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Homework 2

1.
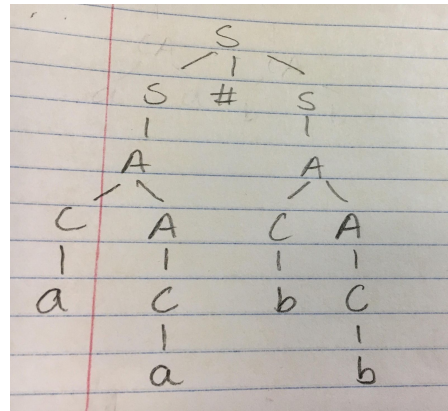A. aa # bb

   S
   S # S
   A # A
   CA # CA
   aa # bb
   Hence, the given string is in L(G).

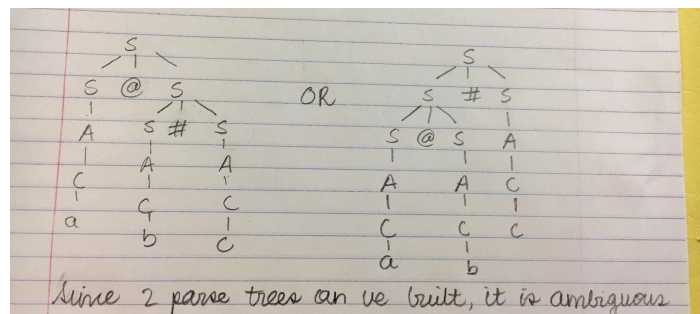

B. a @ b # c

   S
   S # S
   S # S @ S
   A # A @ A
   C # C @ C
   a @ b # c
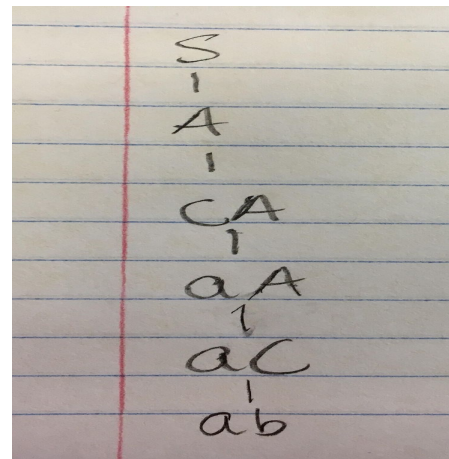Hence, the given string is in L(G).

C. ab
   S
   A
   CA
   aA
   aC
   ab
   Hence, the given string is in L(G).

2. S -> A | S # S
   A -> C | C A | A @ A
   C -> a | b | c

3.
A. <statement>
   <assignment>
   <var> = <value> [, <value>];
   a = <Number> , <var>;

a = 0 , b;
Hence, it belongs in L(G').

B. <statement>
<assignment>
<var> = <value> [, <value>];
a = <var> , <var>;
a = b , c;
Since <value> in [] can only be used once or not at all, it is impossible to get
a = b, c, 1;
Hence, it does not belong in L(G').

C. <statement>
<while>
while(<value>){{<statement>}}
while(<var>){<Assignment><Statement>}
while(a){<var> = <value> ; <while>}
while(a){b = <number> ; while(<var>){{<statement>}}}
while(a) = {b = 0; while(b){}}
Hence, it belongs in L(G').

D. <statement>
<assignment>
<var> = <value> [, <value>];
a = <number>;
a = 0;
Hence, it does not belong in L(G').

E. Statements to add:
<statement> -> <If>
<If> -> if(<value>) {{<statement>}}[<Else>]
<Else> -> else{{<statement>}}

4. <start> ::= <non-terminal> "::=" <expansion>
<expansion> ::= <expansion><expansion> | <expansion> "|" <expansion>
<expansion> ::= <non-terminal> | <terminal>
<non-terminal> ::= "< "<name>"> "
<name> ::= <terminal> | <terminal><name>
<terminal> ::= "0" | "1" | … "9" | "a" | "b" | … | "A" | "B" | … | "Z"