https://github.com/roxanazachman01/FLCD

Documentation:

Statement:

Implement a parser algorithm

1. One of the following parsing methods will be chosen (assigned by teaching staff):

    1.a. recursive descendent

    1.b. ll(1)

    1.c. lr(0)

2. The representation of the parsing tree (output) will be (decided by the team):

    2.a. productions string (max grade = 8.5)

    2.b. derivations string (max grade = 9)

    2.c. table (using father and sibling relation) (max grade = 10)

Deliverables:

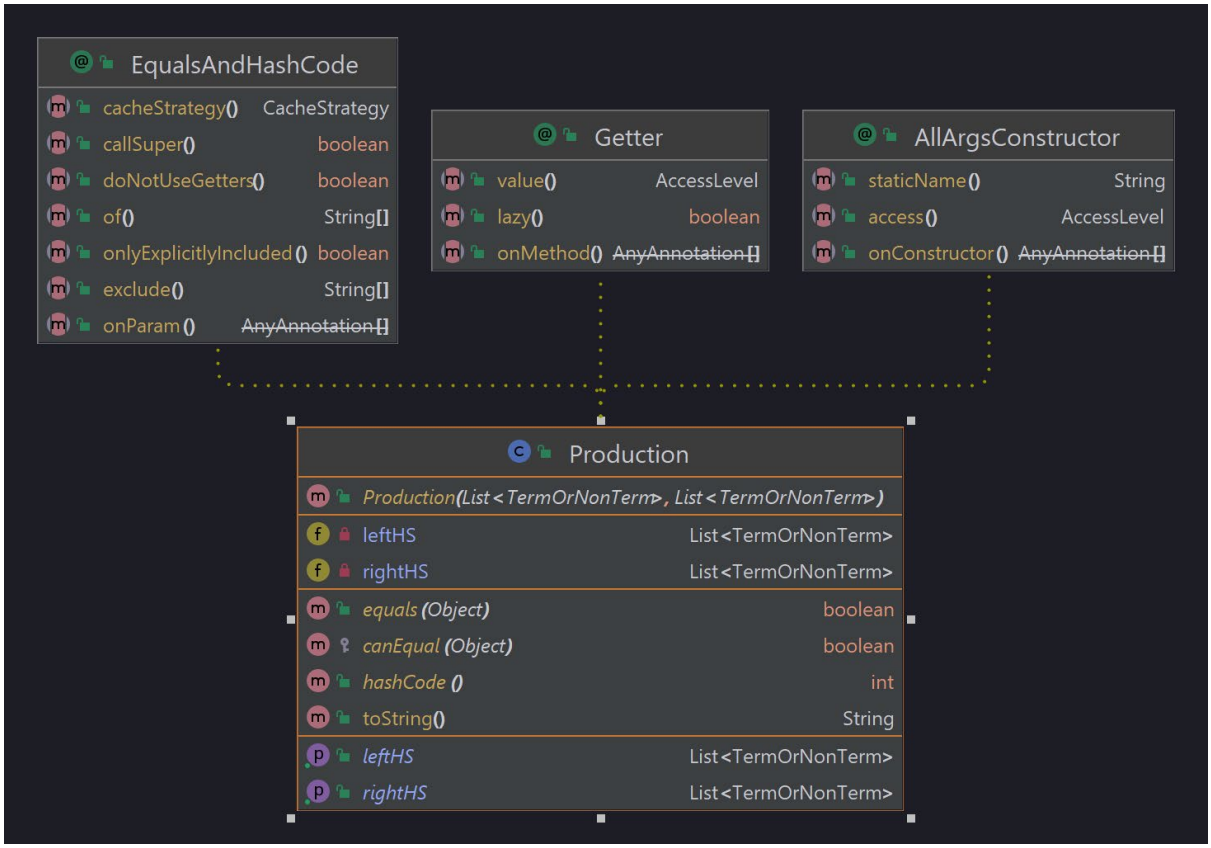
1. Class Grammar (required operations: read a grammar from file, print set of non-terminals, set of terminals, set of productions, productions for a given nonterminal, CFG check)
2. Input files: g1.txt (simple grammar from course/seminar), g2.txt (grammar of the minilanguage - syntax rules from Lab 1b)

