CSE 302: Compiler Design — Lab 4

BX2 Grammar

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\langle program \rangle ::= (\langle globalvar \rangle | \langle function \rangle | \langle procedure \rangle)^*
⟨globalvar⟩ ::= "var" ⟨globalvar-init⟩ (", " ⟨globalvar-init⟩)* ": " ⟨type⟩ "; "
\langle globalvar-init \rangle ::= \langle variable \rangle ("=" (\langle number \rangle | \langle bool \rangle))?
\langle function \rangle ::= "fun" \langle variable \rangle "(" \langle parameter-groups \rangle? ")" ": " \langle type \rangle \langle block \rangle
⟨procedure⟩ ::= "proc" ⟨variable⟩ "(" ⟨parameter-groups⟩? ")" ⟨block⟩
\langle parameter-groups \rangle ::= \langle parameter-group \rangle (", " \langle parameter-groups \rangle)?
⟨parameter-group⟩ ::= ⟨variable⟩ (", " ⟨variable⟩) * ": " ⟨type⟩
\langle stmt \rangle ::= \langle vardecl \rangle \mid \langle block \rangle \mid \langle expr \rangle \mid ; \mid \langle assign \rangle \mid \langle print \rangle \mid \langle ifelse \rangle \mid \langle while \rangle
              | "return" (expr)? ";"
⟨vardecl⟩ ::= "var" ⟨varinit⟩ (", " ⟨varinit⟩)* ": " ⟨type⟩ "; "
\langle varinit \rangle ::= \langle variable \rangle ("=" \langle expr \rangle)?
\langle block \rangle ::= "{" \langle stmt \rangle * "}"
\langle assign \rangle ::= \langle variable \rangle "=" \langle expr \rangle ";"
⟨print⟩ ::= "print" ⟨expression⟩ ";"
\langle ifelse \rangle ::= "if" "(" \langle expr \rangle ")" \langle block \rangle ( "else" (\langle ifelse \rangle | \langle block \rangle))?
⟨while⟩ ::= "while" "("⟨expr⟩ ")" ⟨block⟩
\langle expr \rangle ::= \langle variable \rangle \mid \langle number \rangle \mid \langle bool \rangle \mid \langle unop \rangle \langle expr \rangle \mid \langle expr \rangle \langle binop \rangle \langle expr \rangle
              |\langle variable \rangle "(" (\langle expr \rangle (", " \langle expr \rangle) *)? ")"
              | "(" \( \texpr \) ") "
\langle variable \rangle ::= [A-Za-z_][A-Za-z0-9_]*
                                                                                                                            (except keywords)
                                                                                                                (must be in range [0, 2^{63}))
\langle number \rangle ::= [0-9] +
⟨bool⟩ ::= "true" | "false"
⟨unop⟩ ::= "-" | "~" | "!"
⟨binop⟩ ::= "+" | "-" | "*" | "/" | "%" | "<<" | ">>" | "&" | "\" | "∧"
                 | "==" | "!=" | "<" | "<=" | ">" | ">=" | "&&" | "||"
```