

CS172 Practice Midterm Questions

1. Give a DFA or NFA for the language of all strings that do not contain 010100.
(There's no need to prove your answer correct.)
2. For any two sets A and B the symmetric difference of A and B , written $A \oplus B$, is all things which are in either A or B but not both. Prove that the class of regular languages is closed under \oplus .
(You can use the following results from class and previous homeworks: that the class of regular languages is closed under union, intersection, and complementation.)
3. Prove that any finite language is regular. Include all proof details.
4. Give a context free grammar for the strings over $\{0, 1\}$ where the number of 0s is exactly one different from the number of 1s.
(Accompany your construction with a justification of its correctness; this need not be a complete proof.)
5. Let L be the language of all palindromes over $\{0, 1\}$ that contain the same number of 0s and 1s. Prove that L is not context free.