Week 8: Assignment 8

Due on 2021-10-21, 23:59 (UTC)

1. Consider the following two languages:
   - $L_1 = \{a^n b^n c^{n+1} \mid n \geq 0\}$
   - $L_2 = \{a^n b^n c^n \mid n \geq 0\}$
   - Which one is context-free? Explain your reasoning. (10 points)
   - Which one is regular? Explain your reasoning. (10 points)

2. Consider the following automaton:
   - $A_1 = (\{q_0, q_1\}, \{a, b\}, \{q_1\}, q_0, \{q_1\})$
   - $A_2 = (\{q_0, q_1\}, \{a, b\}, \{q_0\}, q_0, \{q_1\})$
   - Which one is deterministic? Explain your reasoning. (10 points)
   - Which one is NFA? Explain your reasoning. (10 points)

3. Consider the following language:
   - $L = \{a^n b^m \mid n \neq m\}$
   - Which one is context-free? Explain your reasoning. (10 points)
   - Which one is regular? Explain your reasoning. (10 points)

4. Consider the following two languages:
   - $L_1 = \{a^n b^n c^n \mid n \geq 0\}$
   - $L_2 = \{a^n b^n c^{n+1} \mid n \geq 0\}$
   - Which one is context-free? Explain your reasoning. (10 points)
   - Which one is regular? Explain your reasoning. (10 points)

5. Consider the following automaton:
   - $A_1 = (\{q_0, q_1\}, \{a, b\}, \{q_0\}, q_0, \{q_1\})$
   - $A_2 = (\{q_0, q_1\}, \{a, b\}, \{q_1\}, q_0, \{q_1\})$
   - Which one is deterministic? Explain your reasoning. (10 points)
   - Which one is NFA? Explain your reasoning. (10 points)

6. Consider the following language:
   - $L = \{a^n b^n c^n \mid n \geq 0\}$
   - Which one is context-free? Explain your reasoning. (10 points)
   - Which one is regular? Explain your reasoning. (10 points)