CS 6110 – FORMAL METHODS – SPRING 2011

Your email ID:

BACKGROUND QUIZ

This quiz is to help me assess your background. Your performance will not affect your course grade in any way.

1. Write down the shortest four strings in the regular language denoted by the regular expression \((a + be)^*\).

2. What is the powerset of the set of strings \(\{\varepsilon, a\}\)?

3. Write a recursive program to compute \(n!\) (factorial). Use any pseudo-code you are familiar with.

4. Write a recursive program to reverse a list. Use any pseudo-code you are familiar with.
5. Simplify the following Boolean expression where \( \land \) is “and”, \( \lor \) is “or”, \( \neg \) is “not”, \( \Rightarrow \) is “implication”, and \( \oplus \) is XOR.

\[
\neg(a \land (b \lor (c \oplus (d \Rightarrow e))))
\]

6. Simplify the following First Order Predicate Logic formula

\[
\neg(\forall x. (p(x) \rightarrow (\exists y. q(y) = r(x, y))))
\]