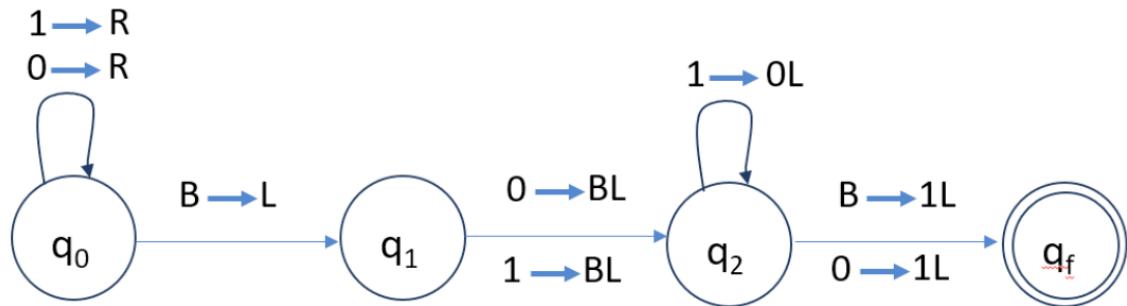


Name: Kishan Kumar Zalavadia

EUID: 11685261

Assignment-5

- 1) What is the output of the following Turing machine while the input is 1101.
B represents blank. (5 points)



Ans:

1) I/P: 1101

$q_0:$

1	1	0	1	—
---	---	---	---	---

$q_0:$

1	1	0	1	—
---	---	---	---	---

$q_0:$

1	1	0	1	—
---	---	---	---	---

$q_0:$

1	1	0	1	—
---	---	---	---	---

$q_0:$

1	1	0	1	—
---	---	---	---	---

$q_1:$

1	1	0	1	—
---	---	---	---	---

$q_2:$

1	1	0	—	—
---	---	---	---	---

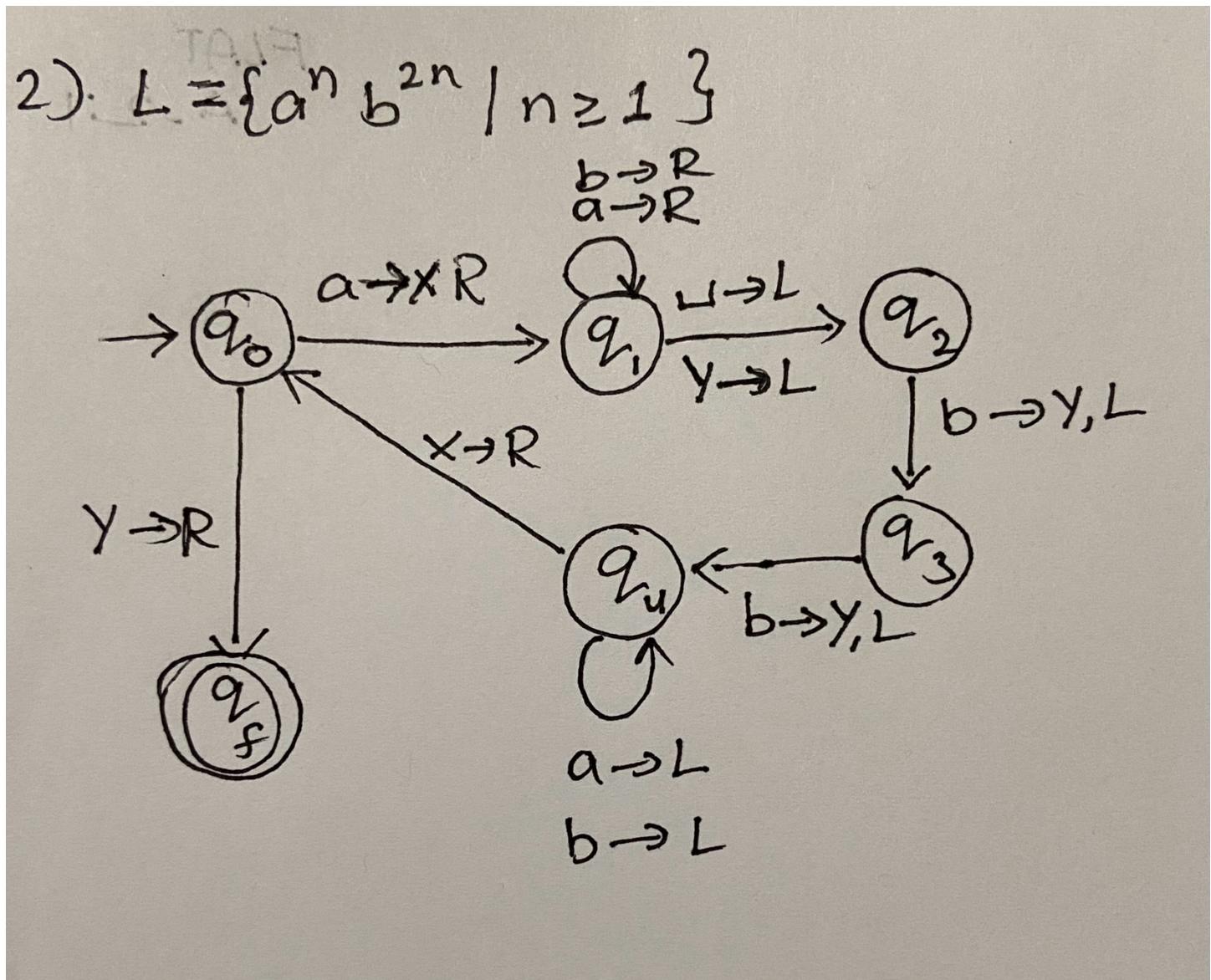
$q_3:$

1	1	—	—	—
---	---	---	---	---

2) Find a Turing machine that accept the following language. (15 points)

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

Ans:



- 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 following 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 (20 points)

Ans:

