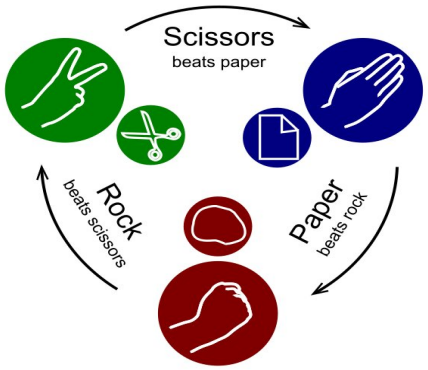
Assignment-3: Design and Simulation of FA using JFLAP

1. Consider Σ= $\{0, 1\}$ and $w \in \Sigma^*$. Design DFA(s) accepting the following languages:
   (a) $L_1 = \{w |\ w$ begins with a 1 and ends with a $0\}$
   (b) $L_2 = \{w |\ w$ has length at least 3 and its third symbol from left is a $0\}$
   (c) $L_3 = \{ab^n a^m \mid n \geq 2, m \geq 3\}$
2. Consider Σ= $\{a, b, c\}$ and $w \in \Sigma^*$. Design NFA(s) accepting the following languages:
   (a) $L_1 = \{w |\ w$ contains the string abc or that end with the string $ac\ \}$
   (b) $L_2 = L\{(ab \cup abc)^*\}$
3. Let us consider the following algorithm for washing hair.
   1. Wet hair. (W)
   2. Add shampoo to hair. (S)
   3. Lather hair. (L)
   4. Rinse hair. (R)
   5. Repeat at Step 2.

   Design an NFA for the hair washing process. Convert the NFA to an equivalent DFA.
4. Design a DFA that models one round of the classic game Rock-Paper-Scissors. The DFA accepts two-lettered inputs where the first letter is Player 1s input and the second letter is Player 2s input. The input alphabet(Σ) is {R, P, S} representing rock, paper, and scissors. For example, string **RP** represents rock for Player 1 and paper for Player 2; this string ends in a final state in which Player 2 wins since paper covers rock. The following figure depicts how the three game elements interact.



   Convert the DFA into an equivalent regular grammar.