

**University of Calgary**  
**SENG 300 - Introduction to Software Engineering**

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**Group Project Iteration 1**  
Finding Declarations and References

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# 1 Structural Diagram

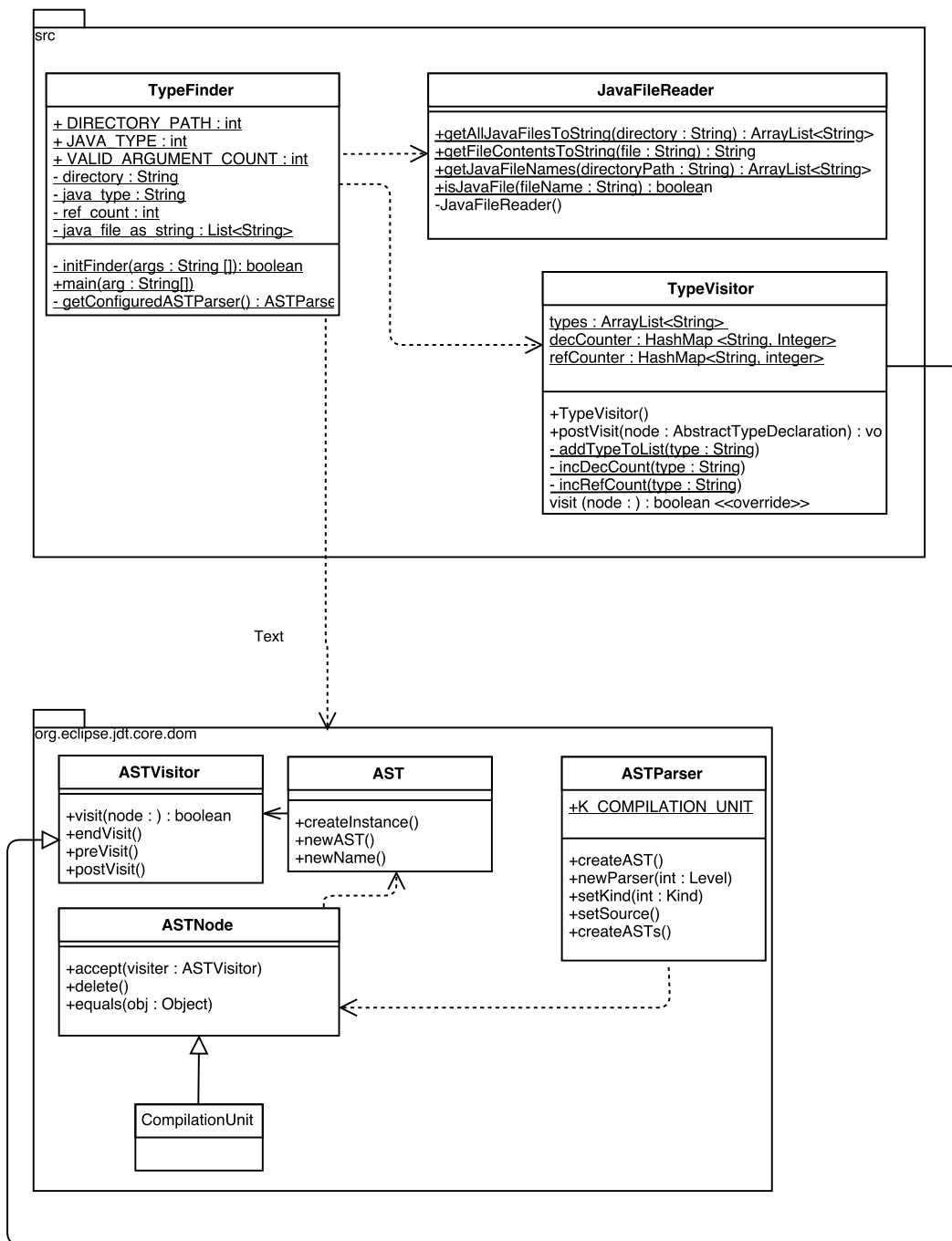


Figure 1: The relationship between our main package and relevant classes provided by `org.eclipse.jdt.core.dom`

