**Week 3 Tutorial Session**

Tutorial exercises include more problems than what 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. Convert the following NFA into a DFA using the algorithm from the lecture.

   ![NFA Diagram]

2. Prove that every NFA can be converted into an equivalent one that has a single accepting state.

3. (a) Write down the definition of regular languages over an alphabet $\Sigma$.
   (b) Write down the definition of regular expressions over an alphabet $\Sigma$.
   (c) Given a string $w$, define $w^R$ as the string $w$ in reverse order. That is, if $w = w_1w_2\ldots w_n$, then $w^R = w_nw_{n-1}\ldots w_1$. For example, if $w = \text{live}$, then $w^R = \text{evil}$.

   Given a language $L$, define its reversal $L^R$ as the set of strings in $L$ in reverse. More precisely, $L^R = \{w^R \mid w \in L\}$. For example, if $L = \{\text{live, raw, level}\}$, then $L^R = \{\text{evil, war, level}\}$.

   If $L$ is a regular language, prove that $L^R$ as also regular.