General Announcements

- Quiz 2 has been handed back. Pick up your Quiz 2 during my office hours. Solutions are posted on the course website.

- Quiz 2 was difficult, though someone did get a perfect score of 100. Quiz 2 will be “curved” in that each of you will receive 6 additional points in Rainbow Grades (though not the one who got 100!).

- For any Quiz 2 questions or regrades, please see any TA or me during office hours

- At recitation on 4/25, TAs will cover Homework 9 recitation problems. Homework 9 will be posted by 4/21 (due 5/1). Note that Homework 9 is our last homework assignment.

- At recitation on 5/2 (last day of classes), there will be review for Quiz 3, which is on 5/2 at 6:00-7:50PM in DCC 308 (as per usual). Quiz 3 will be entirely multiple choice and focus on our coverage of Chapters 22-29 (or however far we get with that material). Quiz 3 will be handed back at our final exam....

- Our final exam is Tuesday 5/8 from 11:30AM to 2:30PM in DCC 308. Our final exam will be comprehensive and similar in style to the midterm exam, i.e., a mix of multiple choice and freeform-answer questions. Final exams will not be handed back or available for review.

- Homework grading is ongoing. Currently, Homework 7 is being graded. Homeworks 5 and 6 need to still be graded.

Exercise 24.2(a)

For the DFA in the lecture notes, show that \( L(M) = \{0^n | n > 0 \} \).

**ANSWER:**

When \( M \) processes a 1, it enters \( q_2 \) from which it never leaves, so if \( w \) contains a 1 then \( M(w) = \text{NO} \).

If \( w = \epsilon \), then \( M \) stops in \( q_0 \) and rejects the input.

If \( w = 0^n \) for \( n > 0 \), then \( M \) enters \( q_1 \) and never leaves, accepting input \( w \).

Therefore, \( L(M) = \{0^n | n > 0 \} \).
Exercise 24.2(b)

(i) Strings with no 1’s, i.e., \( \mathcal{L}(M) = \{0\}^* \)
(ii) Strings that do not only contain 0’s, i.e., \( \mathcal{L}(M) = \{0^n|n > 0\} \)
(iii) Strings with an even number of zeros, including \( \varepsilon \) and strings with no zeros
(iv) Strings with an odd number of zeros
(v) \( \mathcal{L}(M) = \{\varepsilon, 0\} \) (i.e., only two YES-strings)
(vi) Every string except \( \varepsilon \) and 0, i.e., \( \mathcal{L}(M) = \{\overline{\varepsilon}, 0\} \)

Exercise 24.3(a)

Construct a DFA that solves the computing problem \( \mathcal{L}(M) = \{01, 000, 101, 111\} \).

What changes if \( \mathcal{L}(M) \) also includes \( \varepsilon \)?