This assignment asks you to prepare written answers to questions on regular languages and finite automata. Each question has a short answer. You may discuss this assignment with other students and work the problems together. However, your writeup should be your own individual work. Remember written assignments are to be turned in in class on the date due.

- 1. Write regular expressions for the following languages:
  - (a) (2 points) All strings of a's and b's that do not include the substring ab.
  - (b) (2 points) All strings of a's and b's that do not include the substring aba
  - (c) (2 points) All strings of digits where every 3rd digit (starting with the first digit) is even.
- 2. For each of the following finite automata, give an equivalent regular expression.



(b) (2 points)





3. (3 points) Let  $\Sigma = a, b$ . How many DFA's are there with two states and input alphabet  $\Sigma$ ? (Note: Many of these machines may accept the same language. Count DFA's as different if the machines are different, even if they accept the same language.)