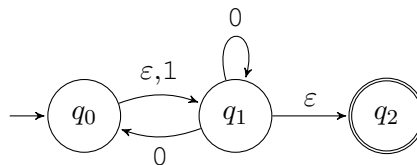


Week 2 Tutorial Session

Tutorial exercises include more problems than a typical student can solve in 15-20 minutes. Don't be discouraged if you cannot solve all the problems within the time limit.

1. Draw a state diagram of a DFA that accepts the following language:
 - (a) $\{w \mid w \text{ has at least two a's and at least two b's}\}$
 - (b) $\{w \mid w \text{ doesn't contain the substring aba}\}$
 - (c) $\{w \mid w \text{ contains the same number of occurrences of ab and ba as substrings}\}$
 For example aba is in this language because aba contains a single ab and a single ba, but abab is not in this language because abab contains two ab and one ba.
2. Prove that every NFA can be converted into an equivalent one that has a single accepting state.
3. We considered the following NFA in the second lecture:



- (a) Does the NFA accept 01? 11? 011?
- (b) What is the language of the NFA? **Justify your answer formally and carefully.**