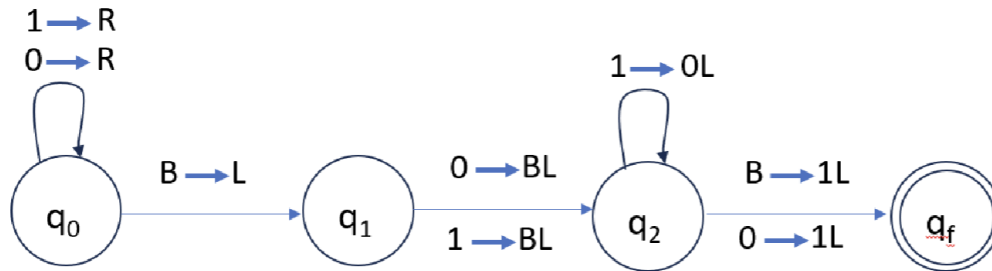


Assignment-5 Key

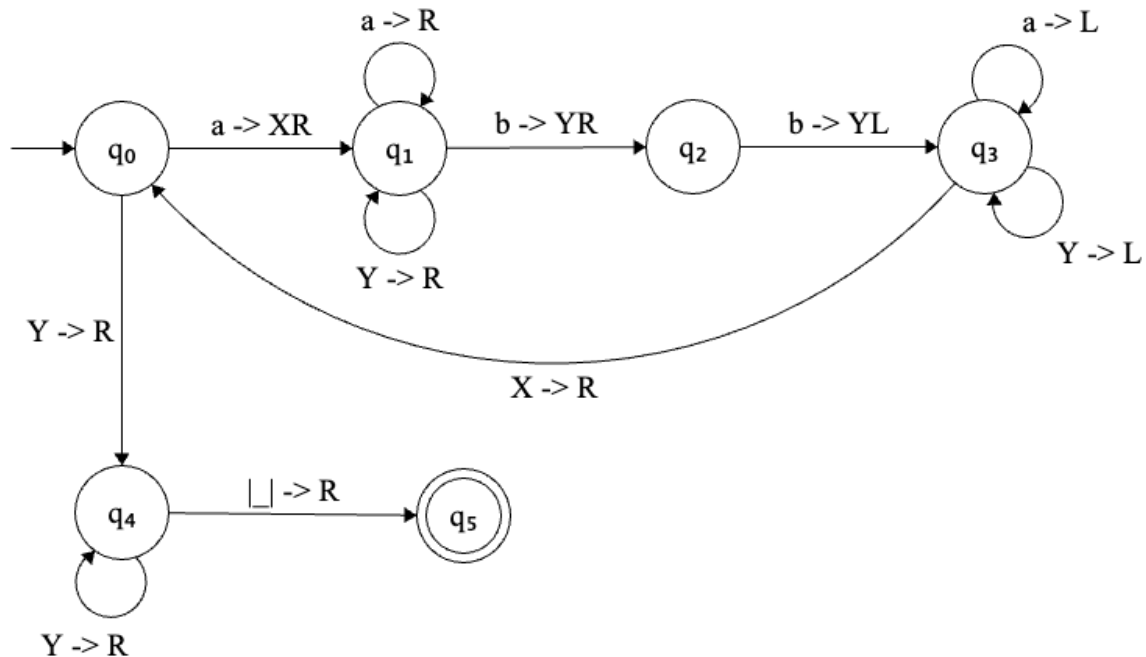
- What is the output of the following Turing Machine while the input is 1101. B represents blank.



- Input: **1101**
- Configurations:
 $q_0 1101 \rightarrow 1q_0 101 \rightarrow 11q_0 01 \rightarrow 110q_0 1 \rightarrow 1101q_0 B \rightarrow 110q_1 1 \rightarrow 11q_2 0B \rightarrow 1q_f 11$
- Output: **111**

- Find a Turing machine that accepts the following language.

$$L = \{a^n b^{2n} \mid n \geq 1\}$$



3. Find a Turing machine that computes the remainder of its input when divided by 3 while each number is represented by 1's.
 If the remainder is zero, output should be one zero on the tape.
 If the remainder is greater than zero, output should start with one zero followed by the remainder.

For example, an input tape containing the number 8:

Input: B1111111B (B represents blank)

executing should leave the number 2 on the tape, because 2 is the remainder of 8 when divided by 3. Output: 011

