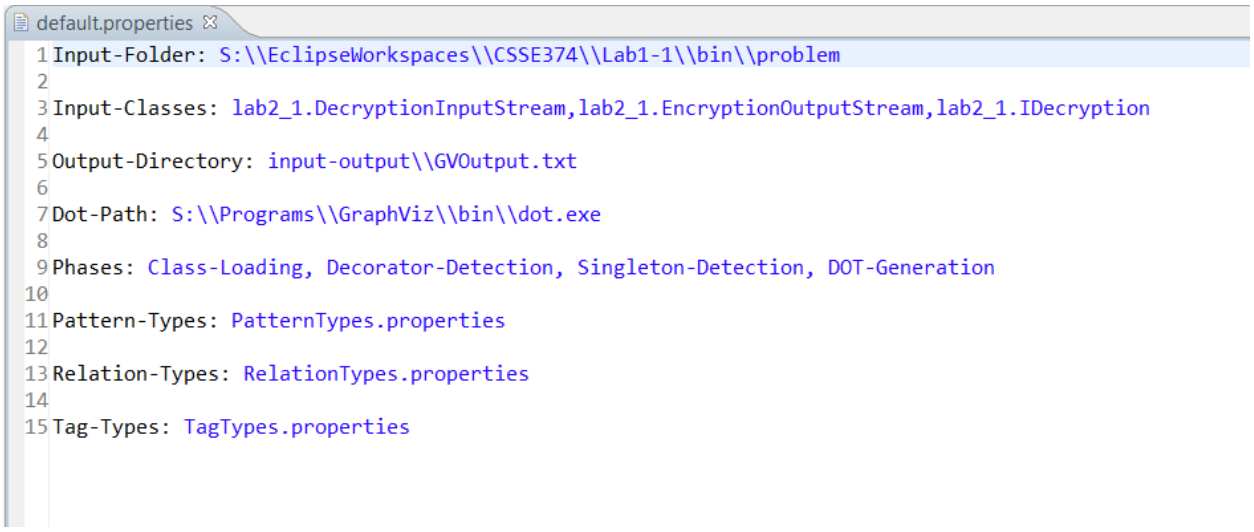
Supporting Documentation - UML Generator by Eleven

This document contains information regarding the settings that users can configure in the .properties file. Included below is an image of an example properties file.



```
Input-Folder: S:\\EclipseWorkspaces\\CSSE374\\Lab1-1\\bin\\problem

Input-Classes: lab2_1.DecryptionInputStream,lab2_1.EncryptionOutputStream,lab2_1.IDecryption

Output-Directory: input-output\\GVOutput.txt

Dot-Path: S:\\Programs\\GraphViz\\bin\\dot.exe

Phases: Class-Loading, Decorator-Detection, Singleton-Detection, DOT-Generation

Pattern-Types: PatternTypes.properties

Relation-Types: RelationTypes.properties

Tag-Types: TagTypes.properties
```

Parsing Classes

There are two properties that the user can use to specify which Java classes will be parsed. The first is the “Input-Folder” property. Here, the user can specify the file path of a directory that contains Java .class files. Each .class file in the specified directory will be parsed and included in the UML diagram. The second way that users can specify classes is by using the “Input-Classes” property. Here, the user can specify fully qualified Java classes (that are included in the project’s build path). This property is useful for parsing classes that might be hard to find in a directory, such as Java API classes (i.e. java.awt.Component, java.util.ArrayList).

Output

The user can specify a directory to place the special text output that is generated by our tool. The “Output-Directory” requires a valid file path. If the specified file does not exist, a new one will be created at that location. This file is used to hold the special text output that GraphViz requires in order to generate a UML diagram. It is very unlikely that the user will need to handle this output directly.

Dot Path

Our tool depends on GraphViz, specifically the dot.exe executable, to generate the UML diagram. The user must specify the location of this executable on their computer. The “Dot-Path” property requires a valid file path.

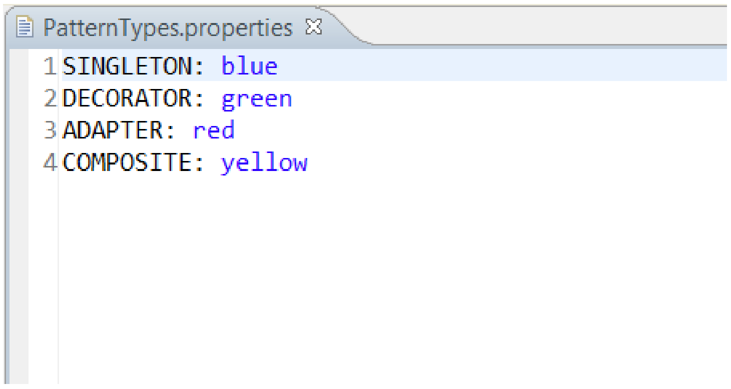
Phases

There are several phases that the user can configure. The phases are executed in the order that the user specifies. The design of our tool easily allows for the creation and addition of new phases. All currently implemented phases are listed below:

