COMP 280 : Assignment 12

due: Thursday, April 27, 2000

1. (2 pts) Does there exist a FA accepting the language $a^n ba$? Justify your answer.

2. (3 pts) Does there exist a FA accepting the language of all palindromes over $\Sigma = \{a, b\}$ of length at most three? Justify your answer.

3. (3 pts) Does there exist a FA accepting the language of all palindromes over $\Sigma = \{a, b\}$? Justify your answer.

4. (6 pts) Let Σ be a set of S symbols and let N be a positive integer. How many different FAs with N states exist over Σ when

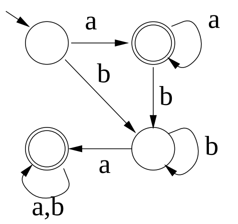
   (a) (3 pts) the transition relation R is a relation that need not contain a transition for every state on every input.

   (b) (3 pts) the transition relation R is a function with a transition out of every state on every input.

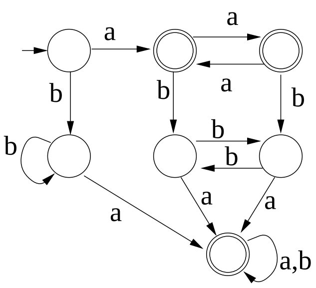
   Note: the states do not all need to be reachable in these FAs.

5. (3 pts) Let M_1 and M_2 be FAs over some Σ. In class, we discussed how to construct FA M accepting $\mathcal{L}(M_1) \cap \mathcal{L}(M_2)$. Prove that for all input sequences I, M accepts I only if M_1 accepts I.

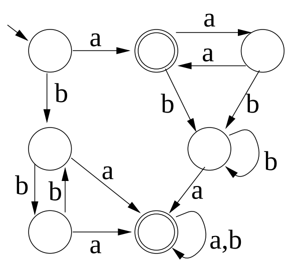
6. (5 pts) Consider the three FAs given below. Which pairs of FAs accept the same language? Justify your answer.



M1



M2



M3