Introduction to Parser

By Team 8

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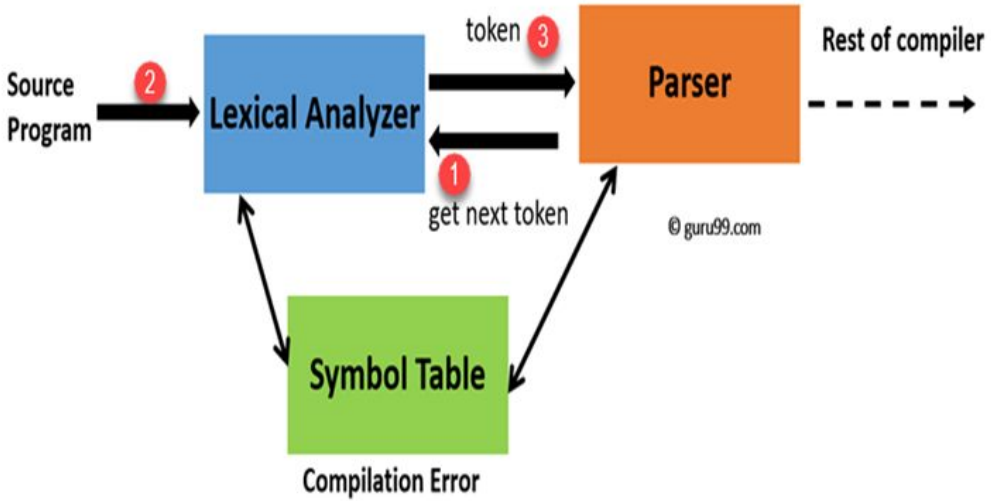
The Role of Parser

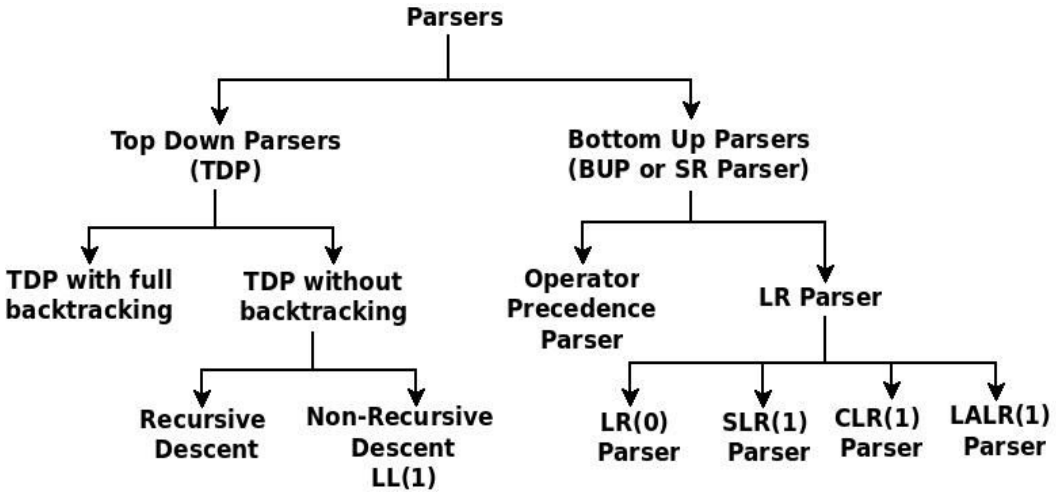
- The parser obtains a string of tokens from the lexical analyser, and verifies that the string of token names can be generated by the **grammar** for the source language. Report any syntax errors and also **recover** from common errors.
- The **parser constructs a parse tree** and passes it to the rest of the compiler for further processing.



What is parsing?

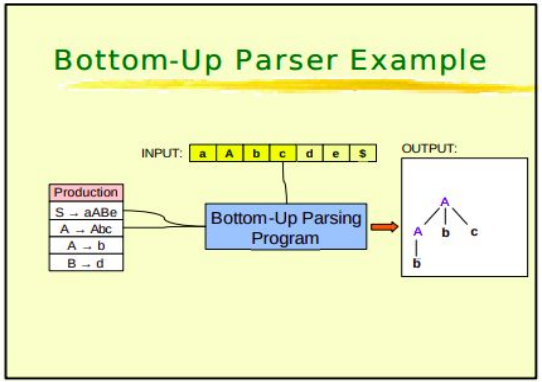
1. Given the tokens generated from the lexer , the parser generates a parse tree or an abstract syntax tree which is the hierarchical representation of terminals or non-terminals. These symbols represent the derivation of the grammar to yield input strings.
2. Checks the acceptability of the input string .
3. Returns any syntax error for the source language.

There are different types of parse trees :



Parser description for tureasy

- The parser written for tureasy in Ocaml language is basically a **bottom up parser .**
- The parsing starts from the bottom for an input string and comes to the start symbol after a series of reduction . The leaves are filled first and then other levels of the parse tree.
- Reduction basically is process where the parser tries to identify the RHS of a production rule and replaces it with the LHS.
- Uses a stack to store both state and sementatial forms.
- Here is a simple general example to demonstrate bottom up parsing by our language :



Overview of parser.mly file

- We have written the code for parser in the file **parser.mly** file. To run this file, we use the command "**ocamlyacc parser.mly"** which produces a parse tree from the context-free grammar specification with attached semantic actions, in the style of yacc. The output would be an "error" if the input string does not pertain to the grammar denoting that a specific production rule is violated otherwise no conflicts.
- Here is a small peek to the file

```
matrix_decl: MATRIX ID ASSIGN LBRACK set_list RBRACK
                        {{
                                typ = Matrix;
                                mname = $2;
                                sets = $5;
                        }}

set_decl:
          NUMSET ID ASSIGN LBRACK set RBRACK
        {{
                typ = Numset;
                sname = $2;
                set = $5;
        }}

        | STRSET ID ASSIGN LBRACK set RBRACK
        {{
                typ = Strset;
                sname = $2;
                set = $5;
        }}

graph_decl:
        GRAPH ID ASSIGN LBRACK edge_list RBRACK
        {{
                typ = Graph;
                gname = $2;
                edges = $5;
        }}

```