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| MSC SOFTWARE DEVELOPMMENT |
| Advanced Object Technology |
| Assignment 1 |
|  |
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## Section 1 – Demonstrated Use of Object Orientated Concepts

### Re-Use

Logging?

### Encapsulation

TODO – demonstrated by FlowFileStats.java?

### Abstraction

TODO – ensure to differentiate with Encapsulation

### Inheritance

The concept of Inheritance is demonstrated by BinetFileParser extending ParsableFile. The parsing of other types of traffic files could be supported here in the future by introducing subsequent classes that extend ParsableFile and override the necessary functionality.

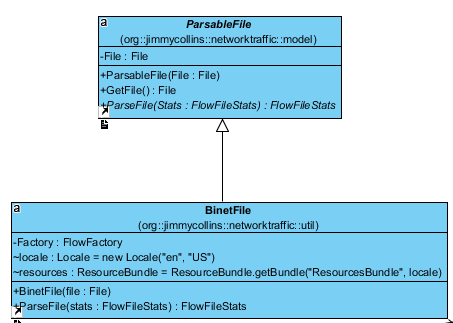


Figure X: Use of Inheritance

### Overloading

Function overloading is demonstrated by the logging class I use within the application. There are different logging functions that can be used depending on, for example, if a log is being written to the log file or to the user interface for display to the user.

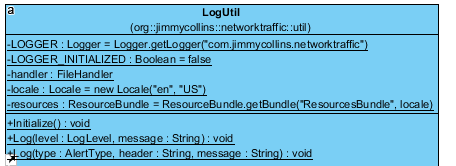


Figure X: LogUtil Class

### Dynamic Binding

Dynamic Binding is used in the logic I use to parse the traffic file. In the example in Figure X below, the compiler cannot determine the type, because the instance of BinetFile is also an instance of ParsableFile, so the type is determined at run-time.

Ref: <http://www.javatpoint.com/static-binding-and-dynamic-binding>

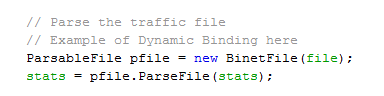


Figure X: Example of Dynamic Binding

### Nested Class

The ParsingObserver class (shown in the code snippet in Figure X below) defined in MainUIController is an example of a Nested Class. This class is used as part of my implementation of the Observer pattern (see Section 2), and contains functionality for updating the user interface as parsing of a file progresses.

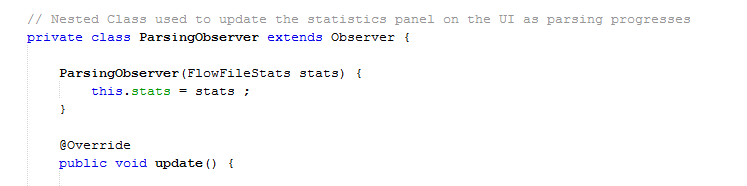


Figure X: Nested Class

### Inner Class

There are a couple of examples of inner classes. Shown in Figure X below is a snippet that illustrates the usage of an anonymous inner class in the function I use to parse the traffic file.

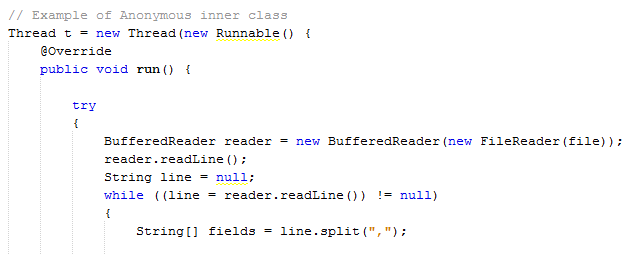


Figure X: Example of Anonymous Inner Class

### Abstract Class

A demonstrated used of an Abstract class is ParsableFile. This defines an abstract class with the relevant fields and methods relevant to parsing a file.

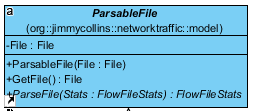


Figure X: ParsableFile Class

### Generic Method

Usage of a generic method is demonstrated by SortMapByValue contained with the static Utility class. See Figure X below for a snippet of the method signature.

