

Quiz: Turing Machine

- Due May 4 at 11:59pm
- Points 85
- Questions 11
- Available Apr 28 at 8pm - May 6 at 11:59pm
- Time Limit None
- Allowed Attempts 2

This quiz was locked May 6 at 11:59pm.

Attempt History

	Attempt	Time	Score
KEPT	Attempt 2	27 minutes	83 out of 85
LATEST	Attempt 2	27 minutes	83 out of 85
	Attempt 1	88 minutes	68 out of 85

❗ Correct answers are no longer available.

Score for this attempt: 83 out of 85

Submitted May 4 at 11:46pm

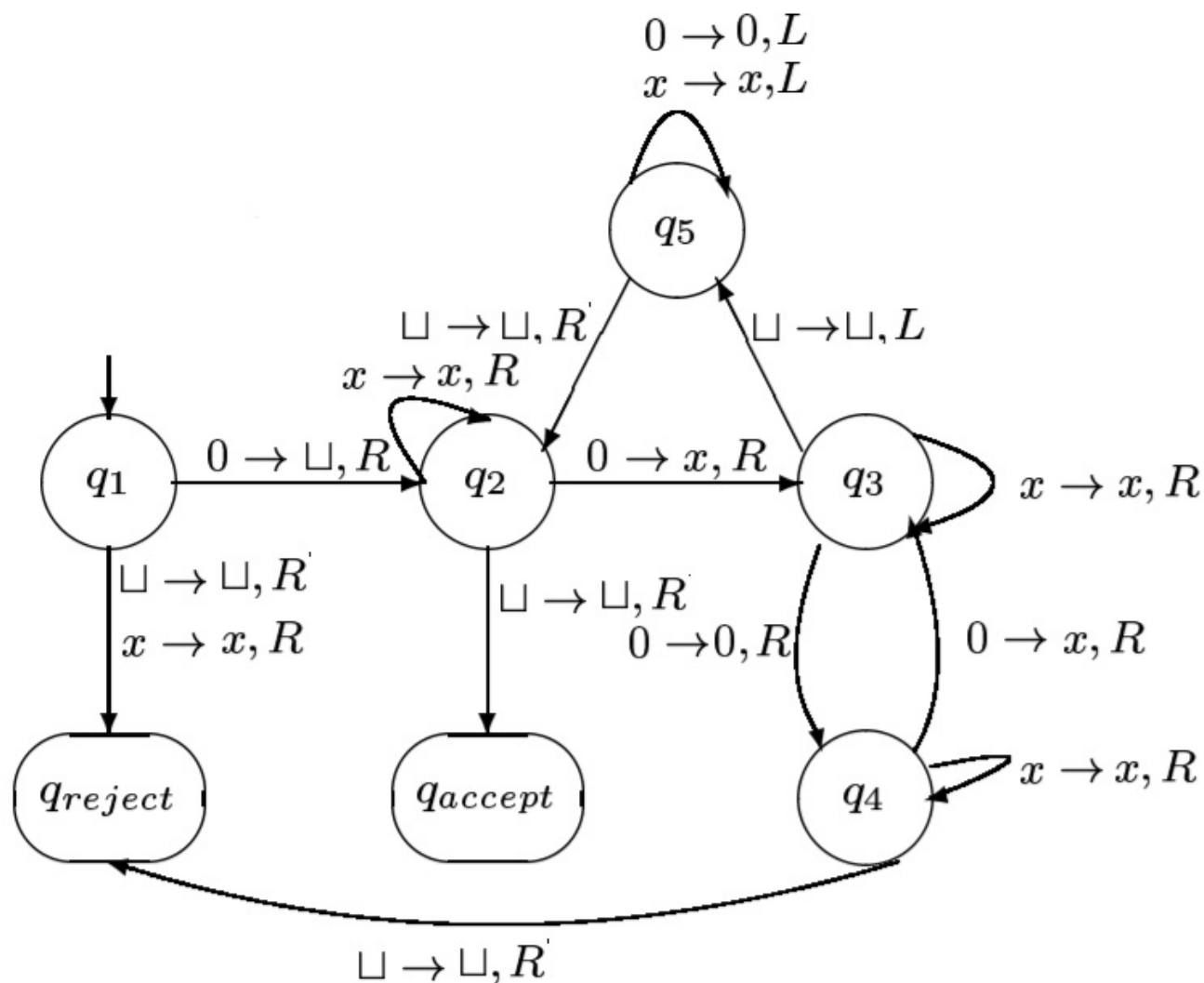
This attempt took 27 minutes.



