14.

Define \( \text{min}(L) = \{ x \in L : \text{no proper prefix of } x \text{ is in } L \} \)

Claim: \( \text{min}(L) = L - (L\Sigma^+) = L \cap (\overline{L\Sigma^+}) \), and \( \text{min}(L) \) is regular.

Proof of \( \text{min}(L) \subseteq L - (L\Sigma^+) \): Assume \( x \in \text{min}(L) \). Then by definition of \( \text{min}(L) \), \( x \in L \). Towards a contradiction, assume \( x \notin L - (L\Sigma^+) \). Then \( x \in L \) and \( x \) is of the form \( yz \) where \( y \in L \) and \( z \in \Sigma^+ \). Then \( y \) is a proper prefix of \( x \), since \( z \) is non-empty, and since \( y \in L \) this contradicts that \( x \in \text{min}(L) \). So \( x \in L - (L\Sigma^+) \).

Proof of \( L - (L\Sigma^+) \subseteq \text{min}(L) \): Assume \( x \in L - (L\Sigma^+) \). Towards a contradiction, assume \( x \notin \text{min}(L) \). Then \( x \in L \) and there is a proper prefix of \( x \) which is in \( L \), so \( x = yz \) where \( y \in L \) and \( z \) is a nonempty string over \( \Sigma \), so \( z \in \Sigma^+ \). But then \( x = yz \in L\Sigma^+ \), which contradicts that \( x \in L - (L\Sigma^+) \), so \( x \in \text{min}(L) \).

So \( \text{min}(L) = L - (L\Sigma^+) \).

Lastly, \( \text{min}(L) = L - (L\Sigma^+) = L \cap (\overline{L\Sigma^+}) \) and regular languages are closed under intersection, concatenation, and complement (proved in cs360), so if \( L \) is regular then \( \text{min}(L) \) must also be regular.