

Print Family (i.e., last) Name: \_\_\_\_\_

Print Given (i.e., first) Name: \_\_\_\_\_

**Instructions:**

- Write all answers in the space provided.
- If you need to do scratch work, use the backs of the sheets.
- During this quiz it is prohibited to:
  1. exchange information with any other person in any way, including by talking or exchanging papers or books;
  2. use any electronic aid, including calculators;
  3. use any books or notes;
  4. leave the classroom before you complete and turn in your quiz.

I have read and understand all of the instructions above. On my honor, I pledge that I have not violated the provisions of the NJIT Academic Honor Code.

\_\_\_\_\_  
Signature and Date

1. Suppose language  $L_1$  is generated by a context-free grammar  $G_1 = (\Sigma, \Omega_1, R_1, S_1)$ , and language  $L_2$  is generated by a context-free grammar  $G_2 = (\Sigma, \Omega_2, R_2, S_2)$ , where for grammar  $G_i$ ,  $i = 1, 2$ ,  $\Omega_i$  is the set of non-terminals,  $R_i$  is the set of productions, and  $S_i$  is the starting nonterminal. Define the language  $L_3 = L_1 + L_2$ . Explicitly define a context-free grammar  $G_3$  for  $L_3$  in terms of  $G_1$  and  $G_2$ , as we did in class.