

Formal Verification and Specification
Lab Session (TP) 03

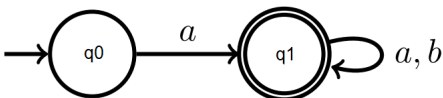
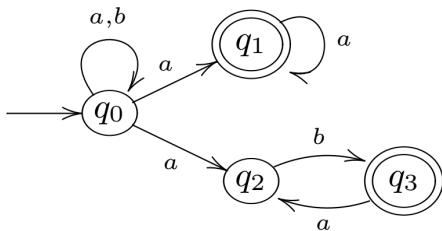
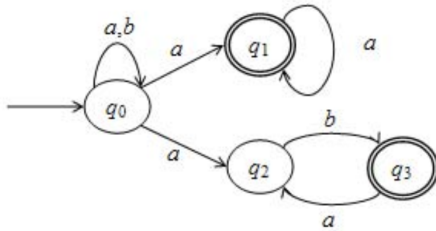
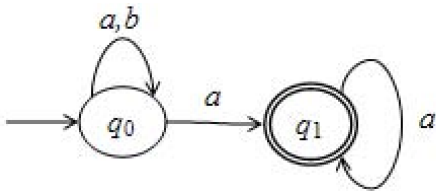
1. LTL Buchi automaton:

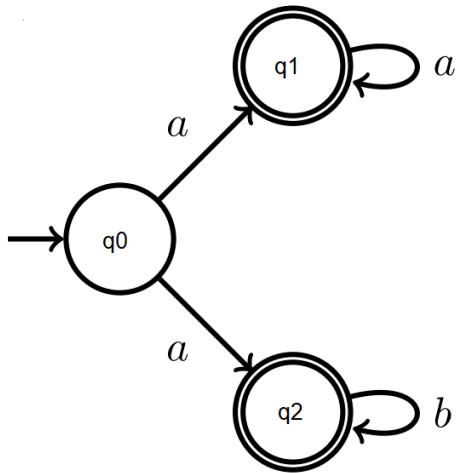
Given the alphabet $\Sigma = \{A, B\}$, introduce for each of the following a Büchi automaton:

- Each B should be followed by two A .
- There are finitely many B s in each path or sequence
- After every A , we have either an even number of consecutive B or there must be infinite number of consecutive B .
- Each path is of the form $X\alpha$, where $X = (BA)^k$, such that $k \geq 1$, and $\alpha \in \Sigma^\omega$, where.

2. LTL Buchi automaton:

Give the accepting ω -language for each of the following ω -automata:





3. LTL Buchi automaton:

Find three(03) accepting runs and three (03) rejecting runs for the following automata :

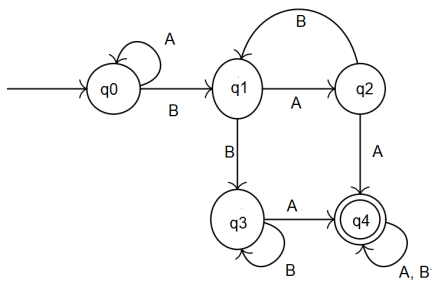


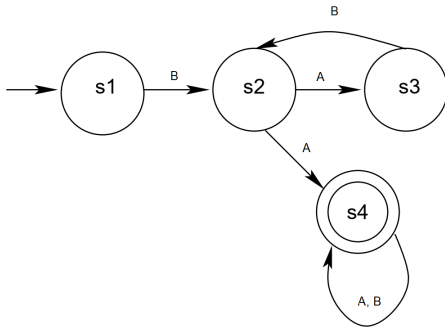
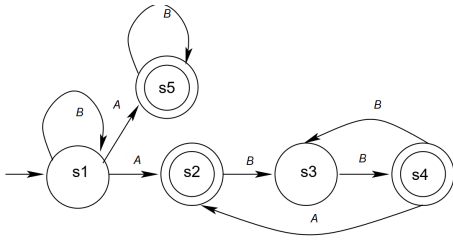
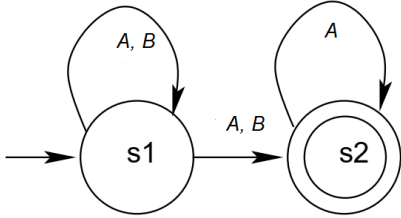
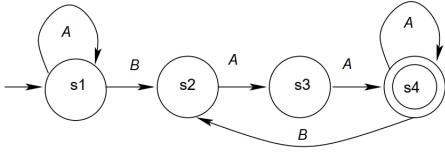
Figure 1: A

