

Quiz 1 – CS 315

Name: _____, ID: _____

If I had eight hours to chop down a tree, I would spend six hours sharpening an axe.

1) Represent the following regular expression as a tree: $(AB^+ \mid C)D$

2) Write regular expressions for the following:

a) Strings of 0s and 1s, where the number of 0s is even.

b) Strings of 0s and 1s for which the number of 01 substrings and 10 substrings are equal.

3) Show whether the following grammar is ambiguous or not:

$$\begin{array}{l} e \rightarrow '0' e \\ \quad | '0' e '1' e \\ \quad | 'x' \end{array}$$

4) Consider an expression language on numbers where we have the following operators:

- “\”: a left associative binary operator, precedence is low.
- “%”: a unary operator applied from left as in %A, precedence is high.
- Paranthesis: used to group an expression.

Examples: 15 \ % 43
 % (25 \ %12)
 %25 \ %%12

Construct an unambiguous grammar for that expression language. Assume numbers can be represented with a token NUM.