

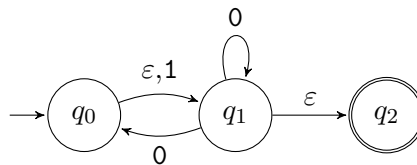
Week 2 Tutorial Session

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.**