

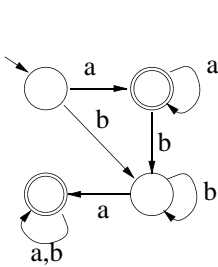
# COMP 280 : Assignment 12

due: Thursday, April 27, 2000

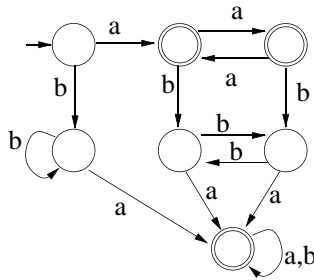
1. (2 pts) Does there exist a FA accepting the language  $a^nba$ ? Justify your answer.
2. (3 pts) Does there exist a FA accepting the language of all palindromes over  $\Sigma = \{a, b\}$  of length at most three? Justify your answer.
3. (3 pts) Does there exist a FA accepting the language of all palindromes over  $\Sigma = \{a, b\}$ ? Justify your answer.
4. (6 pts) Let  $\Sigma$  be a set of  $S$  symbols and let  $N$  be a positive integer. How many different FAs with  $N$  states exist over  $\Sigma$  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.

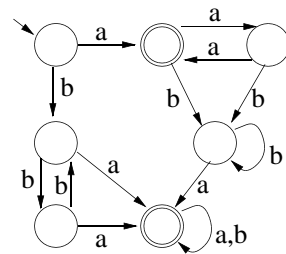
5. (3 pts) Let  $M_1$  and  $M_2$  be FAs over some  $\Sigma$ . In class, we discussed how to construct FA  $M$  accepting  $\mathcal{L}(M_1) \cap \mathcal{L}(M_2)$ . Prove that for all input sequences  $I$ ,  $M$  accepts  $I$  only if  $M_1$  accepts  $I$ .
6. (5 pts) Consider the three FAs given below. Which pairs of FAs accept the same language? Justify your answer.



M1



M2



M3