ADDITIONAL MIDTERM PRACTICE, CPSC 421/501, FALL 2020

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(1) State whether the statements below are true or false, and justify your answer.
  (a) If L_1 and L_2 are regular languages over the same alphabet, then $L_1 \cup L_2$ is regular.
  (b) If L_1 and L_2 are nonregular languages over the same alphabet, then $L_1 \cap L_2$ is nonregular.

(2) Describe a DFA recognizing
$$L = \{s \in \{a, b\}^* \mid s \text{ ends with } aba\} = \{a, b\}^* aba,$$
and explain how it works.

(3) Give a formal description of a Turing machine that decides
$$L = \{s \in \{a, b\}^* \mid s \text{ ends with } aba\} = \{a, b\}^* aba,$$
and explain how it works.

(4) Let $L = \{aaaa\}$. Use the Myhill-Nerode theorem to prove that any DFA recognizing L must have 6 states.

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