The City College of New York
Department of Compute Science
CSc 221: Software Design Laboratory

Assignment 3 – Fall 2019

In this assignment we will expand on your Java programming skills by implementing multiple classes with different features. You will rely on Java's library for certain tasks and design each class to maximum reusability with fewer lines of code.

Note: please do your own work, sharing and/or copying code and/or solution ideas with/from others will result in a grade of 0 and disciplinary actions for all involved parties. If you run into any problems and have done your best to solve them, please see me before/after class or e-mail me.

Problem Description:

Implement the classes shown in the class diagram below (Figure 1). Please adhere to the names shown in the diagram. The classes are self-explanatory; however, note the following:

Class *LogEntry*:

- ✓ **Non-default constructor:** throws an *IllegalArgumentException* if one of the following is true:
  1. *Id* is not a valid numeric string. Numeric strings are strings consisting of numbers ONLY.
  2. *timestamp, source, destination, protocol, length, description*: cannot be *empty* or *null*
- ✓ **toString:** this method returns a comma-delimited string of all the class' variables. i.e. the values of

  id, timestamp, source, destination, protocol, length, description

Class *NetworkLogManager*:

- ✓ **loadFile:** reads records from the provided text file (*Network.log*). Refer to the section below for the file's structure. Valid records should be added to *listLogEntries*. This method should handle Exceptions from the class *LogEntry* by printing the message *Skipping line:* followed by the skipped line. There are 147 invalid records (see **Figure 2**).
  Hints:
  - ✓ Use *Scanner* class to read the input file's lines. This is similar to reading from the standard command prompt.
  - ✓ Use the *String* class' *split* method to parse each line.
- ✓ **toString:** this method returns the string shown next. Replace *??* with the number of entries in *listLogEntries*.

  NetworkLogManager: there are ?? records

- ✓ **searchByRange:** returns a list of records between the provided dates (inclusive). You will need to convert the *String* parameters to type *Date* in order to perform the search. To do this, use the *SimpleDateFormat* class with pattern *"MMM dd yyy HH:mm:ss"*.
- ✓ **searchBy:** the remaining 7 required methods allow searching by a specific field. It is inefficient to implement each one independently, therefore you should create a *private* common method which contains the search logic. This method should select the proper field. One way to do this is to create an internal *enumerator* and use a *switch* structure.

Class *A3Driver*:

- ✓ This is the provided test class. Your code should work with this class **AS IS**. Please DO NOT modify this class and adhere to the names provided in the class diagram (**Figure 1**)
- ✓ Your code's output should match the output shown in **Figure 3**.

Input file's format:

- ✓ The file contains 501 comma-delimited rows.
- ✓ Each row consists of 7 columns (*id, timestamp, source, destination, protocol, length, description*).
- ✓ Some columns contain invalid values. Valid rows have ID and LENGTH that is NOT 0. All columns should have values (i.e. cannot be empty). If either column contains an invalid value, the entire column is rejected. There are 74 invalid rows (**Figure 2**).

Grades:

Item	Points
Class LogEntry	
Constructor	10
Getters/setters	5
Class NetworkLogManager	
Constructor	5
loadFile	10
toString	5
searchByRange	15
7 searchBy methods	20
Common method for 7 searchBy methods	20
Correct output	10
	100

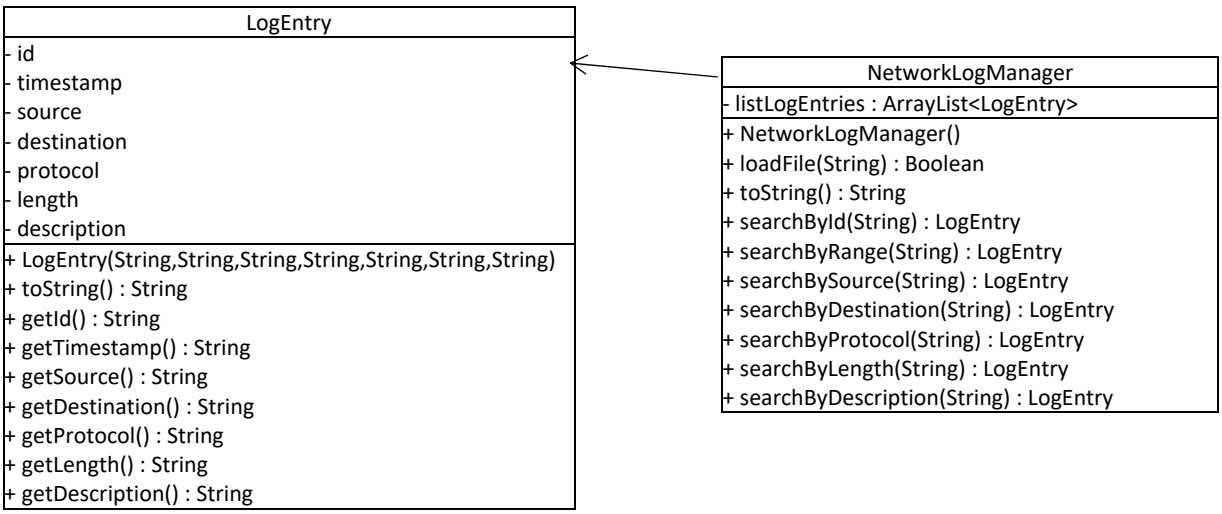

Figure 1: Class diagram.

```
Skipping line: #,Time Stamp,Source,Destination,Protocol,Length,Description
Skipping line: ,Oct 13 2019 05:09:42,192.168.5.138,192.229.189.15,-,491,communication with play.google.com
Skipping line: ,Mar 01 2019 07:46:18,192.168.5.102,.55.163.53,TCP,174,TCP communication with microsoft.com
Skipping line: 6,Oct 11 2019 12:14:45,192.168.5.134,17.172.224.47,TCP,0,TCP communication with 192.168.5.148
Skipping line: 7,Jan 14 2019 08:47:45,192.168.5.233,135.195.175,TCP,0,TCP communication with netflix.com
Skipping line: ,Oct 12 2019 10:29:46,192.168.5.140,g208.82.237.226,TCP,1049,TCP communication with 192.168.5.148
Skipping line: 11,Feb 03 2018 01:02:52,192.168.5.216,192.168.1.1,-,1269,communication with ebay.com
Skipping line: 12,Mar 09 2018 23:40:30,192.168.5.242,31.13.66.35,-,0,communication with linkedin.com
Skipping line: 13,Oct 01 2019 04:43:08,192.168.5.210,172.217.11.14,TCP,0,TCP communication with espn.com
Skipping line: 15,Jan 06 2019 01:08:28,192.168.5.244,161.170.232.170,TCP,0,TCP communication with ebay.com
Skipping line: 18,Feb 11 2019 18:27:30,192.168.5.114,161.170.232.170,TCP,0,TCP communication with pinterest.com
Skipping line: 19,Jul 16 2018 00:57:45,192.168.5.203,a.org208.80.154.224,-,424,communication with reddit.com
```

… …

Figure 2: first 12 skipped Records

```
---------------------------------------------------------------------------------------------------
NetworkLogManager: there are 354 records
---------------------------------------------------------------------------------------------------
Record with id 1: null
Record with id 9: 9,Sep 13 2018 22:50:35,192.168.5.151,101.193.67,TCP,197,TCP communication with amazon.com
---------------------------------------------------------------------------------------------------
There are 146 entries from 2018
```

Figure 3: output of test class

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