
QUIZ 20

1. Suppose M_1 and M_2 are two Turing machines such that $\mathbf{L}(M_1) = \mathbf{L}(M_2)$. Which of the following is necessarily true?

- (A) M_1 and M_2 halt on exactly the same inputs.
- (B) For any input x , if M_1 halts on x then M_2 halts on x .
- (C) For any input x , if M_1 does not halt on x then M_2 does not halt on x .
- (D) For any input x , if M_1 accepts x then M_2 halts on x .

Correct answer is (D).

2. Let M be a Turing machine such that $\mathbf{L}(M)$ is decidable. Which of the following is necessarily true?

- (A) M decides $\mathbf{L}(M)$.
- (B) M halts on all inputs.
- (C) M recognizes $\mathbf{L}(M)$.
- (D) M might not recognize $\mathbf{L}(M)$.

Correct answer is (C).

3. Let L be Turing-recognizable. Which of the following is necessarily true?

- (A) L is decidable.
- (B) \overline{L} is decidable.
- (C) L is not decidable.
- (D) Either \overline{L} is decidable or \overline{L} is not Turing-recognizable.

Correct answer is (D).

4. Let L be decidable. Which of the following is **not** necessarily true?

- (A) L is Turing-recognizable.
- (B) \overline{L} is decidable.
- (C) \overline{L} is Turing-recognizable.
- (D) \overline{L} is not Turing-recognizable.

Correct answer is (D).