CS & IT ENGINEERING

Theory of Computation

Turing Machine

DPP 02 Discussion Notes

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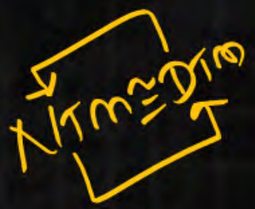
01 Question

02 Discussion

Q.1

Which of the following statement is correct?



[MCQ]

A. Every NTM (Non-deterministic Turing Machine) can be converted into DTM (Deterministic Turing Machine).

B. Every DTM (Deterministic Turing Machine) can be converted into NTM (Non-deterministic Turing Machine).

C. Both (a) and (b) ✓

D. None of these

Q.2 Which of the following statement is/are true regarding halting of turing machine? **[MSQ]**

A. If head of TM always move right, then TM never halts.

B. If head of TM always move left, then TM may halt.

C. If head of TM always move left, then TM never halts.

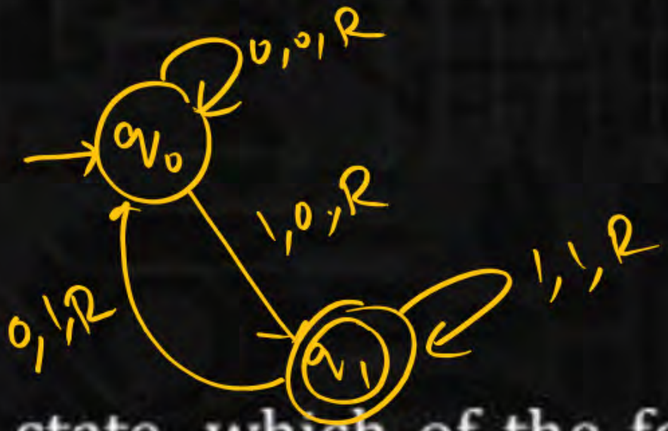
D. If head of TM moves in right and sometimes in left (loop), then also the never halts.

Q.3

Given transition table of turing machine is as follow:

[MCQ]

	0	1
→ q_0	q_0, 0, R	q_1, 0, R
q_1	q_0, 1, R	q_1, 1, R



If q_0 is initial state and q_1 is final state, which of the following language is accepted by given turing machine?

A. Set of all string ending with 1.

B. Set of all string ending with 11.

C. Set of all string starting with 0.

D. Set of all string starting with 10.

Q.4

Which of the following is/are true? [MSQ]

A. There exist no recursive enumerable language that is recursive language. ✗

- "not REL" and "Recursive"

B. If L is CFL, then complement of L may be CFL. ✓

C. There exist no recursive language that is not recursively enumerable. ✓

not recursive and not REL

D. If L is CFL, then complement of L may be CSL. ✓

Q.5 Which of the following has the same computational power as of turing machine? **[MSQ]**

A. PDA with additional 2 stack. $\cong$ TM

B. PDA with additional 1 stack. $\cong$ 2 stack PDA $\cong$ TM

C. FA with additional 1 counter.

D. FA with additional 2 counter. $\cong$ FA + 2 counters $\cong$ TM

$\cong$ FA + 4 counters $\cong$ TM

Q.6

Which of the following is a correct transition function of DTM?

[MCQ]

When

Q = Set of state

Σ = Input alphabet

Γ = Tape alphabet

F = Final state

δ = Transition function

A. $\delta : Q \times \Sigma \rightarrow Q \times \Gamma \times F$

B. $\delta : Q \times \Sigma \rightarrow Q \times \Sigma \times \{L, R\}$

C. $\delta : Q \times \Gamma \rightarrow Q \times \Gamma \times \{L, R\}$

D. $\delta : Q \times \Gamma \rightarrow Q \times \Sigma \times F$

Q.7

How many of the following languages are context sensitive language?

[NAT]

(i) $L = \{a^{n^2} \mid n \geq 0\}$

(ii) $L = \{a^n b^m c^n d^m \mid n, m \geq 0\}$

(iii) $L = \{a^n b^m c^m d^n e^f \mid n, m, f \geq 0\}$

(iv) $L = \{wx\, w^R \mid x, w \in (0, 1)^*\}$

(v) $L = \{a^n b^{n^2} \mid n \geq 0\}$

Q.8

[MCQ]

Consider the following turing machine:

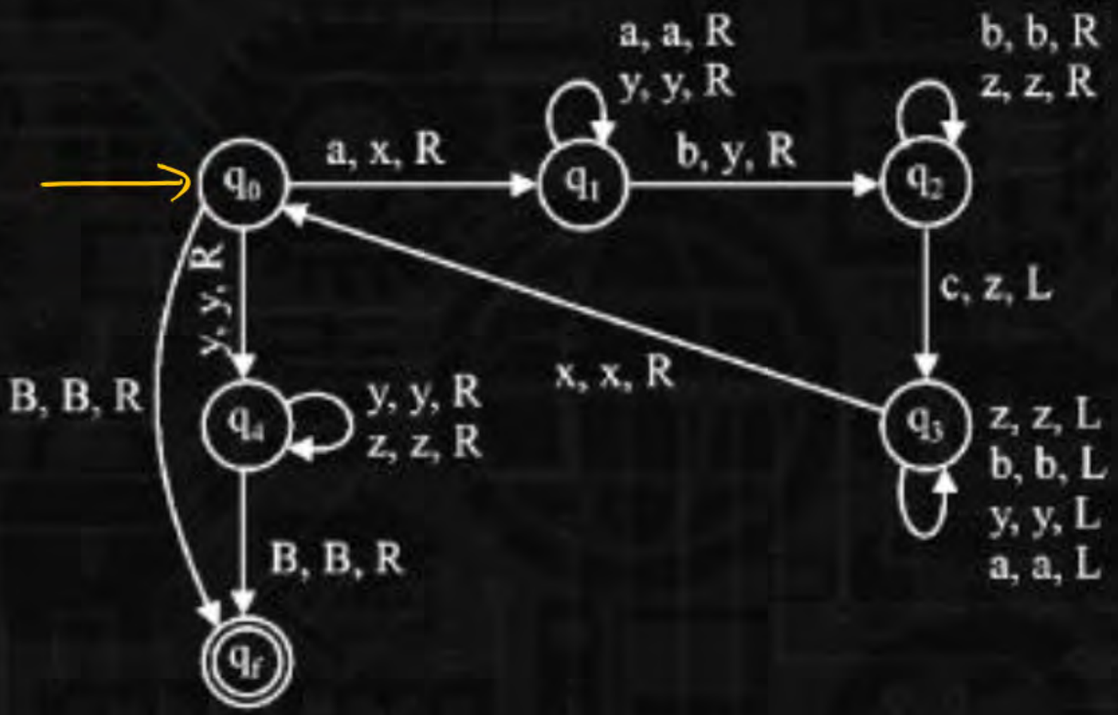
Which of the following language is accepted by given turing machine?

A. $\{L = \{a^m b^n c^p \mid m, n, p \geq 0\}$

B. $\{L = \{a^m b^n c^p \mid m, n \geq 0\}$

C. $\{L = \{a^m b^m c^m \mid m \geq 0\}$

D. $\{L = \{a^m b^{2m} c^{3m} \mid m \geq 0\}$




THANK YOU GW
SOLDIERS !