2. (30 points) The alphabet is \( \{a, b\} \). Give a B-NFA for the following languages

(a) (15 points)

\[ \{ w \in \{a, b\}^\omega \mid w \text{ has an infinite number of } a\text{'s } \} \]

(b) (15 points)

\[ \{ w \in \{a, b\}^\omega \mid w \text{ has a finite number of } a\text{'s } \} \]

This B-NFA with two states accepts strings that "end" with an infinite number of \( b \), meaning that there is a final (and finite number of) \( a \).

(c) (0 points) Think about: For the above languages ponder if they could be done by a B-DFA which is a DFA where we say an infinite string accepts if it hits some final state infinitely often.