

# ECE374 SP23 HW1

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## Problem 1

1: (a). Base:  $\epsilon \in L_A$ . For  $\forall a \in \Sigma$ ,  $a \in L_A$ .

Induction: For  $\forall a \in \Sigma$ ,  $x \in L_A$ ,  $w = axa \in L_A$ .

Explanation: Starting from the center, we add chars to both sides.

(b). Base:  $\epsilon \in L_{B0}$   $\epsilon \in L_{B1}$

Induction: For  $\forall y \in L_{B1}$ ,  $0y, 00y \in L_{B0}$ .  $L_B = L_{B0} \cup L_{B1}$ .  
For  $\forall x \in L_{B0}$ ,  $0x, 00x \in L_{B1}$ . start with 1.

Explanation: Strings in  $L_{B0}$  start with 0, and those in  $L_{B1}$