Question 1

10 / 10 pts

The following Turing Machine is given:



Assume this input string has a length of 6 and is: "0X0XX0 ". Therefore we place this string in the tape from the leftmost cell. so the tape will look like this:

Tape: 0X0XX0BBBBB.... ("B" and "□" both mean "Blank" Symbol)

Assume that the Tape Head is above the leftmost cell of the tape when the TM is at the initial state q_1 .

What happens on the status of the Turing Machine with this string?

case 1: HALT and Accept (type in the blank Accept)

case 2: HALT and Reject (type in the blank Reject)

case 3: LOOP (type in the blank Loop)

What would be the new contents of the tape? (type only the 6 leftmost elements, use "B" for "Blank" Symbol):

Answer 1:

Reject

Answer 2:

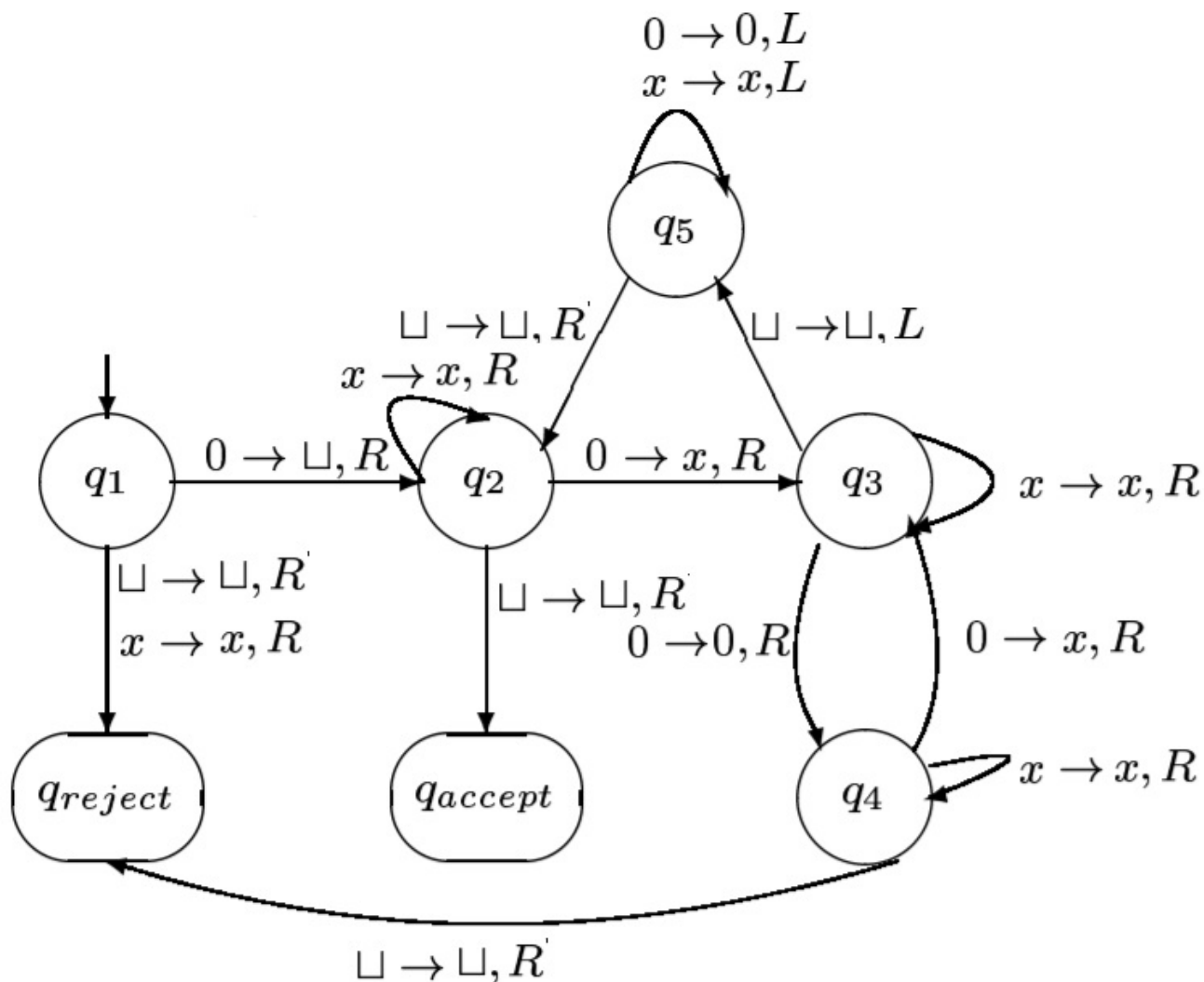
BXXXX0



Question 2

10 / 10 pts

The following Turing Machine is given:



