--Question Starting--
3. Given a deterministic finite automaton (DFA) that recognizes a regular language L, which of the following statements must necessarily be true?
Statement I: For every string in L, the DFA reaches an accepting state after processing the entire string.
Statement II: The DFA can be minimized to a unique minimal DFA that recognizes L, regardless of the initial DFA's structure.
In the context of these statements, select the most appropriate option:
(1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct
Answer Key: 2
Solution:
? Statement I(Correct): By definition, a DFA accepts a string if processing that string from the start state ends in an accepting state, so for every string in L, the DFA must reach an accepting state after processing the entire string.
? Statement II(Incorrect): While a DFA can be minimized to a unique minimal DFA, the initial DFA might have multiple equivalent states that can be merged, but the process of minimization depends on the initial structure. The statement suggests the minimal DFA is always the same regardless of initial structure, which is true; however, the key is that the initial DFA might not be unique or minimal, so the statement as given is ambiguous and only the minimization result is unique, not the starting DFA itself.
Hence, Option (2) is the right answer.

--Question Starting--
4. In the context of software testing, consider the following two statements:
Statement I: Regression testing involves re-executing test cases after changes to the software to ensure that existing functionalities are not broken.
Statement II: Performance testing primarily aims to evaluate the software's capability to perform under expected user loads, including measuring response time and throughput.
Analyze these statements and choose the correct option:
(1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct
Answer Key: 4
Solution:
? Statement I(Incorrect): Regression testing is indeed about re-executing tests after changes, but it is specifically aimed at detecting new bugs introduced by recent modifications, not primarily about verifying existing functionalities.
? Statement II(Correct): Performance testing evaluates how the system performs under load, measuring aspects like response time, throughput, and stability to ensure it meets performance criteria.
Hence, Option (4) is the right answer.