1. For a language $M$, define $M_{2022}$ as the set of all strings in $M$ of length exactly 2022. State whether the following are true or false: (No justification required.)

(a) If $M$ is regular, then so is $M_{2022}$.  

TRUE

(b) If $M_{2022}$ is regular, then so is $M$.  

FALSE

2. Given a string, the slurp of the string is obtained by duplicating every letter. For example, the slurp of TIGER is TTHIGGEERR. The slurp of a language is the slurps of all its strings.

(a) Show that the regular languages are closed under slurping, by providing a general algorithm to convert an FA for a language $L$ to an FA for the slurp of $L$.

TAKEN EVERY TRANSITION, AND
REPLACE IT BY SEQUENCE OF TWO
TRANSITIONS WITH SAME CHAR

(b) Illustrate your algorithm on the following FA.