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HOMEWORK 2

DUE SEPTEMBER 22 IN CLASS

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1. Let $L \subseteq \Sigma^*$ be a regular language. Is

$$L' = \{u \in \Sigma^* : \exists v \in \Sigma^* \text{ such that } uv \in L \text{ and } |u| = |v|\}$$

   necessarily regular? Prove your answer.

2. (Extra credit) Let $L \subseteq \Sigma^*$ be a regular language. Is

$$L'' = \{uv \in \Sigma^* : \exists w \in \Sigma^* \text{ such that } uwv \in L \text{ and } |u| = |v| = |w|\}$$

   necessarily regular? Prove your answer.