1. Here is an ε-NFA. Convert it to a DFA and find all of the strings of length 2 accepted by it.

```
\[\text{\begin{tikzpicture}
\node (S) at (0,0) {S};
\node (T) at (1,1) {T};
\node (U) at (1,-1) {U};
\draw[->] (S) edge[bend left=30] node[above] {a} (T);
\draw[->] (S) edge[bend right=30] node[below] {c} (U);
\draw[->] (T) edge[bend right=30] node[below] {c} (U);
\draw[->] (U) edge[bend right=30] node[below] {b} (T);
\end{tikzpicture}}\]
```

2. Design an ε-NFA for the set of strings consisting of either 01 repeated 1 or more times or 010 repeated 1 or more times.

3. Give a regular expression for the set of strings over the alphabet \{a,b,c\} containing at least one a and at least one b.

4. Give a DFA for the set of strings with an even number of zeros.

5. Give a regular expression for the set of strings with an even number of zeros.

6. Describe in English the language denoted by the regular expression \((1+\varepsilon)(00^*1)^*0^*\)

7. Suppose we have a finite automaton with no transitions into the start state and none out of the final state. This automaton accepts language \(L\). If we modify the automaton by adding an ε-transition from the final state to the start state, what language will it accept?

8. Convert the regular expression \((0+1)(01)^*\) into an ε-NFA using the construction we developed in class.

9. Convert \((1+\varepsilon)(00^*1)^*0^*\) into an ε-NFA any way you wish.

10. Convert the following DFA into a regular expression using the construction we developed in class.