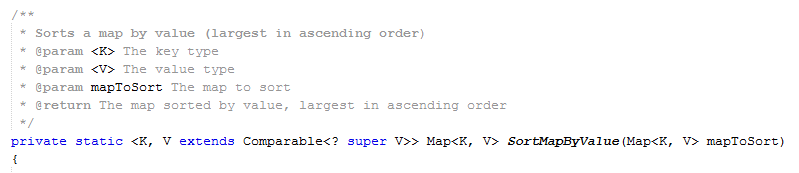


Figure X: Snippet from Generic method SortMapByValue

### Generic Class

TODO – ArrayList?

### Bounding

TODO used in Utility.java – GetTopElements

Usage of Bounded Type Parameter in my Generic function to ensure any objects input are comparable?

Ref: <http://www.journaldev.com/1663/java-generics-example-method-class-interface>

### Custom Exception Handler Type

I have defined a custom exception used when parsing the file. See Figure X below for a code example.

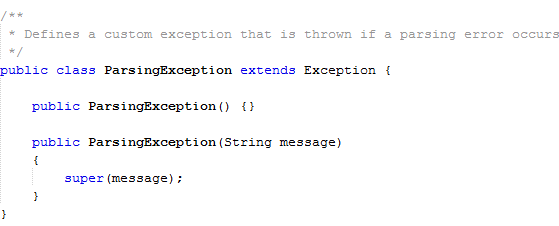


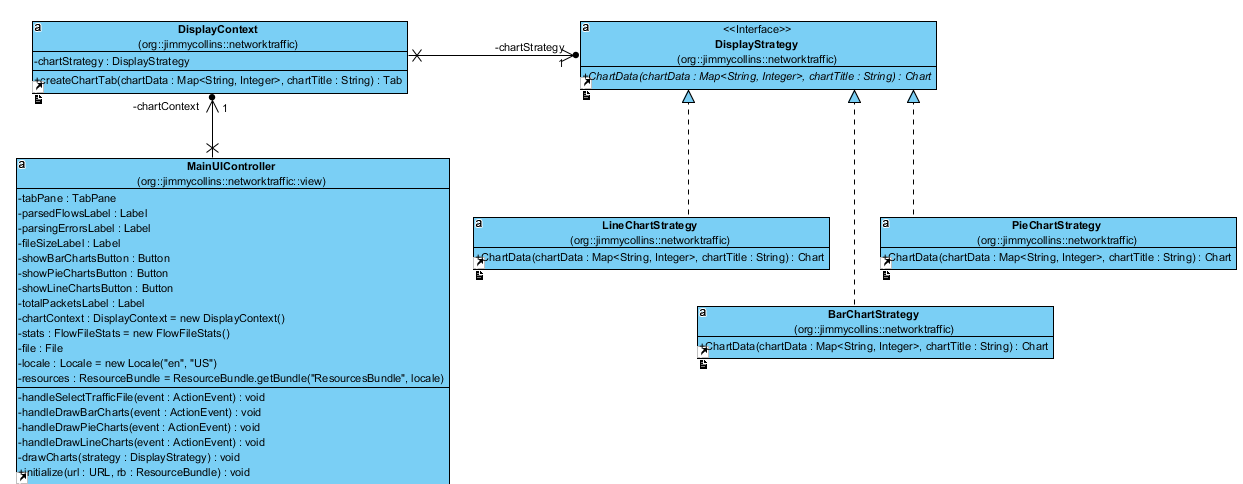
Figure X: Custom Exception

## Section 2 – Usage of Design Patterns

### Strategy Pattern

This is used to allow choosing of different chart types to show the data – pie charts, bar charts and line chats are supported out-of-the-box.

