problem 2: Write a program to read an input file, find the cheapest product from each product category, and write results to an output file.
   - Problem 3: Compile and run a program using the Terminal
2. Approach
   2.1. Problem 1
   a. Design
   - The program continues to display an operation menu and ask for user's input until user chooses to quit by entering "0".
   - The program shows an error message and redisplays the menu when any of user's input is non-numeric. In particular, choice of operation can only be integers. If the user enters an integer that is not listed in the menu, a message shows up to notify users that their selection is not an available option.
   2.2. Problem 2
   a. Design
   - Input file is formatted as a csv file. Each line contains multiple products in the same category. The first word on each line is the category, followed by products and their prices, alternatively.
   - If input prices are not integers or decimal numbers, the program displays an error message and generates an empty output file.
   b. Choice of algorithm
   - If a product category is not empty, set lowest price and cheapest product to the first item on the list. We then constantly compare it with the following items and update the information if a cheaper product is found.
   2.3. Problem 3

```
Last login: Sun Sep  3 14:05:27 on ttys000
Oanhs-MacBook-Air:~ oanhdoan$ ls
Applications    Documents     Google Drive    Lab1.2        Movies         Pictures       ShinyR
Desktop         Downloads     Lab1            Library       Music          Public
Oanhs-MacBook-Air:~ oanhdoan$ cd Lab 1
-bash: cd: Lab: No such file or directory
Oanhs-MacBook-Air:~ oanhdoan$ cd Lab1
Oanhs-MacBook-Air:Lab1 oanhdoan$ ls
Calculator.class       Calculator.java       CheapestProduct.ctxt    README.TXT        output.txt
Calculator.ctxt        CheapestProduct.class CheapestProduct.java    input.txt         package.bluej
Oanhs-MacBook-Air:Lab1 oanhdoan$ javac Calculator.java
Oanhs-MacBook-Air:Lab1 oanhdoan$ java Calculator
Operations available:
0: quit
1: addition
2: substraction
Enter your choice here: 1
First number: 3.6
Second number: 7
3.6 + 7.0 = 10.6
Operations available:
0: quit
1: addition
2: substraction
Enter your choice here: 2
First number: 5.7
Second number: 3
5.7 - 3.0 = 2.6999998
Operations available:
0: quit
1: addition
2: substraction
Enter your choice here: e
Exception occured java.lang.NumberFormatException: For input string: "e"
Operations available:
0: quit
1: addition
2: substraction
Enter your choice here: 0
Thank you for using the calculator.
Oanhs-MacBook-Air:Lab1 oanhdoan$
```

Image 1. Compiled and run Calculator program

3. References

(2016, January 12). Retrieved September 03, 2017, from
    http://docs.oracle.com/javase/8/docs/api/java/util/Scanner.html
(2016, January 11). Retrieved September 03, 2017, from
    https://docs.oracle.com/javase/7/docs/api/java/io/PrintWriter.html