Compiler Design Assignment1 Report

Ali Berat Çetin `150117822`

Rıdvan Gülcü `150117508`

April 2021

1 Grammar

source → funcs decls sts
decl → **int ID** | **float ID** | **bool ID** | **char ID**
`funcs` → funcst funcs | ε
`decls`→ decl; decls | ε
`block`→ begin sts end
`sts` → st sts | ε
`st`→ ifst | whilest | elsest | assignmentst | returnst | ε
`ifst`→ **if** (booleanexp) block
`whilest` → **while** (booleanexp) block
`funcst` → **func** ID(params):type block
`returnst` → **return** arithmeticexp;
`type` → **int** | **float** | **bool** | **char** | **void**
`funcname` → ID
`elsest` → st else st
`assignmentst` → ID = arithmeticexp;
`arithmeticexp` → multexp **and** arithmeticexp | multexp **or** arithmeticexp | multexp-arithmeticexp | multexp+arithmeticexp | multexp % arithmeticexp | multexp
`multexp` → simpleexp * multexp | simpleexp / multexp | simpleexp
`simpleexp` → ID | INTNUM | FLOATNUM | BOOLVAL | CHARACTER | (arithmeticexp) | ID(funccallparams)
funccallparams → simepleexp, funccallparams | ε
`booleanexp`→ simpleexp boolop simpleexp
`boolop` → > | < | == | <= | >= | !=
`params` → decl, params | ε

2 Lexical Structure

- **Comments**: Comments starts with # characters and ends with the end of line character.
- **Keywords**: if, int, float, char, bool, func, while, begin, end, return, true, false
- **Identifiers**: Starts with a letter and continues with a letter or digit. Keywords can not be used in identifier. Must be max 32 characters.
- **Operators**: The followings are operators: $+ - / * = == < <= > >= !=$
- **Delimiters**: The followings are delimeters: whitespace, tab, new line
- **Numbers**: The numbers are defined as follows:
  - **Digit**: 0|1|2|3|4|5|6|7|8|9
  - **IntNum**: digit+(the maximum integer number is 231)
  - **Exponent**: E ($+ | -| \varepsilon$) $digit^+$ (`the maximum exponent value is 128`)
  - **Fraction**: $.digit^+$
  - **FloatNum**: digit+exponent | digit+fraction (exponent | ε)
- **Char**: ASCII chars.
- **Bool**: True or False.