Homework Assignment 3, Part a

Due: Thursday, October 18, 2001

Reading:

Chapter 8, 14, 15.1-15.4.

Basic Problems:

1. Exercise 8.5.
2. Exercise 15.4.

Regular Problems:

3. Exercise 8.8.
4. Assume that A, A', B, and B' are automata, where A and A' have the same external signature, B and B' have the same external signature, and A and B are compatible. Also assume that $traces(A' \times B) \subseteq traces(A \times B)$, and $traces(A \times B') \subseteq traces(A \times B)$. Informally speaking, this says that A "implements" A' in the context of B' and B "implements" B' in the context of A'.
   (a) Prove carefully that, under these assumptions, $ftraces(A' \times B') \subseteq ftraces(A \times B)$, where we use the terminology *ftraces* to indicate the set of all finite traces of the given automaton.
   (b) Produce a counterexample to show that, under these assumptions, it is *not* always the case that $traces(A' \times B') \subseteq traces(A \times B)$.
5. Exercise 15.11.
6. Exercise 15.16
   By **garbage collection** we mean that the process can delete all the information about the algorithm after it performs its *report* action, and sends out its *acks*.