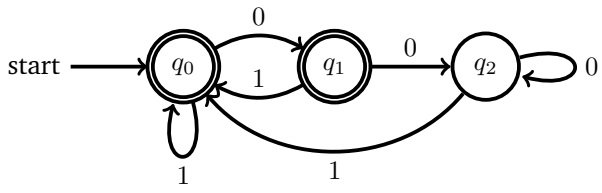
Homework 7

1. Suppose the following finite deterministic automaton over the alphabet $\{0, 1\}$.



   Give a regular expression that can recognise the same language as this automaton. (Hint: If you use Brzozwski's method, you can assume Arden's lemma which states that an equation of the form $q = q \cdot r + s$ has the unique solution $q = s \cdot r^*$.)

2. Consider the following grammar

$$
\begin{aligned}
S &\to N \cdot P \\
P &\to V \cdot N \\
N &\to N \cdot N \\
N &\to A \cdot N \\
N &\to \texttt{student} \mid \texttt{trainer} \mid \texttt{team} \mid \texttt{trains} \\
V &\to \texttt{trains} \mid \texttt{team} \\
A &\to \texttt{The} \mid \texttt{the}
\end{aligned}
$$

   where S is the start symbol and S, P, N, V and A are non-terminals. Using the CYK-algorithm, check whether or not the following string can be parsed by the grammar:

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The trainer trains the student team
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