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CS 536 - Professor Thomas Reps

Homework 4

Question 1

Note: "nonterm" refers to the 1st occurrence, and "$nonterm_n$" is the n-th occurrence of a that nonterminal in from the matching CFG rule.

CFG	Translation
program → MAIN LPAREN RPAREN LCURLY list RCURLY	program.trans = list.trans
list → list oneItem	list.trans = $list_2$.trans ∪ oneItem.trans
| epsilon	list.trans = {}
oneItem → decl	oneItem.trans = decl.trans
| stmt	oneItem.trans = stmt.trans
decl → BOOL ID SEMICOLON	decl.trans = {}
| INT ID SEMICOLON	decl.trans = {}
stmt → ID ASSIGN exp SEMICOLON	stmt.trans = exp.trans
| IF LPAREN exp RPAREN stmt	stmt.trans = exp.trans ∪ $stmt_2$.trans
| WHILE LPAREN exp RPAREN stmt	stmt.trans = exp.trans ∪ $stmt_2$.trans
| LCURLY list RCURLY	stmt.trans = list.trans
exp → exp TIMES exp	exp.trans = exp_2.trans ∪ exp_3.trans
| exp DIVIDE exp	exp.trans = exp_2.trans ∪ exp_3.trans
| exp PLUS exp	exp.trans = exp_2.trans ∪ exp_3.trans
| exp LESS exp	exp.trans = exp_2.trans ∪ exp_3.trans
| exp EQUALS exp	exp.trans = exp_2.trans ∪ exp_3.trans
| LPAREN exp RPAREN	exp.trans = exp_2.trans
| ID	exp.trans = {}
| BOOLLITERAL	exp.trans = {}
| INTLITERAL	exp.trans = { INTLITERAL.value }

Question 2

Yes it can be produced, as shown in the table below.

S				
	A			
	S			
F	**B**	**A**	**F**	
D	**D**	**E**	**D**	**D**
a	**a**	**b**	**a**	**a**

S → DA | EB

A → BF | ED

B → EH | DE

F → DD

H → AA

D → a

E → b