
Laboratory 5 – FLCD

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GRAMMAR CLASS

Class that contains 4 fields:

- nonTerminals : list of non-terminals
- terminals: list of the terminals
- startingSymbol: starting symbol
- productions: map (string -> list of list of strings)

LRITEM CLASS

Class that contains 3 fields:

- nonTerminal : string
- production: list of strings
- dotIndex: int – index that shows the position of the dot in the production

PARSER CLASS

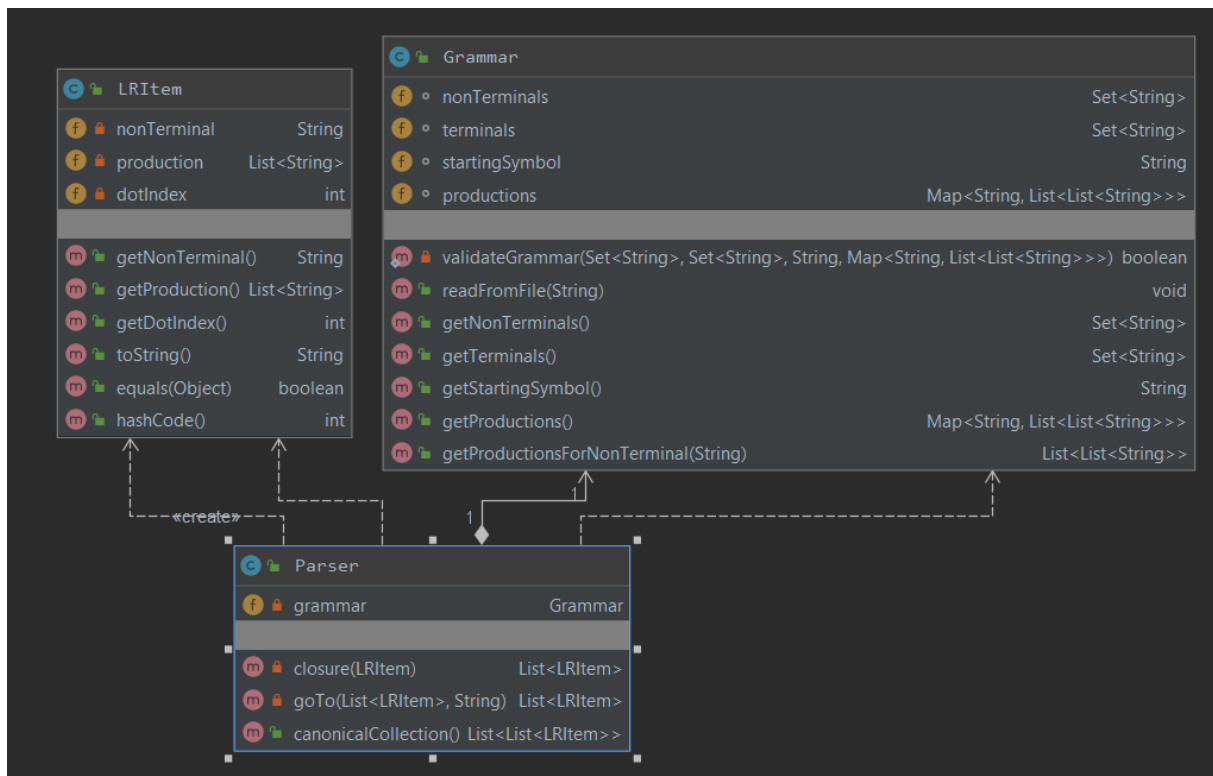
Functions:

- **closure**: takes a list of LRItems as input and returns the closure of that list
- **goTo**: calls the closure function with the LRItems that match the corresponding state and symbol
- **canonicalCollection**: returns the canonical collection of the given grammar

PRODUCTIONS

- We used a hashmap to represent the productions, keeping the non-terminals as the keys and the corresponding production as a list of lists that contain every symbol of the production.

CLASS DIAGRAM



EXAMPLES:

1.

- grammar.txt:

```
1 S A
2 a b c
3 S
4 S -> a A
5 A -> b A
6 A -> c
```

- Canonical Collection:

```
Canonical collection:
[[ S' -> .S ], [ S -> .aA ] ]
[[ S' -> S. ] ]
[[ S -> a.A ], [ A -> .bA ], [ A -> .c ] ]
[[ S -> aA. ] ]
[[ A -> b.A ], [ A -> .bA ], [ A -> .c ] ]
[[ A -> c. ] ]
[[ A -> bA. ] ]
```

2.

- grammar.txt:

1	S
2	a b c
3	S
4	S -> b S a S b c

- Canonical Collection:

```
Canonical collection:
[[ S' -> .S ] , [ S -> .bS ] , [ S -> .aSb ] , [ S -> .c ] ]
[[ S' -> S. ] ]
[[ S -> a.Sb ] , [ S -> .bS ] , [ S -> .aSb ] , [ S -> .c ] ]
[[ S -> b.S ] , [ S -> .bS ] , [ S -> .aSb ] , [ S -> .c ] ]
[[ S -> c. ] ]
[[ S -> aS.b ] ]
[[ S -> bS. ] ]
[[ S -> aSb. ] ]
```