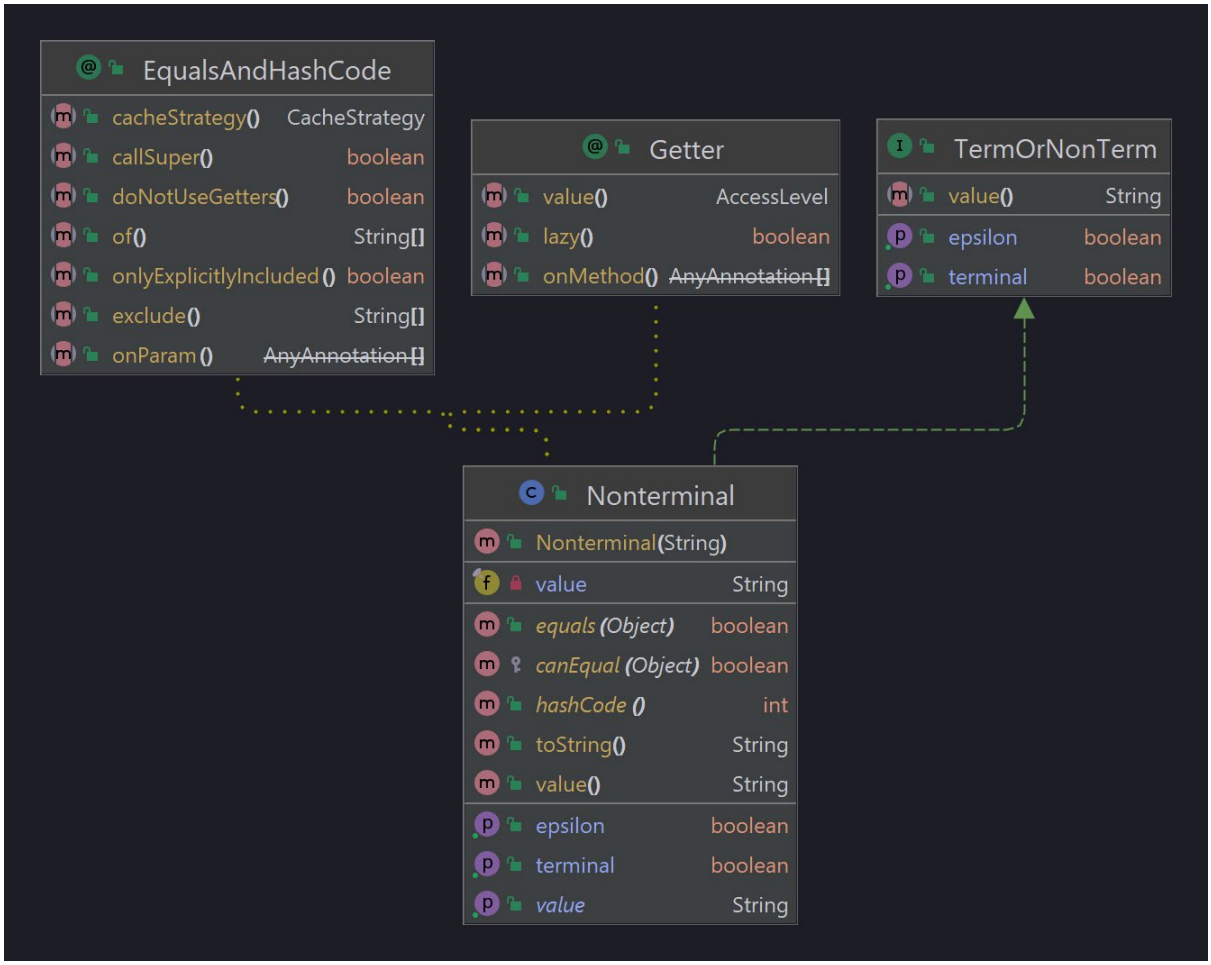
Implementation:

