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**CS152**

**Compiler Project Phase 2**

**Tiny Language Grammar**

**(Lowercase names represent Non-Terminals uppercase names represent Terminals)**

**start -> program\_start**

**program\_start -> program identifier semicolon block end\_program**

**block -> declaration\_list begin\_program statement\_list**

**declaration\_list -> declaration\_list declaration semicolon | declaration semicolon**

**declaration -> identifier\_list colon optional\_array integer**

**identifier\_list -> identifier\_list identifier optional\_comma | identifier**

**optional\_array -> array l\_bracket number r\_bracket of | epsilon**

**statement -> var assign expression | var assign bool\_exp question expression colon expression | if bool\_exp then statement\_list optional\_elseif optional\_else end\_if |**

**while bool\_exp begin\_loop statement\_list end\_loop |**

**do begin\_loop statement\_list end\_loop while bool\_exp | read var\_list | write var\_list | break | continue | exit**

**optional\_elseif -> optional\_elseif elseif bool\_exp statement\_list |**

**elseif bool\_exp statement\_list optional\_else | epsilon**

**optional\_else -> else statement\_list | epsilon**

**var\_list -> var\_list comma var | var**

**optional\_comma -> comma | epsilon**

**statement\_list -> statement\_list statement semicolon | statement semicolon**

**bool\_exp -> relation\_and\_exp relation\_and\_exp\_list**

**relation\_and\_exp\_list -> relation\_and\_exp\_list or relation\_and\_exp | or relation\_and\_exp | epsilon**

**relation\_and\_exp -> relation\_exp relation\_exp\_list**

**relation\_exp\_list -> relation\_exp\_list and relation\_exp | and relation\_exp | epsilon**

**relation\_exp -> not expression comp expression | not true | not false |**

**not l\_paren bool\_exp r\_paren | expression comp expression | true | false |**

**l\_paren bool\_exp r\_paren**

**comp -> equal\_to | not\_equal\_to | less\_than | greater\_than | less\_than\_or\_equal\_to | greater\_than\_or\_equal**

**expression -> multiplicative\_exp multiplicative\_exp\_list**

**multiplicative\_exp\_list -> multiplicative\_exp\_list add multiplicative\_exp |**

**multiplicative\_exp\_list sub multiplicative\_exp | add multiplicative\_exp | sub multiplicative\_exp | epsilon**

**multiplicative\_exp -> term term\_list**

**term\_list -> term\_list multiply term | term\_list divide term | term\_list mod term |**

**multiply term | divide term | mod term | epsilon**

**term -> sub var | sub number | sub l\_paren expression r\_paren | var | number |**

**l\_paren expression r\_paren**

**var -> identifier | identifier l\_bracket expression r\_bracket**

**program -> PROGRAM**

**identifier -> IDENT**

**semicolon -> SEMICOLON**

**end\_program -> ENDPROGRAM**

**begin\_program -> BEGINPROGRAM**

**comma -> COMMA**

**colon -> COLON**

**array -> ARRAY**

**l\_bracket -> L\_BRACKET**

**number -> NUMBER**

**r\_bracket -> R\_BRACKET**

**of -> OF**

**integer -> INTEGER**

**assign -> ASSIGN**

**question -> QUESTION**

**if -> IF**

**then -> THEN**

**end\_if -> ENDIF**

**elseif -> ELSEIF**

**else -> ELSE**

**while -> WHILE**

**begin\_loop -> BEGINLOOP**

**end\_loop -> ENDLOOP**

**do -> DO**

**read -> READ**

**write -> WRITE**

**break -> BREAK**

**continue -> CONTINUE**

**exit -> EXIT**

**or -> OR**

**and -> AND**

**not -> NOT**

**true -> TRUE**

**false -> FALSE**

**equal\_to -> EQ**

**not\_equal\_to -> NEQ**

**less\_than -> LT**

**greater\_than -> GT**

**less\_than\_or\_equal\_to -> LTE**

**greater\_than\_or\_equal\_to -> GTE**

**add -> ADD**

**sub -> SUB**

**multiply -> MULT**

**divide -> DIV**

**l\_paren -> L\_PAREN**

**r\_paren -> R\_PAREN**

**mod -> MOD**