## 2 Sequence Diagrams

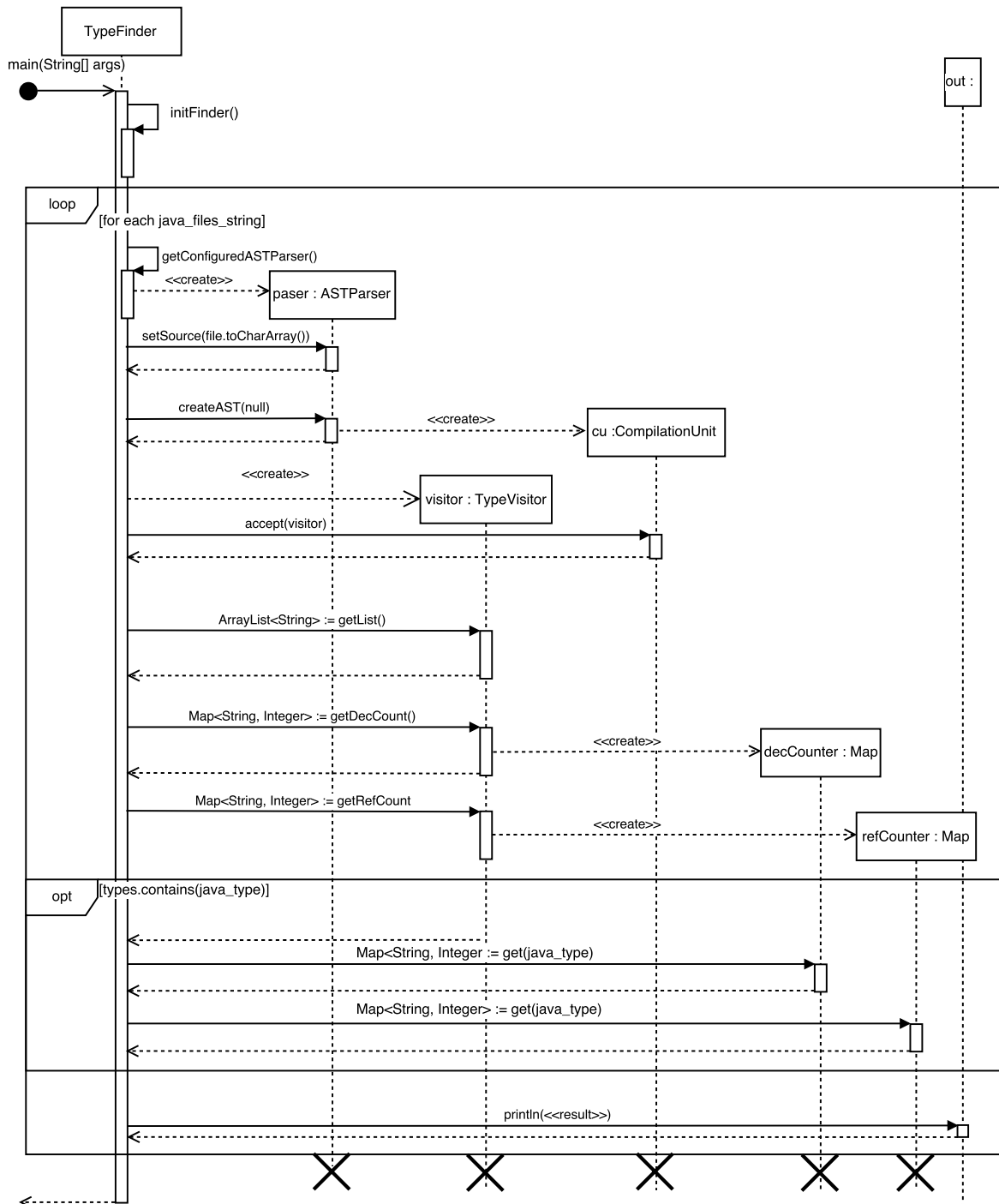


Figure 2: Sequence of TypeFinder program initialization and completion

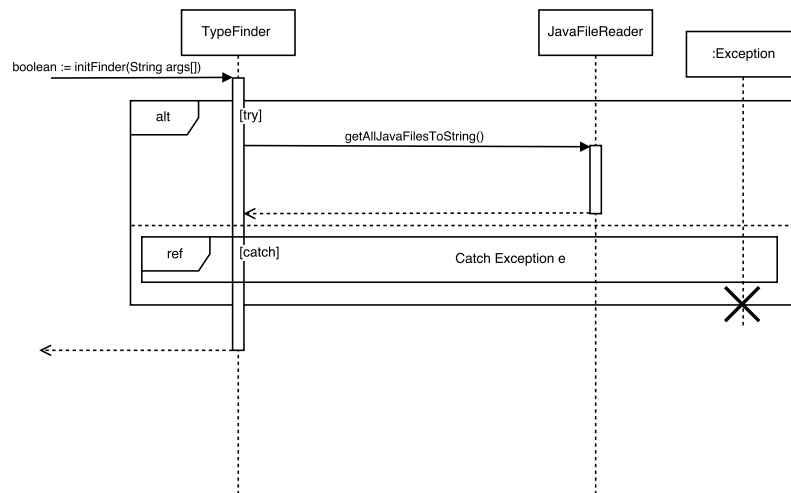


Figure 3: Initializing `TypeFinder` involving checking for valid user input. If valid, it acquires