
QUIZ 21

1. Suppose L is undecidable. Which is the strongest statement that necessarily follows?

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

Correct answer is (D).

2. Suppose L is unrecognizable. Which is the strongest statement that necessarily follows?

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

Correct answer is (C).

3. Let N be a non-deterministic Turing machine. Which of the following is necessarily true?

- (A) $\mathbf{L}(N)$ is decidable.
- (B) $\mathbf{L}(N)$ is undecidable.
- (C) $\mathbf{L}(N)$ is recursively enumerable.
- (D) $\mathbf{L}(N)$ is not recursively enumerable.

Correct answer is (C).

4. Just like Turing machines, we can encode DFAs by binary strings as well. For a DFA M , its binary encoding will be denoted by $\langle M \rangle$. Consider the language $L_d^{\text{DFA}} = \{\langle M \rangle \mid M \text{ is a DFA with input alphabet } \{0, 1\} \text{ and } \langle M \rangle \notin \mathbf{L}(M)\}$. Which of following is true?

- (A) L_d^{DFA} is regular.
- (B) L_d^{DFA} is not regular but is decidable.
- (C) L_d^{DFA} is not decidable but is recursively enumerable.
- (D) L_d^{DFA} is not recursively enumerable.

Correct answer is (B).