

SER502 Project - Team #10

Language: CLOVE

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Tools & Technologies

For the language CLOVE, we used the following tech stack:

Java - for the evaluator.

ANTLR4 - for generating the lexer & parser for the Grammar for Clove.

IntelliJ - the common IDE for testing and writing the code.

GitHub - for version control and collaboration.

Slack - as the default communication channel.

Grammar

The design of the Grammar:

For writing the grammar of the language and implementing the parser, lexical analyzer, and tokens for it, we used ANTLR4 and its parser generator.

Functions and Data Types supported by the grammar of the language **Clove**:

1. Data Types - **Int**, **String** & **Boolean**.
2. Boolean Operators - **AND**, **NOT** & **OR**.
3. Loops - **While**, **For** and **For-Each** loops.
4. Conditional Statement - **if-then-else** (*traditional if-else*).
5. Ternary Operator - **"?:"**
6. Print Function - **print(variable)**.
7. Operators - Arithmetic operators: **"+"**, **"-"**, **"*"**, **"/"**, **"%"** | Comparison operators: **">"**, **"<"**, **"=="**, **"!="**, **"<="**, **">="** | Assignment operator: **"="**
8. Comments - **"\$"** character for commenting.

Lexer and Parser

After writing the grammar for the language, we used ANTLR's cli command:

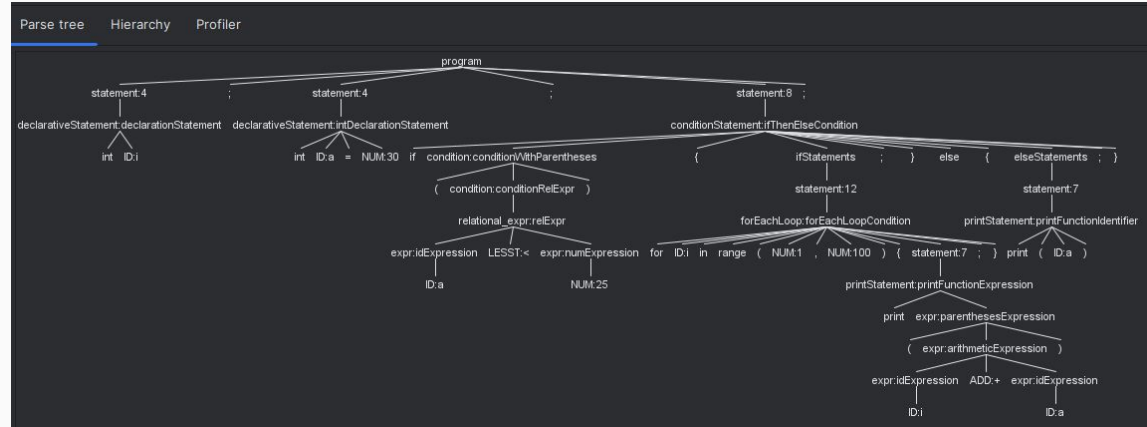
```
antlr4 -visitor CloveGrammar.g4
```

This command generates the lexical analyzer, parser and tokens for the interpretation of the syntax of Clove.

Parse Tree

Sample Input written in Clove Grammar:

```
int i;  
int a = 30;  
  
if (a<25) {  
    for i in range(1, 100) {  
        print(i+a);  
    };  
} else {  
    print(a);  
};
```



Evaluator

Once the lexer, parser and tokens are successfully generated, we extend the **CloveGrammarBaseGenerator.java** to **CloveVisitor.java**, where we are evaluating the code written in Clove and handling the errors gracefully.

CLOVE DEMO

Test Program: Arithmetic Operations

dataTypes.clove:

```
int a = 5;  
int b = 10;  
int c = 6;  
int d = 9;  
Str str1 = "Hello World!";  
bool test1 = true;  
bool test2 = true;
```

```
if (test1 and test2) {  
    print(str1);  
    print(d+c*b/a-b);  
    print(d%c);  
} else {  
    print(d);  
};
```

OUTPUT

```
PS E:\ASU\SER502\Project\SER502-clove-Team10> java -jar clove.jar dataTypes.clove  
PRINTED VALUE: Hello World!  
PRINTED: 11  
PRINTED: 3
```


Test Program: For Loops

ForLoops.clove:

```
int a = 5;  
int i = 0;  
Str eos = "End of Section";
```

```
for i in range(1, 10) {  
    print(i+a);  
};
```

```
print(eos);
```

```
for (i=0; i<5; i++) {  
    print(a-i);  
};
```

OUTPUT

```
PS E:\ASU\SER502\Project\SER502-clove-Team10> java -jar clove.jar ForLoops.clove  
PRINTED: 6  
PRINTED: 7  
PRINTED: 8  
PRINTED: 9  
PRINTED: 10  
PRINTED: 11  
PRINTED: 12  
PRINTED: 13  
PRINTED: 14  
PRINTED VALUE: End of Section  
PRINTED: 5  
PRINTED: 4  
PRINTED: 3  
PRINTED: 2  
PRINTED: 1
```

End of Presentation