

Friday, Feb. 3

1. Let A , B and C be sets. Show that

(a) $(A - B) - C \subseteq A - C$

(b) $(B - A) \cup (C - A) = (B \cup C) - A$

2. If A , B , C and D are sets, does it follow that $(A \otimes B) \otimes (C \otimes D) = (A \otimes C) \otimes (B \otimes D)$?

3. Let $\Sigma = \{0, 1\}$. For each of the following languages, give the state diagram for a DFA that recognizes it. You can build the DFA in JFLAP (www.jflap.org) and test it out.

- $L_1 = \{w : w \text{ begins and ends with an even number of 1's}\}$
- L_2 is the language that consists of all strings w such that w ends in an odd number of 1's and w contains an even number of 0's.
- $\Sigma^*0\Sigma^*1\Sigma^*0\Sigma^*$ Examples in \mathcal{L} : 010, 000110, 11011001. Examples not in \mathcal{L} : 111, 011, 00011.
- $\mathcal{L} = \{w \mid w \text{ is a binary number divisible by 2, given least significant digit first}\}$. Examples in \mathcal{L} : 0, 01, 001, 010, 01011. Examples not in \mathcal{L} : 1, 111, 101.