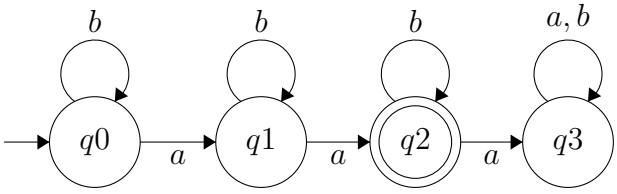
On my honor, I have not given, nor received, nor witnessed any unauthorized assistance on this work.

Print name and sign: _____

Question:	1	2	3	Total
Points:	4	13	13	30
Score:				

1. (4 points) Professor Summet is giving a mini-lecture on regular expressions. She says, "Kleene star also distributes over the or operation! For example, if you have $(a|b)^*$ that's the same as $(a^*|b^*)$." Later, you tell your teammates that Dr. Summet is obviously having a bad day and is incorrect. Explain how you know she is incorrect. You can give concrete examples if it helps your explanation.

2. Consider the following DFA:



(a) (2 points) Give two strings (including the shortest string) that this DFA accepts.

(b) (5 points) Give the formal 5-tuple definition for this DFA.

(c) (2 points) Informally describe the language this DFA recognizes.

(d) (4 points) Give a regular expression for the language this DFA accepts.

3. Given the alphabet $\Sigma = \{0, 1\}$ and the language L represented by the regular expression:
   $(0(0|1)^*0)|(1(0|1)^*1)$

   (a) (4 points) Informally describe the language L.

   (b) (4 points) For each of the following strings s, state whether $s \in L$ or not.

   i. ϵ _____

   ii. 1 _____

   iii. 0000 _____

   iv. 1010101 _____

   (c) (5 points) Draw a DFA for this language.