the Java file contents and setting up the information necessary for parsing. If invalid, prompt the user with an error message.

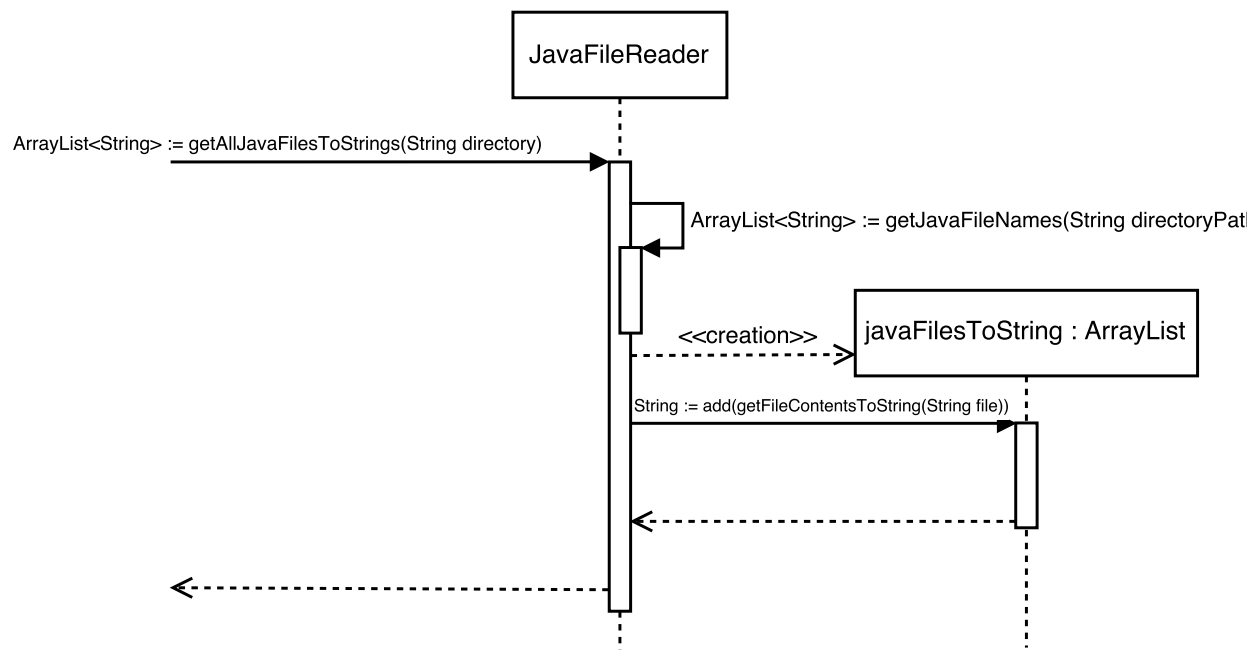


Figure 4: JavaFileReader retrieves the contents of all Java files in a directory, one file at a time.