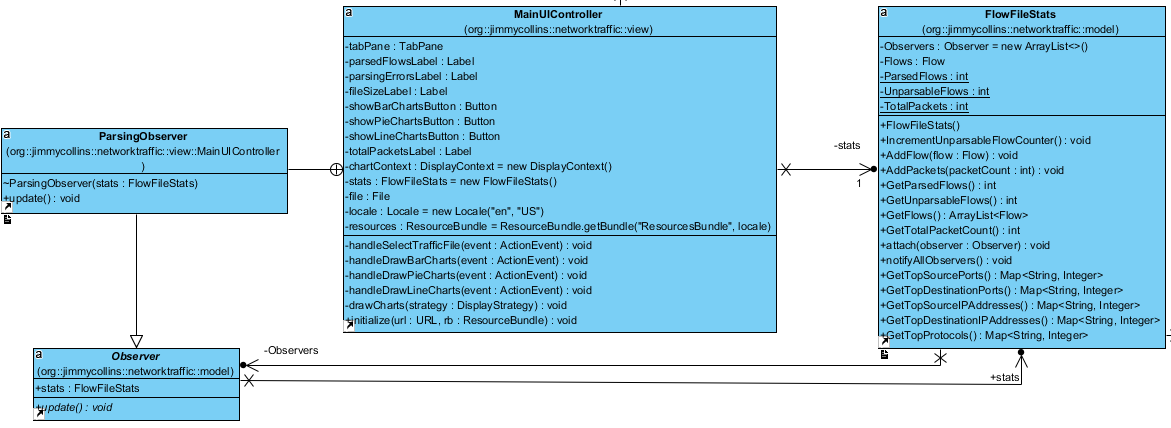
Support for other charts could be added easily by adding another class and implementing DisplayStrategy.



### Observer Pattern

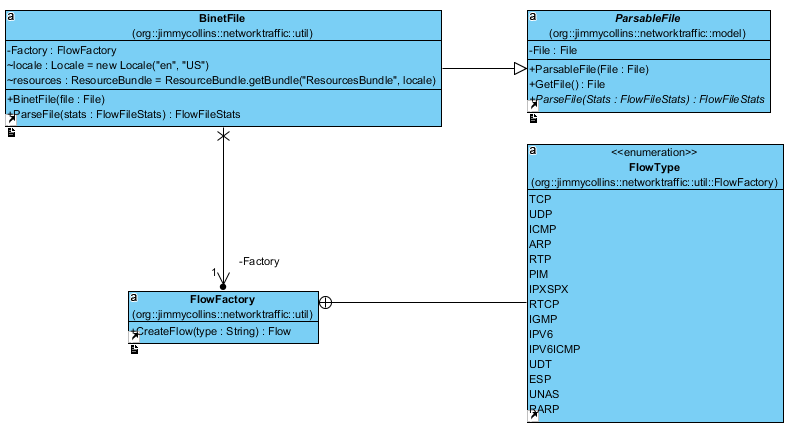
The Observer pattern is used to monitor file parsing information as a file is being parsed, and display a summary on the user interface.

FlowFileStats is Observable, and certain fields are observed by MainUIController and updated on the user interface as they change.



### Factory Pattern

The Factory pattern is used in the application when parsing the file. A class called FlowFactory is used to set the type field on the Flow object being created and return a new Flow object.



## Section 3 – System UML Diagrams

TODO – use Visual Paradigm.

## Section 4 – Code Screen Captures

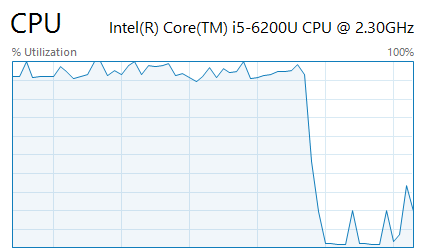
TODO – 1) Generic function.

TODO – 2) File Parsing? Inner class in Main Controller? Threading?

## Section 5 – Evaluation of Work

TODO

Performance – show CPU utilization graph when parsing 300mb file



Better data model. i.e. the objects we use to parse the flows.

Better implementation of Factory pattern.

More intelligent – use to find Botnet activity?

Couple if i18n issues – e.g. MB used in MainController.

Include some graphs from GitHub?