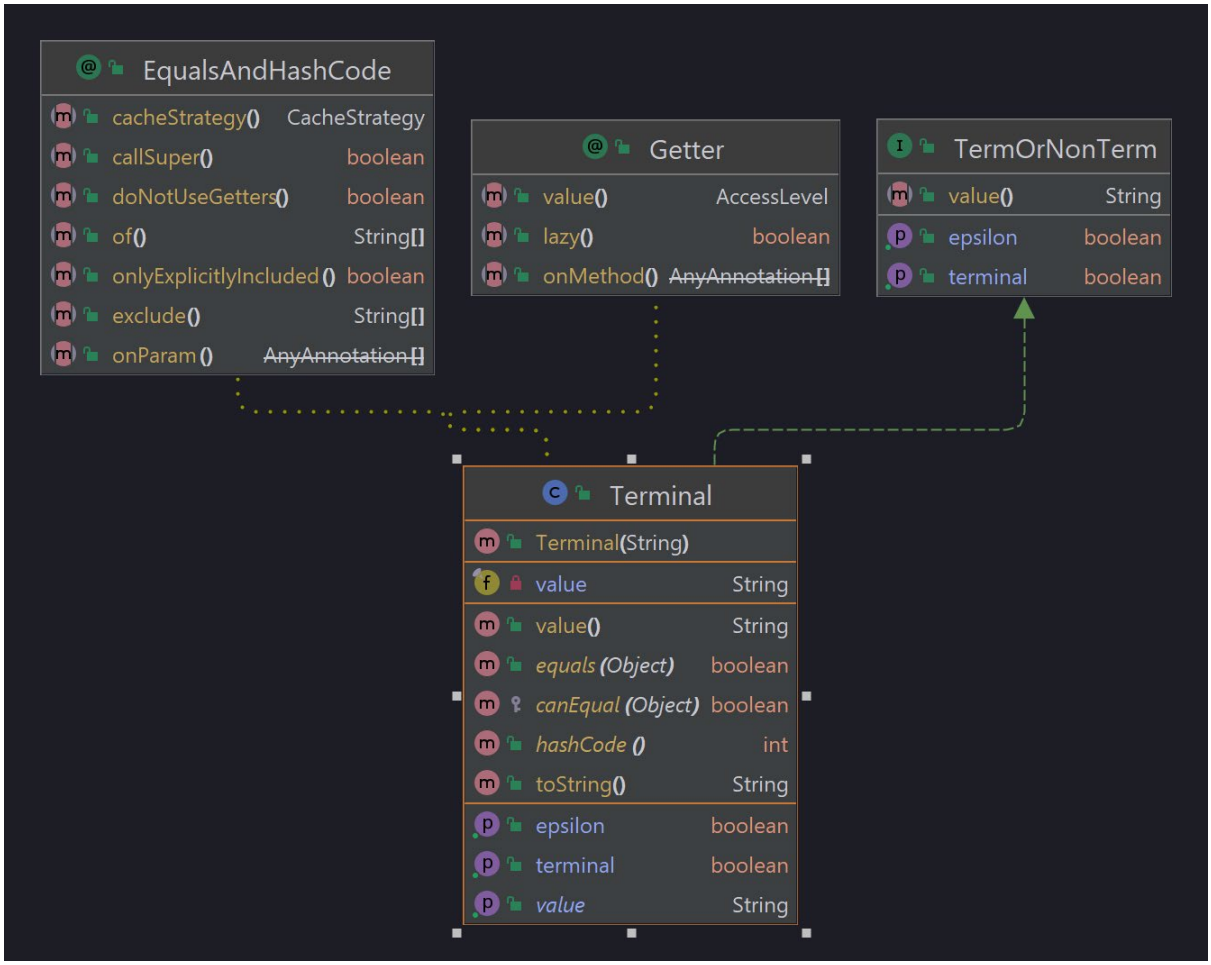
The input file is read in the constructor of the Grammar, then the loaded elements are validated. (throws exception if starting symbol is not a nonterminal or elements in productions are neither terminals or non-terminals).

The starting symbol is stored as a Nonterminal type, which implements the interface TermOrNonTerm. The set of non-terminals are stored as Nonterminal type and terminals as Terminal type. The list of production is stored as an array list of type Production, which is a class that contains a list of TermOrNonTerm as left hand-side and right hand-side. The reason for using the interface is to be able to store both terminals and non-terminals in the same list, since they have the same behaviour. (methods for getting the value and checking whether it is a terminal or nonterminal).