Assume this input string has a length of 6 and is: "0X00XX". Therefore we place this

string in the tape from the leftmost cell. so the tape will look like this:

Tape: 0X00XXBBBBB.... ("B" and "□" both mean "Blank" Symbol)

Assume that the Tape Head is above the leftmost cell of the tape when the TM is at the initial state q1.

What happens on the status of the Turing Machine with this string?

case 1: HALT and Accept (type in the blank Accept)

case 2: HALT and Reject (type in the blank Reject)

case 3: LOOP (type in the blank Loop)

What would be the new contents of the tape? (type only the 6 leftmost elements, use "B" for "Blank" Symbol):

Answer 1:

Reject

Answer 2:

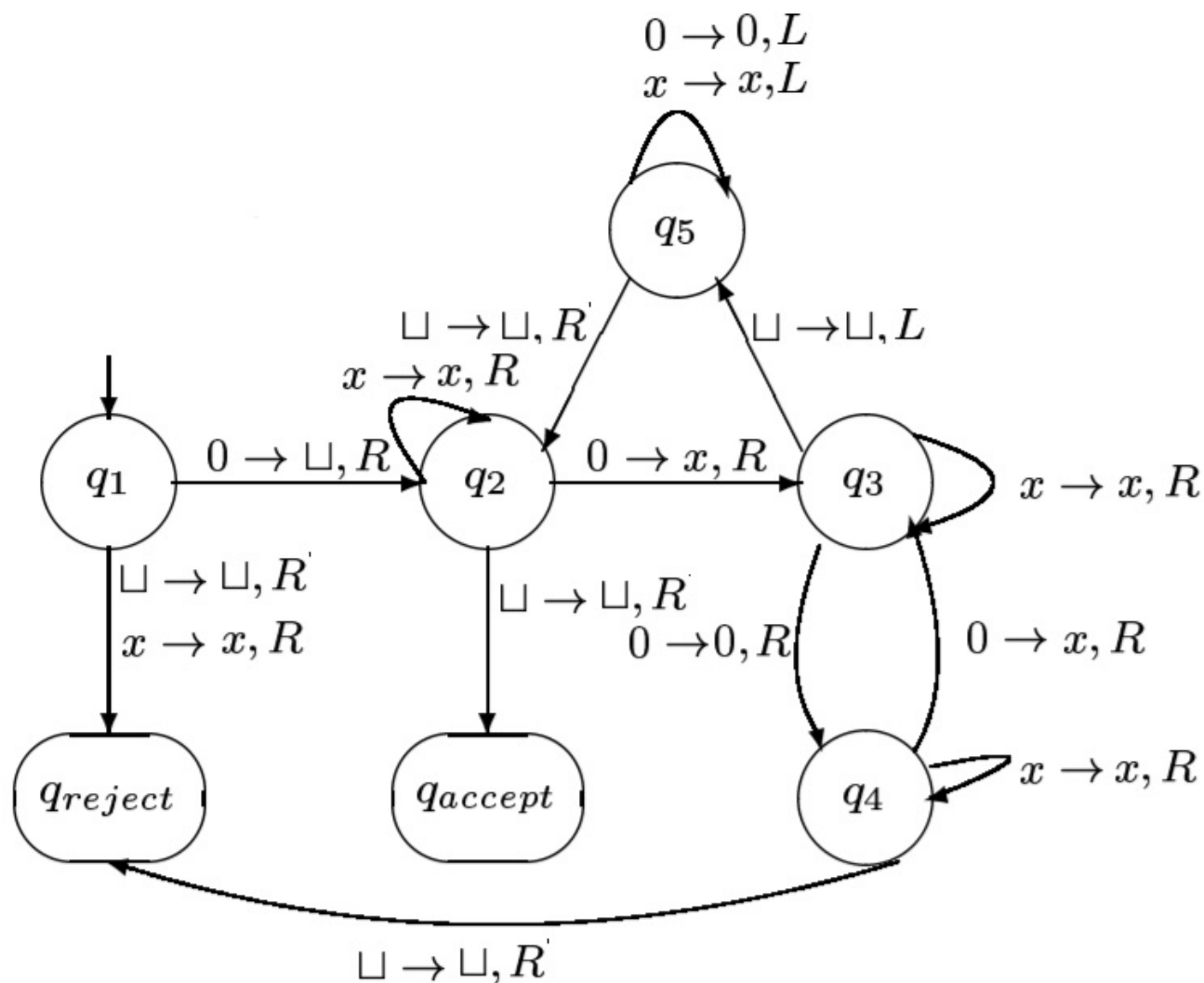
BXX0XX



Question 3

10 / 10 pts

The following Turing Machine is given:



Assume this input string has a length of 6 and is: "0XXXXX". Therefore we place this string in the tape from the leftmost cell. so the tape will look like this:

Tape: 0XXXXXBBBBB.... ("B" and "□" both mean "Blank" Symbol)

Assume that the Tape Head is above the leftmost cell of the tape when the TM is at the initial state q_1 .

What happens on the status of the Turing Machine with this string?

case 1: HALT and Accept (type in the blank Accept)

case 2: HALT and Reject (type in the blank Reject)

case 3: LOOP (type in the blank Loop)

What would be the new contents of the tape? (type only the 6 leftmost elements, use "B" for "Blank" Symbol):

Answer 1:

Accept

Answer 2:

BXXXXX



Question 4

10 / 10 pts

One of the transition functions in a Turing Machine (TM) is in this form:

$$\delta(Q,P) = (M,N,L)$$

After this transition, current state of the TM changes from to

, and the control unit scans from under the Head

Tape and updates under the Head Tape with , then the Head Tape

moves one cell to the .

Answer 1:

Q

Answer 2:

M

Answer 3:

P

Answer 4:

N

Answer 5:

left



PartialQuestion 5

8 / 10 pts

Select the correct statement(s)

☒ Decidable Languages are subsets of Recognizable Languages.

☐ Recursively Enumerable Languages are subsets of Recursive Languages.



If language L is a regular language, then it is also a Recursively Enumerable Language.