### 3 State Diagram

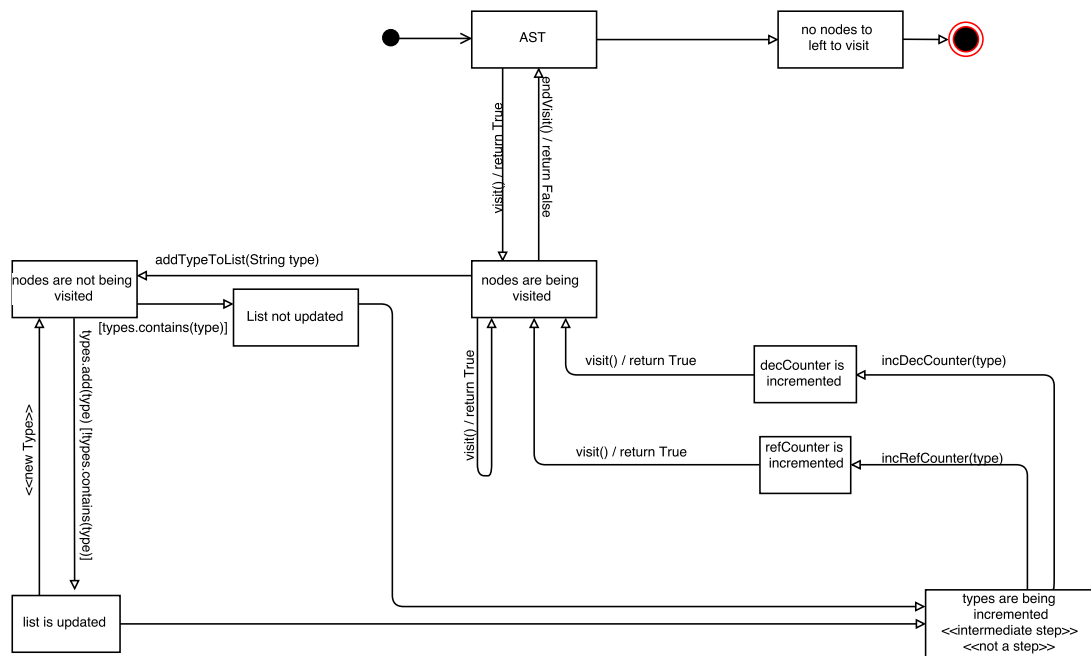


Figure 5: The state of the program in finding declaration and reference counts.

## 4 Explanation

### 4.1 Usage

Run the `Java TypeFinder.class` file through command line:

```
java TypeFinder <directory> <Java type>
```

`directory` is the path of the directory (either absolute or relative).

### 4.2 Struture

The UML diagram was kept as simple as possible and only represent main components of the software. All the methods in the Type Finder Class were included since they drive the software during execution. The `JavaFileReader` class is reads the all files in the directory and allows for parsing via AST. We Did not include all the methods for the `TypeVisitor`. The abstracted details were only supporting features that did not aid in the understanding of the functionality. As for `visit(node : ) : boolean`, the formating was done this way due to the multiple overridden methods with different parameter types, such as `SingleVariableDecleration`, `TypeDecleration...etc.` like the rest only the key components of the `ASTParser`, `AST`, `ASTVistor`, `ASTNode` were maintained in the uml Diagram. Everything that did not aid or was none essential in understanding the relationships between the `TypeFinder` and the `AST` parser was left out.

### 4.3 Sequence

The software works by recieving arguments from the user, those being the directory of interest and the fully qualified name of a java type. It the enters a loop which executes per file read. After entering the loop, the `ASTParser` is configured with the correct specifications and created. after that the the file to be read is set and the `AST` is created along with a visitor. we then begin to visit the nodes of the ast count the number of decleration/references of types. finally at the end of the loop we sum the total number of counts. the loop is exited and the number of references and declerations in printed to the console.

The inner workings of the `getConfiguredASTParser()` method is non-essential to the client's understanding of the software. Thus the details were abstracted away and not expanded on. Another aspect of the code that was abstracted away was most of the methods in `JavaFileReader`. We modeled a very broad overview, this informs anyone viewing the model (provided some basic knowledge of java) of what is happening. Had we made our diagram anymore specific in this area, it would draw attention away from the more important functionality of the software, and would only overwhelm the viewer. A very basic diagram shows the execution of `initFinder`, which was only meant to serve the purpose of showing that the `javaFileReader` Class was being used to read the files. A more Specific sequence diagram was provided to show how `getAllJavaFilesToStrings()` was recieving information about the directory and files, as well as how it returned the rusult for `ASTParser` to use.