Answers

1. LTL Buchi automaton:

Given the alphabet $\Sigma = \{A, B\}$, introduce for each of the following a Büchi automaton:

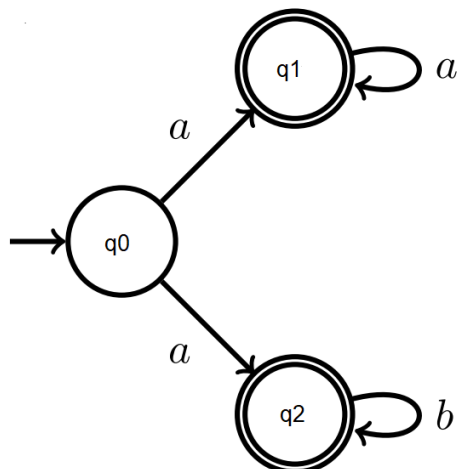
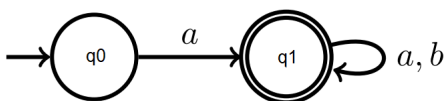
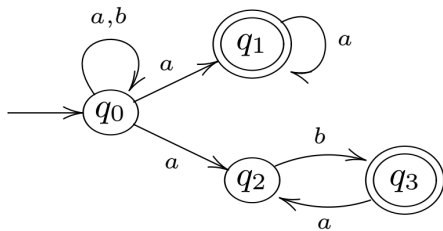
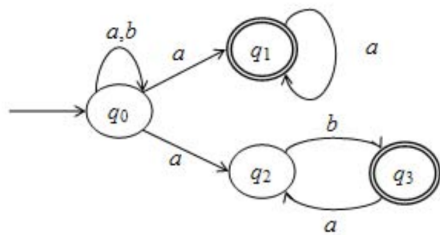
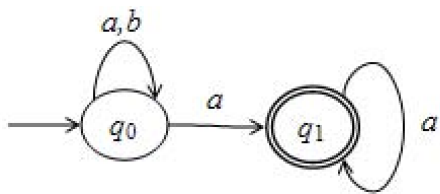
- Each B should be followed by two A .
- There are finitely many B s in each path or sequence
- After every A , we have either an even number of consecutive B or there must be infinite number of consecutive B .
- Each path is of the form $X\alpha$, where $X = (BA)^k$, such that $k \geq 1$, and $\alpha \in \Sigma^\omega$, where.



Answer:

2. LTL Buchi automaton:

Give the accepting ω -language for each of the following ω -automata:



Answer: • $\Sigma^* a^\omega = (a + b)a^\omega$

- $\Sigma^* aa^\omega U \Sigma^* a(a + b)^\omega = (ab)^* a^+(a^\omega + ab^\omega)$
- $(a + b)^* a^\omega + (a + b)^* (ab)^\omega$
- $a(a + b)^\omega$
- $a^\omega + ab^\omega$

3. LTL Buchi automaton:

Find three(03) accepting runs and three (03) rejecting runs for the following automata :

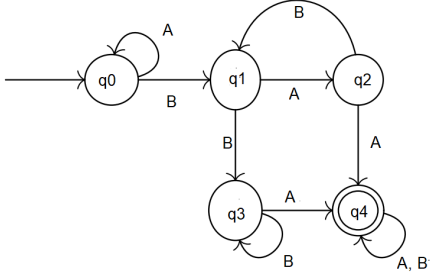


Figure 2: $\mathbb{A}$

Answer: • $ABAA, BABBBAB, BBAAB \in L(\mathbb{A})$

- $AAB, BBBB, ABABA \notin L(\mathbb{A})$