1. Consider integers written in base 3 with no leading 0s. Let $L_1$ be the set of such strings which represent odd numbers.

   (a) Construct a DFA that accepts $L_1$.

   (b) Construct a left-linear grammar for $L_1$.

2. Consider the language $L_2$ generated by the following grammar

   $$
   S \rightarrow AB + C \\
   A \rightarrow aB + C \\
   B \rightarrow Ab + C \\
   C \rightarrow b + aaaC
   $$

   Characterize $L_1$ using a combination of set notation and regular expressions.

3. What does it mean for an infinite set to be “countable”?
4. Construct a DFA equivalent to the following NFA.

5. Consider the language over $\Sigma = \{a, b, c\}$ consisting of strings with more occurrences of the pattern “abc” than occurrences of the pattern “abb”. Is this a regular language? Justify your answer.