

HW 1 CMSC 452. Morally DUE Feb 11

1. (0 points) What is your name? Write it clearly. Staple your HW. When is the midterm? Where is the midterm? When is the Final? IMPORTANT- I WANT TO MAKE SURE I HAVE YOUR CORRECT EMAIL ADDRESSES. I HAVE EMAILED ALL OF YOU USING WHAT I CURRENTLY THINK IS YOUR EMAIL ADDRESS BUT IF YOU DIDN'T GET IT THEN EMAIL ME ASAP TO GIVE ME YOUR REAL EMAIL ADDRESS.

2. (50 points) Let $n_a(w)$ be the number of a 's in w .

- (a) Write a DFA for the language

$$\{w : n_a(w) \equiv 1 \pmod{3}\}.$$

LABEL the states with numbers. (Make sure the number of states is minimal.)

- (b) Write a DFA for the language

$$\{w : w \text{ begins with } ba \}.$$

(Make sure the number of states is minimal.) LABEL the states with numbers.

- (c) USING the construction in class give the DFA for

$$\{w : n_a(w) \equiv 1 \pmod{3}\} \cap \{w : w \text{ begins with } ba \}.$$

3. (50 points) For this problem use our conventions. Circle the accept states, box the reject-with-dignity states. Draw a DFA for the following language

$$\{(x, y) : x \leq y \text{ AND } x \equiv y \pmod{3}\}.$$

Do NOT use the intersection of DFA's theorem on this— just do it directly.