1. Apply the algorithm of MCNAUGHTON-YAMADA on the following automaton. Detail each step.

2. Prove that the problem
   
   **Input**: Two finite automata $A_1, A_2$
   
   **Question**: $L(A_1) = L(A_2)$?

   is decidable.

We define by $|e|$ the size of a regular expression $e$, i.e. the number of symbols appearing in $e$.

3. Is there a unique minimal regular expression $e$ such that $L(e) = L$ for a given regular language $L$?

4. Give a procedure which, given a finite automaton $A$, returns a minimal regular expression $e$ such that $L(A) = L(e)$.
   
   *(No need for more than a sentence)*