1. Give the production rules for a grammar over the alphabet $\Sigma = \{a,b\}$ that generates the following languages.

   a. $L_1 =$ all strings with exactly one a
   
   b. $L_2 =$ all strings with exactly two a’s
   
   c. $L_1 \cup L_2$
   
   d. $L_3 = \{a^n b^{2n} \mid n > 0\}$

2. Give complete verbal descriptions of the languages generated by the following grammars whose production rules are as follows.

   $S \rightarrow aA$

   a. $A \rightarrow bbS$
   
      $S \rightarrow \lambda$

   b. $S \rightarrow aSb \mid bSa \mid a$
   
      $S \rightarrow Aa$

   c. $A \rightarrow B$ Careful!
   
      $B \rightarrow Aa$