PA-FAI-01 : Construct a Turing Machine.

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Q. Construct a Turing Machine for the language $L = \{0^n 1^n 2^n\}$ where $n \geq 1$.

Answer to include:

1. Algorithm
2. Representative Transition diagram
3. Initial Tape and final Tape
4. Similar to what you saw in slides 29 and 30.

Ans

Initial Tape

0	0	0	0	1	1	1	1	2	2	2	2	_

Step 1 : Initializing

Step 2 : Replace '0' by 'x'

Step 3 : If 0's to the right keep skipping until '1'.

Step 4 : Replace '1' by 'y'

Step 5 : If 1's to the right keep skipping until 2

Step 6 : Replace '2' by 'z'.

Step 7 : If 2's to the right continue skipping

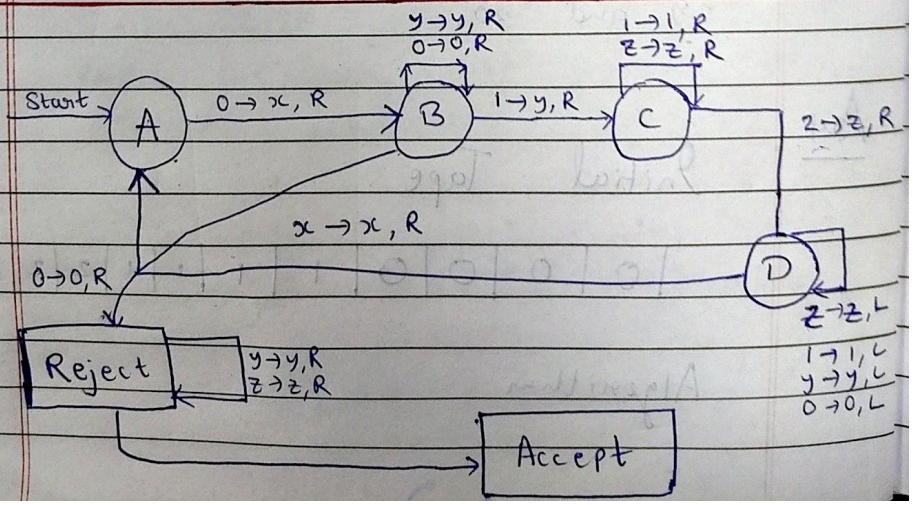
Step 8 : Move left until encounter zero.

Step 9 : Continue until all zeros replaced by 'x', 1's by 'y' and 2's by 'z'.

Step 10 : Validate if any 0, 1 or 2 in extra

If No - Accept

Yes - Reject.



Tape :-

Loop 1

Initial	0	0	0	0	1	1	1	1	2	2	2	2	_	_
Final	x	0	0	0	y	1	1	1	z	2	2	2	_	_

Loop 2

Initial	x	0	0	0	y	1	1	1	z	2	2	2	_	_
Final	x	x	0	0	y	y	1	1	z	z	2	2	_	_

Loop 3

Initial	x	x	0	0	y	y	1	1	z	z	2	2	_	_
Final	x	x	x	0	y	y	y	1	z	z	z	2	_	_

Loop 4

Initial	x	x	x	0	y	y	y	1	z	z	z	2	_	_
Final	x	x	x	x	y	y	y	y	z	z	z	z	_	_