If a Turing Machine may sometimes stops and sometimes loop, then its language cannot be a Decidable Language.



If a Turing Machine's Tape has a right end and left end, then its language is a Context Sensitive Language.



A multitape Turing Machine has definitely more computational power than a single tape Turing Machine.



If you can solve a problem with a non-deterministic Turing Machine, then you can definitely find a deterministic Turing Machine to solve that problem.



Question 6

10 / 10 pts

The language that is associated to the Turing Machine that always HALT is what? (including its subset languages)

(Select all the apply)



Recursive Language



Recursive Enumerable Language



Context Free Language



Context Sensitive Language



(Turing) Decidable Language



(Turing) Recognizable Language



Partially Decidable Language



Regular Language



Question 7

5 / 5 pts

A language is regular if and only if it is:



recognized by Deterministic Finite Automaton (DFA).

- ☐ recognized by a Pushdown Automaton (PDA).
- ☐ recognized by a Linear Bounded Automaton (LBA).
- ☐ accepted by a Turing machine (TM).



Question 8

5 / 5 pts

Which statement is correct for the Turing-recognizable languages?

- ☐ Turing-recognizable languages are undecidable.
- ☒ Turing-recognizable languages decide yes if a string is in the Turing Machine's language.
- ☐ Turing-recognizable languages decide no if a string is not in the Turing Machine's language.



Turing-recognizable languages decide yes if a string is in the Turing Machine's language, and decide no if a string is not in the language.

- ☐ None are correct



Question 9

5 / 5 pts

Context-Free languages are closed under what operation?

- ☐ Complement
- ☒ Union
- ☐ Intersection
- ☐ Set Difference
- ☐ none of the above



Question 10

5 / 5 pts

If a language problem is undecidable then:

- ☐ No efficient algorithm exists to solve it
- ☒ No algorithm exists to solve it
- ☐ No Turing machine can be designed to accept strings in the language
- ☐ No Turing machine can be designed to reject strings not in the language
- ☐ All of the above



Question 11

5 / 5 pts

Regular expressions are closed under:

- ☐ Union
- ☐ Intersection

- ☐ Kleene Closure
- ☒ All of the above

Quiz Score: 83 out of 85