- Class-Loading: This phase uses ASM to parse each of the previously specified Java classes and build an intermediate model object. **<u>This phase must be included as the very first phase</u>** in order for our tool to generate a UML diagram.
- DOT-Generation: This phase uses the dot executable to convert the special text output into a proper UML diagram. This phase must be included in order to generate a UML diagram. Additionally, **<u>this should be the very last phase</u>** that is executed (as any phases included after it will be executed, but their changes will not be present in the UML diagram).
- Singleton-Detection: This phase runs singleton pattern detection on the intermediate model. Any singleton classes will be labeled with the <<Singleton>> stereotype and colored blue on the UML diagram.
- Decorator-Detection: This phase runs decorator pattern detection on the intermediate model. Any classes involved in a decorator pattern will be labeled with the appropriate stereotype and colored green on the UML diagram. Stereotypes include <<Decorator>> and <<Component>>. The association relationship between decorator and component classes will also be labeled with <<decorates>>.
- Adapter-Detection: This phase runs adapter pattern detection on the intermediate model. Any classes involved in an adapter pattern will be labeled with the appropriate stereotype and colored red on the UML diagram. Stereotypes include <<Adapter>>, <<Adaptee>>, and <<Target>>. The association relationship between the adapter and the adaptee will also be labeled with <<adapts>>.
- Composite-Detection: This phase runs composite pattern detection on the intermediate model. Any classes involved in a composite pattern will be labeled with the appropriate stereotype and colored yellow on the UML diagram. Stereotypes include <<Component>>, <<Composite>>, and <<Leaf>>.

Pattern Types

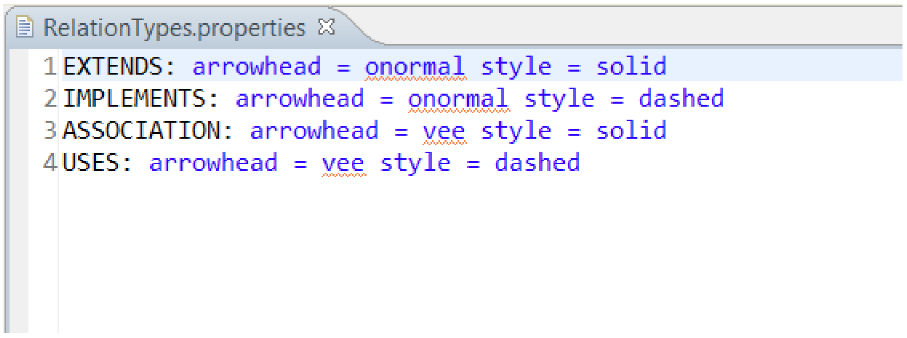
The user can fully configure which type of design patterns are supported by our UML Generator. The “Pattern-Types” property requires a file path to another valid .properties file. This properties file must provide a list of all supported design patterns and the colors they’re associated with. An image of a properly configured pattern types properties is included below.


PatternTypes.properties

```
SINGLETON: blue
DECORATOR: green
ADAPTER: red
COMPOSITE: yellow
```

Relation Types

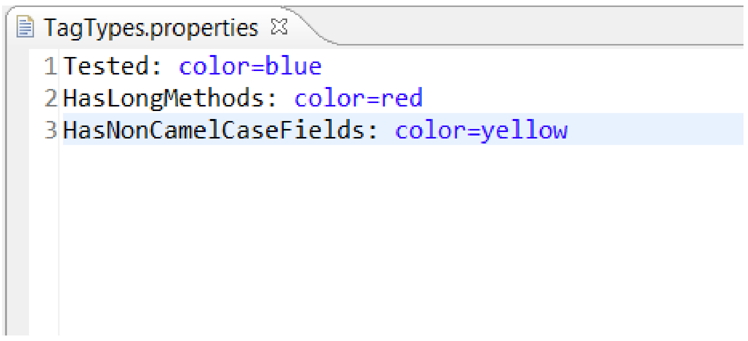
The user can fully configure which type of class relations are supported by our UML Generator. The “Relation-Types” property requires a file path to another valid .properties file. This properties file must provide a list of all supported relations and details about their arrow types. An image of a properly configured relation types properties is included below.


RelationTypes.properties

```
EXTENDS: arrowhead = onormal style = solid
IMPLEMENTS: arrowhead = onormal style = dashed
ASSOCIATION: arrowhead = vee style = solid
USES: arrowhead = vee style = dashed
```

Tag Types

The user can fully configure which type of tags are supported by our UML Generator. Tags are used to label classes and relations in secondary types of detection (similar to pattern detection). The “Tag-Types” property requires a file path to another valid .properties file. This properties file must provide a list of all supported tags and the colors they’re associated with. An image of a properly configured tag types properties is included below.


TagTypes.properties

```
Tested: color=blue
HasLongMethods: color=red
HasNonCamelCaseFields: color=yellow
```

Pattern-Specific Settings

Our design fully supports pattern-specific detection settings. These are settings that influence the pattern detection process, by specifying requirements for classes to qualify as a specific design pattern. Each pattern-specific setting can be added as a standalone property in the overall properties file. The design of our tool easily allows for the creation and addition of new pattern-specific settings. All currently implemented pattern specific settings are listed below:

- Singleton-RequiresGetInstance: This setting determines whether a class requires a “getInstance” method to qualify as a singleton. In the properties file, this setting requires a Boolean value (“true” or “false”). If this property is omitted from the properties file, it is internally set to false by default.