The code checks whether the grammar is a cfg by checking the size of the left hand-side in the list of productions. If all productions have size 1, then it is a cfg.




EqualsAndHashCode
cacheStrategy() CacheStrategy
callSuper() boolean
doNotUseGetters() boolean
of() String[]
onlyExplicitlyIncluded() boolean
exclude() String[]
onParam() AnyAnnotation[]
Getter
value() AccessLevel
lazy() boolean
onMethod() AnyAnnotation[]
TermOrNonTerm
value() String
epsilon boolean
terminal boolean
Nonterminal
Nonterminal(String)
value String
equals (Object) boolean
canEqual (Object) boolean
hashCode () int
toString() String
value() String
epsilon boolean
terminal boolean
value String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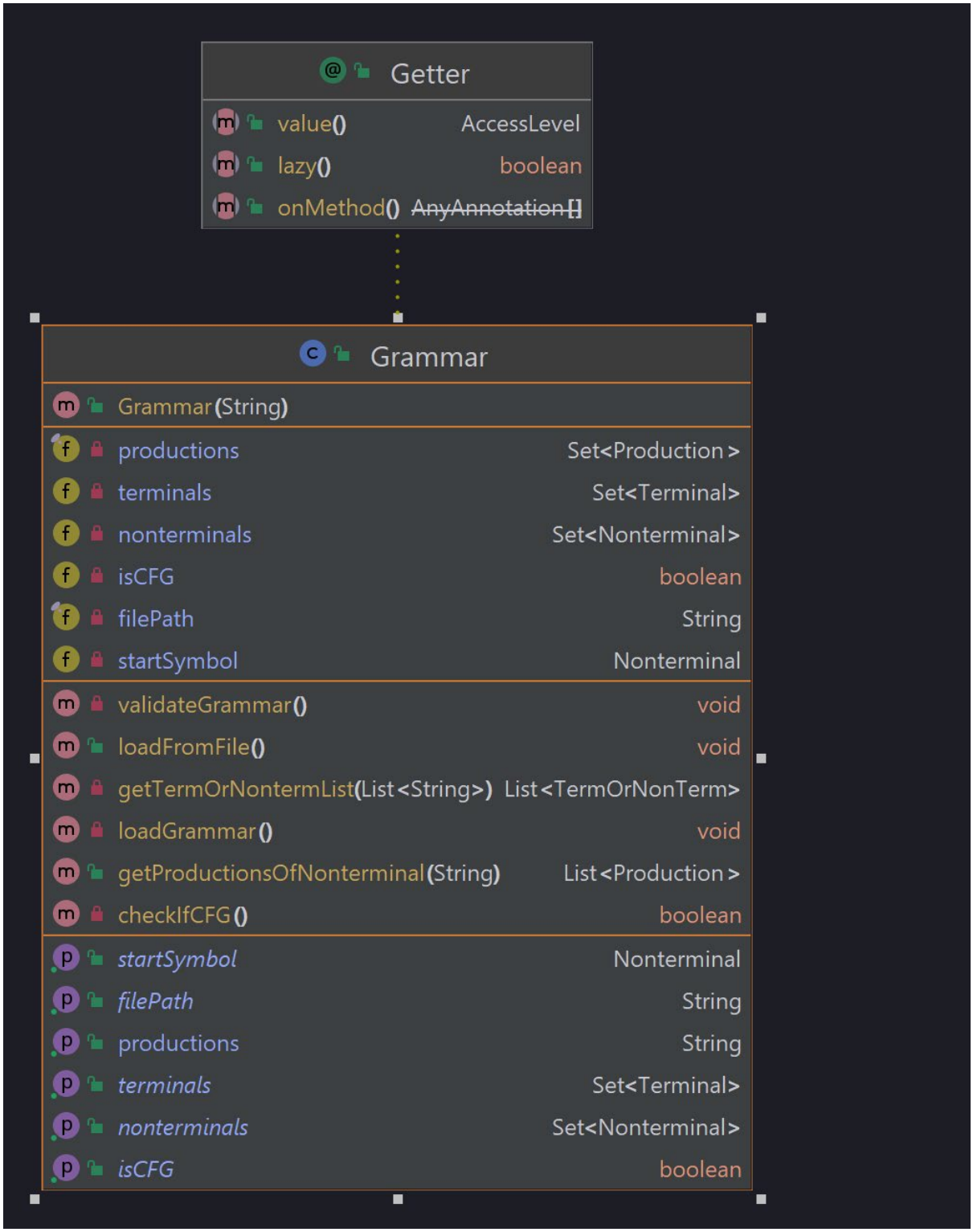
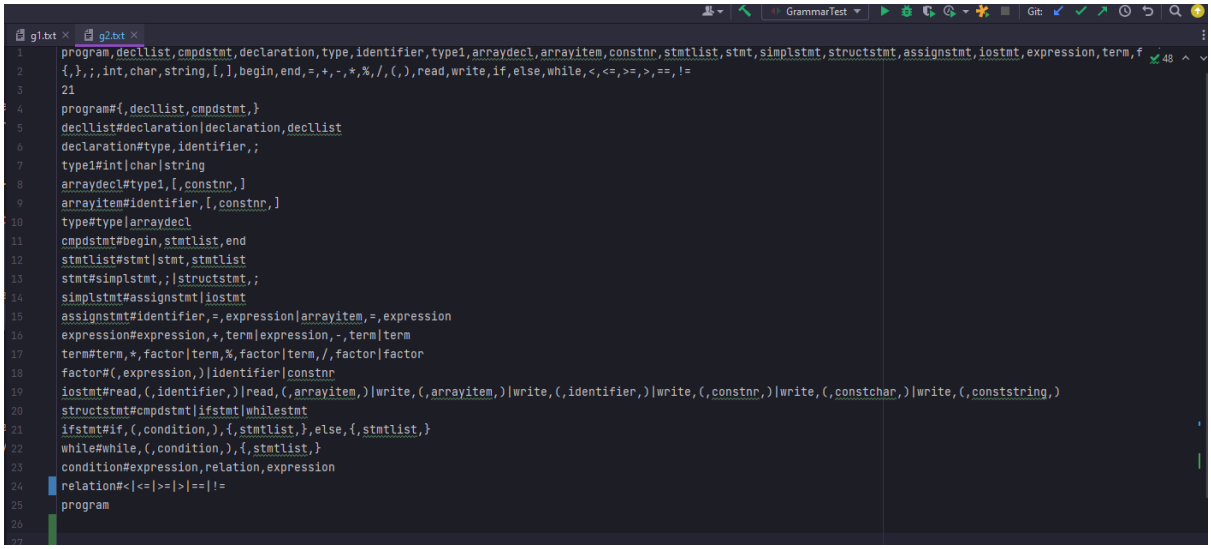
canEqual (Object) boolean
hashCode () int
toString() String
epsilon boolean
terminal boolean
value String



Testing: tests the grammar loads correctly the input file for the mini language

Input file:



Tests:

```java
public class GrammarTest {
    @Test
    public void testGrammar() {
        final Grammar grammar = new Grammar( filePath: "in/g2.txt");

        assertThat(grammar.getStartSymbol()).isEqualTo(new Nonterminal( value: "program"));

        assertThat(grammar.getNonterminals()).contains(new Nonterminal( value: "program"));
        assertThat(grammar.getNonterminals()).contains(new Nonterminal( value: "stmt"));
        assertThat(grammar.getNonterminals()).contains(new Nonterminal( value: "term"));
        assertThat(grammar.getNonterminals()).contains(new Nonterminal( value: "term"));

        assertThat(grammar.getTerminals()).contains(new Terminal( value: "{"));
        assertThat(grammar.getTerminals()).contains(new Terminal( value: "while"));
        assertThat(grammar.getTerminals()).contains(new Terminal( value: "if"));

        assertThat(grammar.isCFG()).isTrue();

        assertThat(grammar.getProductionsOfNonterminal( str: "condition").get(0)
                .getRightHS()).contains(new Nonterminal( value: "relation"));
    }
}
```