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**CSL 105: Discrete Mathematical Structures****Instructor:** Ragesh Jaiswal

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1. Show that if  $L$  and  $M$  are regular languages, then so is  $L \cap M$ .
2. Show that the following languages are not regular:
  - $L = \{0^n \mid n \text{ is a perfect square}\}$
  - $M = \{w \mid w \in \{0, 1\}^* \text{ and } w \text{ is a palindrome}\}$
3. Argue that for any DFA  $M$ , there is an equivalent DFA  $M_{min}$  with *minimum number of states*. (this means that of all the DFA that recognizes  $L(M)$ ,  $M_{min}$  is the one with smallest number of states)