CS & IT ENGINEERING



Theory of Computation Turing Machine Recursively Enumerable

Turing Machine Recursively Enumerable

Turing Machine-2

DPP 02 Discussion Notes



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TOPICS TO BE COVERED

01 Question

02 Discussion



Which of the following statement is correct?





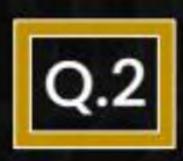
Every NTM (Non-deterministic Turing Machine) can be

converted into DTM (Deterministic Turing Machine).

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

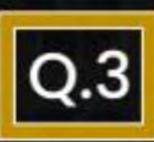
C. Both (a) and (b)

D. None of these

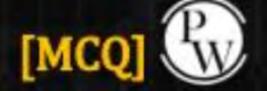


Which of the following statement is/are true regarding halting of turing machine?

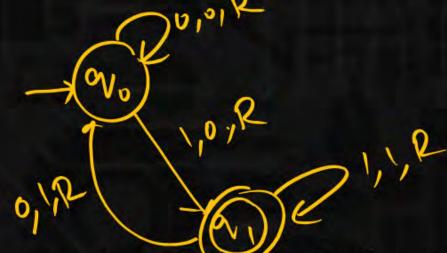
- A.
- If head of TM always move right, then TM never halts.
- В.
- If head of TM always move left, then TM may halt.
- G.
- If head of TM always move left, then TM never halts.
- D.
- If head of TM moves in right and sometimes in left (loop), then
- also the never halts.



Given transition table of turing machine is as follow:

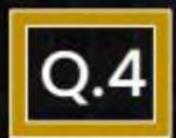


	0	1
$\rightarrow q_0$	q ₀ , 0, R	q1, 0, R
q_1	q ₀ , 1, R	q ₁ , 1, R



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.

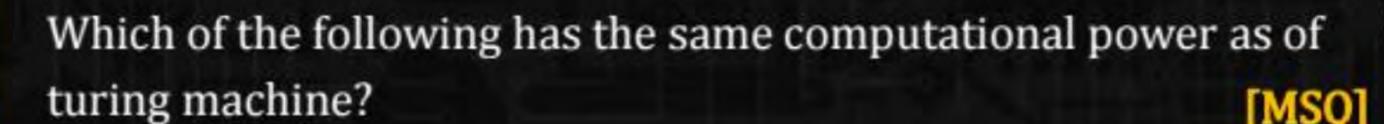


Which of the following is/are true?



- A. There exist no recursive enumerable language that is recursive language.
- B. If L is CFL, then complement of L may be CFL.
- There exist no recursive language that is not recursively enumerable.
- D. If L is CFL, then complement of L may be CSL.

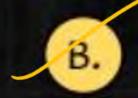








PDA with additional 2 stack.



PDA with additional 1 stack. = 2 Stack PDA 7100



FA with additional 1 counter.



FA with additional 2 counter. = FA + 2 (numbers = 1 m = FA + 4 (ounter) = 1 m

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



Q = Set of state

 Σ = Input alphabet

 Γ = Tape alphabet

F = Final state

 δ = Transition function

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

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

 $\delta: \mathbb{Q} \times \Gamma \to \mathbb{Q} \times \Gamma \times \{L, R\}$

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



How many of the following languages are context sensitive language?



[NAT]

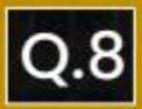
(i)
$$L = \{a^{n^2} \mid n \ge 0\}$$

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

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

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

(v)
$$L = \{a^n b^{n^2} | n \ge 0\}$$



Consider the following turing machine:



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

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

В.

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



$$\{L = \{a^m \ b^m \ c^m \ | \ m \ge 0\}$$

D.

$$\{L = \{a^m \ b^{2m} \ c^{3m} \ | \ m \ge 0\}$$

