Name:_____ Section (circle one): 01 (9:00) 02 (10:00) 03 (11:00)

This quiz, is due at the beginning of the second day of class. Please either print it and complete it by hand, or complete it electronically and then print it. A lot of this reading material should be familiar; some of Elaine Rich's notation may be different than you have seen before; you need to understand and use her notation. This quiz is mostly about definitions and notation. **Please print 2-sided.**

Chapter 2.

1. We consistently use the symbol Σ to denote the _____ from which we compose strings.

   According to the textbook's definition, can Σ ever be infinite?

   According to the textbook's definition, can a string have infinite length?

   Σ* is the _____ of all strings **including the empty string** whose symbols come from Σ.

2. Let Σ be {a, b, c}, and let s∈Σ*be abcbcc. What is the value of each of the following expressions?

   |s|

   sa

   s^0

   s^2

   s^R

   $\#_b(s)$

   How many different proper prefixes does s have?

   How many different proper substrings does s have?

3. A (formal) *language* is a _____ of strings over an _____.

4. Are ∅ and {ε} the same language? Explain briefly.

5. If the ordering of the symbols in {a, b, c} is the order given here, arrange the following strings into lexicographic order, according to the textbook's definition: b ba abc cac ε ab

6. If L_1 = {a, ab} and L_2 = {a, c, ε}, how many *different* strings are in the language L_1L_2? _____

7. If L =∅ , what is L*? _____

8. Give an example of a language L for which $L^+ \neq L^* - \{\varepsilon\}$. L = __ _____

9. Consider Exercise 2.2 0n page 19. List here the letters (chosen from {a, b, c, d})of the given strings that are in L_1L_2:__ _____

> 2) Let $L_1 = \{a^n b^n : n > 0\}$. Let $L_2 = \{c^n : n > 0\}$. For each of the following strings, state whether or not it is an element of L_1L_2:
>
> a) ε. No.
> b) aabbcc. Yes.
> c) abbcc. No.
> d) aabbcccc. Yes.

10. Can a language (set of strings over an alphabet) ever be uncountably infinite?

11. What are the possibilities for the cardinality of the set of all languages over a given alphabet ?

    Answer: _____ and _____

12. What is the relationship between {0}*{1}* and {01}*? (circle one)

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Good problems to think about, but not to turn in (not yet, some may be assigned later):
Exercises 2.3, 2.5a, 2.7abde, 2.8