Assignment 1
Compilers II - CS3423

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1 Conditional Statement

Alternative 2 is not context free, rather it is context sensitive. The number of indents for an if statement depends on the depth of the if statement in the nested `if-then-else` statement which makes it context sensitive. Therefore, alternative 1 is chosen over alternative 2.

2 Assumptions

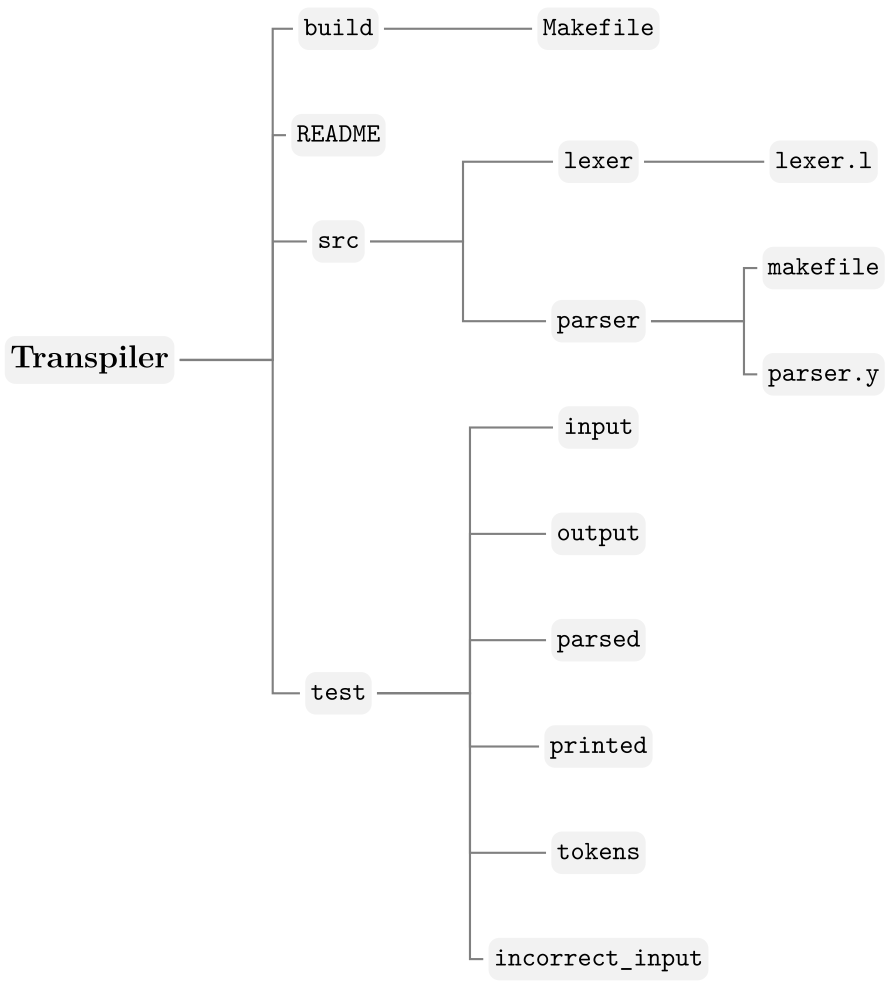
- All the statements (including set statements, unless it is a compound statement) are separated using semicolon (;).
- Print statement can only print int or float values.
- The print statement by default prints a new line ('\n') along with the value.
- `'=='` is used as the relational equality operator.
- Unary operators `+` and `-` cannot be repeated more than once in a row. Example `+++i, +-i, -i` all give syntax errors. Whereas, `not+j, -not+j` are valid syntax.
- Our transpiler doesn't support increment (`++`) and decrement (`--`) operators.
- Our transpiler supports assignment statement in the rhs of an assignment statement. Example, `a = b = c;` is not a syntax error.
- Our transpiler supports assignment statement in the access operator also. Example, `a[b = 0] = 0;` is not a syntax error.
- Our transpiler resolves the conflict of `push_pop_statement` using attribute grammar.
- Our transpiler checks if a function has a return statement using attribute grammar.
- Our transpiler follows the following precedence and associativity order.

Operators	**Associativity**
`not, +, -, size`	Left
*, /, %	Left
+, -	Left
>, <, <=, >=	Left
==, <>	Left
&	Left
^	Left
|	Left
`and`	Left
`or`	Left
=	Right

Table I: Operator Associativity

- Our predicate contains expressions separated by logical operators. Example, `a * b >= c % 2` is valid syntax.
- Our transpiler assumes that the program body is not empty.

3 Steps to Compile and Run



The file structure of the Transpiler is shown above.
In order to run build and run this project follow the commands as listed below:

```
$ cd build
$ make
```

This will create all the required files according to the input files in the ./test/input directory. It produces the following the transpiled cpp code in the ./test/output, the result of the compiled and executed file in ./test/printed directory, the tokens log file in the ./test/tokens directory and the parser log file in the ./test/parsed directory for the corresponding input file. It also runs the incorrect test cases present in the ./test/incorrect_input directory and gives the syntax errors accordingly.

In order to clean the project run the following command:

```
$ make clean
```

The above command will remove all the files created by the makefile in build directory.

NOTE: The main.o object file after build will be present in both the build folder and the ./src/parser directory as our build works in that way.
NOTE: Testing of files happens in lexicographical order.
NOTE: Please ignore any warnings that might pop up. The project works end to end perfectly.