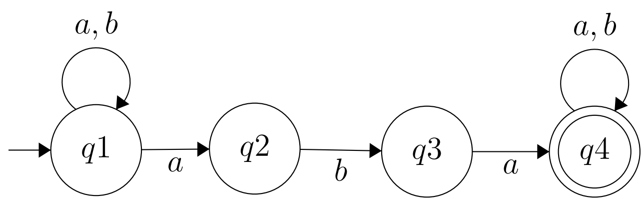
On my honor, I have not given, nor received, nor witnessed any unauthorized assistance on this work.

Print name and sign: ____

Question:	1	2	3	Total
Points:	15	7	8	30
Score:				

1. Consider the following NFA defined with $\Sigma = \{a, b\}$:



(a) State whether or not each string is accepted by the NFA:

i. (1 point) `ab` ______________

ii. (1 point) `aaabaaa` ______________

iii. (1 point) `abbb` ______________

iv. (1 point) `abbba` ______________

(b) (1 point) Give an informal description of the strings accepted by this NFA.

(c) (3 points) Give the formal 5-tuple definition for the NFA.

(d) (7 points) Draw an equivalent DFA. Be sure to show your transition table as well.

2. (7 points) Consider the language of *palindromes* (that is, strings which are the same whether read forwards or backwards) over the alphabet $\Sigma = \{0, 1\}$.[1] We want to use the pumping lemma to show that this language is not regular. The proof is begun for you below. Finish it (and remember not to make any leaps of logic or faith).

   Suppose that the set of palindromes were regular. Let p be the pumping length. Consider the string $s = 0^p110^p$. s is clearly a palindrome and $|s| >= p$ so...

[1] Concrete examples of palindromes would be 00011000 or 010010 while 1000 or 010101 would not be palindromes.

3. (8 points) Draw an NFA for the regular expression $(a^*|(ab)^*)b^*$. If you use any abstractions (eg. black box parts of your NFA), make sure the states and transitions can be clearly understood.