
QUIZ 24

1. Which of the following **is** a property of recursively enumerable languages?

- (A) $\{\langle M \rangle \mid M \text{ accepts 312929 strings}\}$
- (B) $\{\langle M \rangle \mid M \text{ has 312929 states}\}$
- (C) $\{\langle M \rangle \mid M \text{ has 312929 symbols in the tape alphabet}\}$
- (D) $\{\langle M \rangle \mid M \text{ accepts a string in 312929 steps}\}$

Correct answer is (A).

2. Which of the following **is not** a property of recursively enumerable languages?

- (A) $\{\langle M \rangle \mid M \text{ accepts 0011}\}$
- (B) $\{\langle M \rangle \mid \mathbf{L}(M) \text{ is accepted by a TM with an even number of states}\}$
- (C) $\{\langle M \rangle \mid \forall w \in \mathbf{L}(M). M \text{ accepts } w \text{ in at most } |w|^2 \text{ steps}\}$
- (D) $\{\langle M \rangle \mid \exists M'. \mathbf{L}(M) = \mathbf{L}(M') \text{ and } \forall w \in \mathbf{L}(M'). M' \text{ accepts } w \text{ in at most } |w|^2 \text{ steps}\}$

Correct answer is (C).

3. Let $L = \{\langle M \rangle \mid M \text{ accepts at least 312929 strings}\}$. Which of the following is true?

- (A) L is decidable
- (B) L is not recursively enumerable
- (C) \bar{L} is decidable
- (D) \bar{L} is not recursively enumerable

Correct answer is (D).

4. Which of the following statements is a direct consequence of Rice's Theorem?

- (A) $A_{\text{TM}} = \{\langle M, w \rangle \mid M \text{ accepts } w\}$ is undecidable.
- (B) $\text{HALT} = \{\langle M, w \rangle \mid M \text{ halts on } w\}$ is undecidable.
- (C) $E_{\text{TM}} = \{\langle M \rangle \mid \mathbf{L}(M) = \emptyset\}$ is undecidable.
- (D) $\text{REGULAR} = \{\langle M \rangle \mid \mathbf{L}(M) \text{ is regular}\}$

Correct answer is (C).