[FE][T339] Development Technology

Among the diagrams used in UML 2.x, which of the following is the <u>diagram that can represent the interactions based on messages sent or received between objects</u>?

a) Component diagram

b) State machine diagram

c) Sequence diagram

d) Use case diagram

UML

The **Unified Modeling Language (UML)** is a general-purpose, development, modeling language in the field of software engineering that is intended to provide a standard way to visualize the design of a system.

UML is an important aspect involved in **object-oriented** software development. It uses graphic notation to create visual models of software systems.

Sequence Diagram

A **sequence diagram**, in the context of UML, represents object collaboration and is used to define **event sequences between objects** for a certain outcome.

Given here is an example of a sequence diagram of e-mail message sequence:
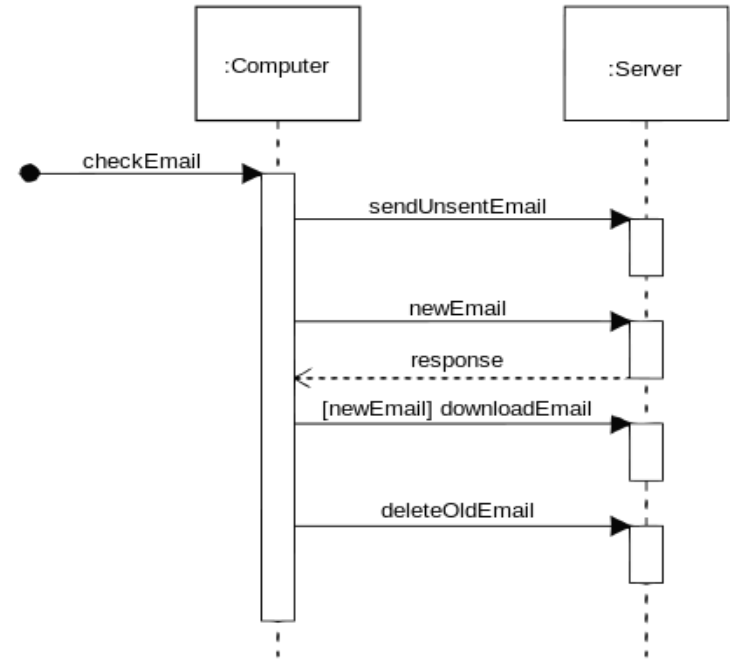
**Figure:** Sequence diagram of e-mail message sequence

Answer Explanation

Sequence diagrams describe interactions between objects in terms of an exchange of messages over time. More specifically, a **sequence diagram represents the interactions between objects based on messages sent or received between them**. A sequence diagram is a good way to visualize and validate various runtime scenarios. These can help to predict how a system will behave and to discover responsibilities an object may need to have in the process of modeling a new system.

Therefore, **c)** is the correct answer.
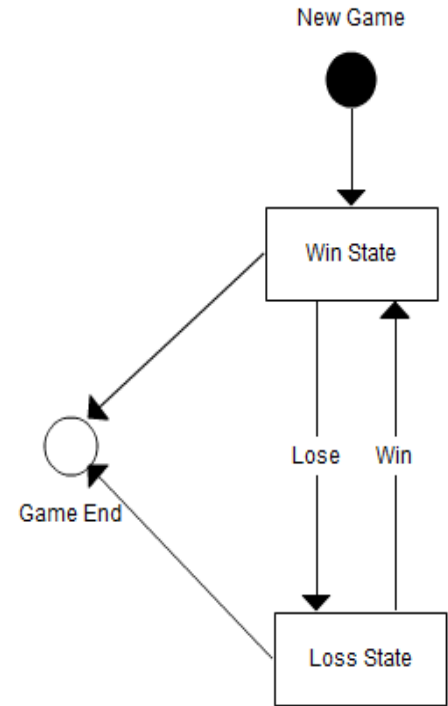
Explanation of Other Choices

a) **Component diagram** is a type of UML diagram that illustrates and defines the overall components that are part of a composite software system. This diagram defines the architectural structure of the entire system in terms of the components and how they are interconnected. Component diagrams are very important from implementation perspective.
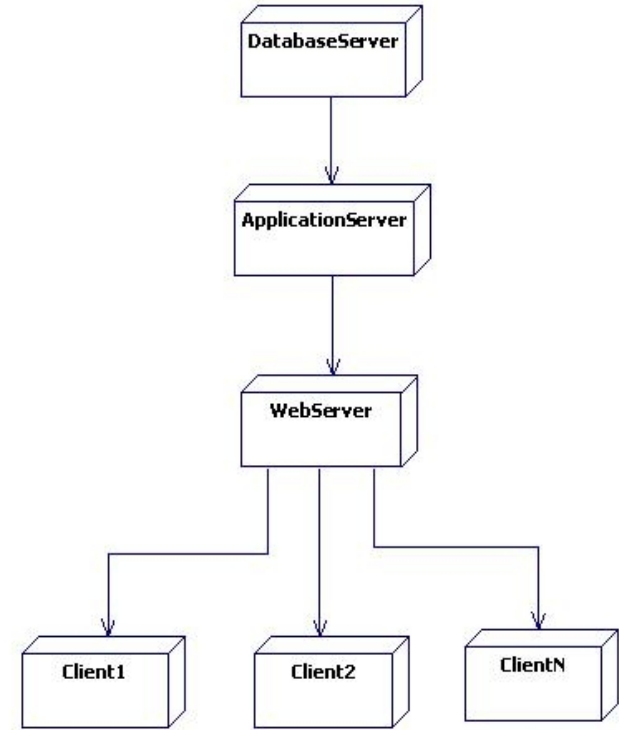
**Figure:** Component diagram for library management system

b) **State machine diagram** identifies states and transitions of an object as it proceeds its life cycle throughout the system. State machine diagrams (also called state diagrams) are a traditional object-oriented way to show behavior and to document how an object responds to events, including internal and external stimuli. This behavior is represented and analyzed in a series of events that occur in one or more possible states. Each diagram represents objects and tracks the various states of these objects throughout the system.

Figure: State machine diagram showing the basic states and actions

Explanation of Other Choices

d)   **Use case diagram** is a dynamic or behavior diagram in UML. Use case diagrams model the functionality of a system using actors and use cases. Use cases are a set of actions, services, and functions that the system needs to perform. In this context, a "system" is something being developed or operated, such as a website. The "actors" are people or entities operating under defined roles within the system.
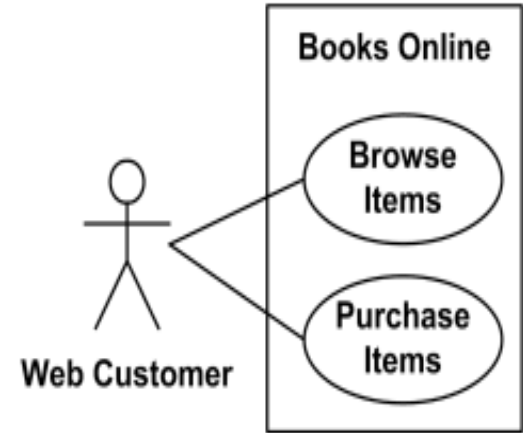
Figure: Use case diagram for online book store

Answer <c>