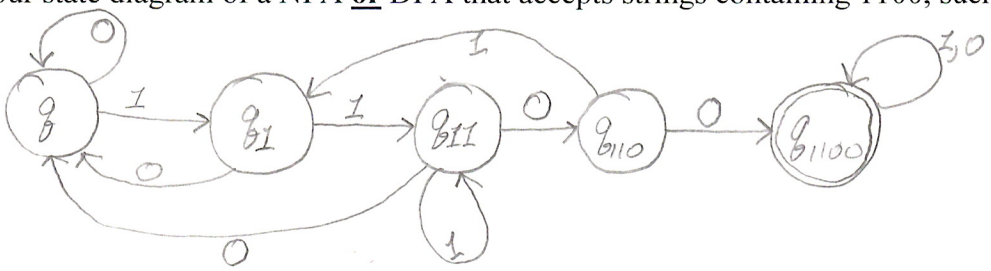
Quiz #4 CS361 Spring 2017 Name: Alexander Molodyh

I. True or False (1 Point each for the best 8, answer all)

F 1. The set of states Q in a DFA can be empty. When Q is not empty, the DFA can have more than one start state.
F 2. Let's A, p, and s be defined as in the Pumping Lemma, if s = xyz, then s'= xz must also be in A. In addition, the Pumping Lemma for NFA is mostly used to prove that a language is actually regular
T 3. Any language accepted by a NFA can also be accepted by a DFA.
T 4. The class of regular language is closed under the concatenation operation.
F 5. A NFA is considered as a special case of a DFA.
F 6. If machine M has two input symbols that transit to q_2 from q_1, then M cannot be a DFA.
F 7. Every CFG has an equivalent NFA, and every DFA has an equivalent CFG.
F 8. If a DFA has n states, it cannot accept strings with a length greater than n^2.
T 9. A = $\{0^n1^n\}$ can be accepted by a PDA.

II. Short answers (2 points each)

1. Show your state diagram of a NFA **or** DFA that accepts strings containing 1100, such as 00**11001**.



2. Let A={a, b} and B={0, 1} show A ∪ B and A o B. Then explain what is A^* and show all strings in A^* that have a length smaller than 3.

A ∪ B = {a, b, 0, 1}

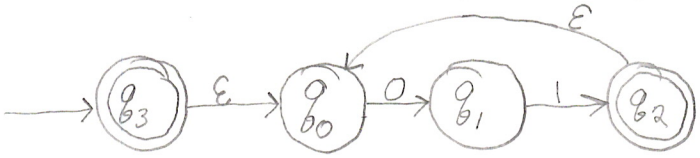
A o B = {a0, a1, b0, b1}

A^* All the combinations of elements of A.

$A^* = \{\varepsilon, a, b, aa, ab, ba, bb, \ldots\}$

II. Short answers (4 points)

1. Design a DFA or NFA that accepts regular expression $(01U10)^*$.



2. Design a PDA that accepts $E = \{0^i1^j | i > j\}$. You may have to use the back page.

Since $i > j$, than there is more 0's than 1's. So a PDA would not work on this language. I have made a graph on the back of the page that I think might work.