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ASSIGNMENT

Question No: 01

(20)

Choose a software architectural style of your choice and give its explanation that must cover the below given components of an architecture style:

- Elements/components**
- that perform functions required by a system**
- Connectors**
- that enable communication, coordination, and cooperation among elements**
- Constraints**
- that define how elements can be integrated to form the system**
- Attributes**
- that describe the advantages and disadvantages of the chosen structure**

ANSWER(1):

Blackboard Architecture Style:

In Blackboard Architecture Style, the data store is active and its clients are passive. Therefore the logical flow is

determined by the current data status in data store. It has a blackboard component, acting as a central data repository, and an internal representation is built and acted upon by different computational elements.

Further, a number of components that act independently on the common data structure are stored in the blackboard. In this style, the components interact only through the blackboard. The data store alerts the clients whenever there is a data-store changes. The current state of the solution is stored in the blackboard and processing is triggered by the state of the blackboard. When changes occur in the data, the system sends the notifications known as trigger and data to the clients. This approach is found in certain AI applications and complex applications, such as speech recognition, image recognition, security system, and business resource management system Inc.

●Elements/components:

1) Knowledge Sources (KS):

Knowledge Sources, also known as **Listeners** or **Subscribers** are distinct and independent units. They solve parts of a problem and aggregate partial results. Interaction among knowledge sources takes place

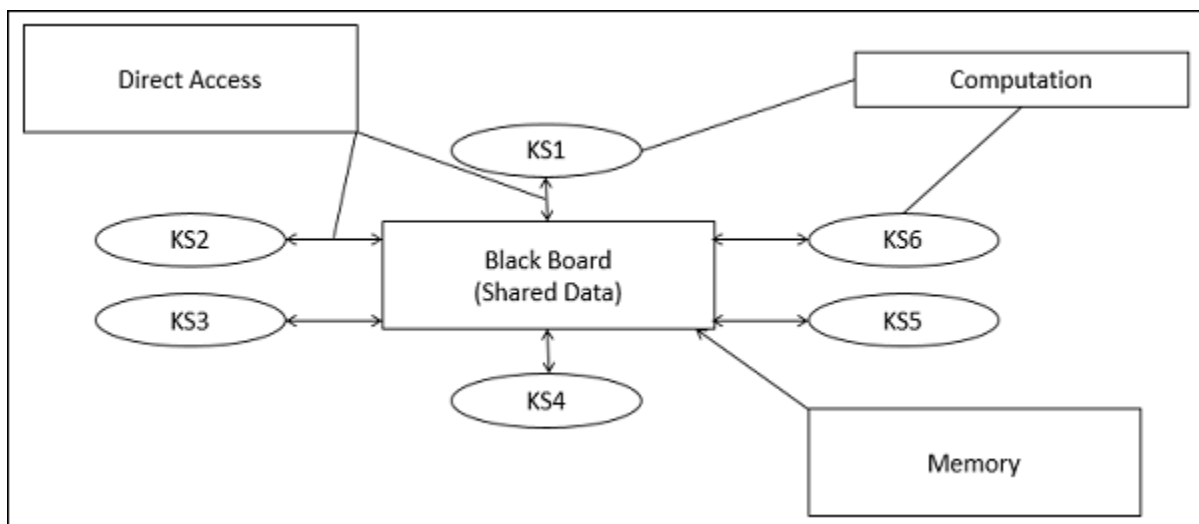
uniquely through the blackboard.

2) Blackboard Data Structure:

The problem-solving state data is organized into an application-dependent hierarchy. Knowledge sources make changes to the blackboard that lead incrementally to a solution to the problem.

3) Control:

Control manages tasks and checks the work state.



•Connectors And Constrains:

- A number of components that act independently on the common data structure are stored in the blackboard.

- In this style, the components interact only through the blackboard. The data-store alerts the clients whenever there is a data-store change.

- The current state of the solution is stored in the blackboard and processing is triggered by the state of the blackboard.

- The system sends notifications known as trigger and data to the clients when changes occur in the data.

- This approach is found in certain AI applications and complex applications, such as speech recognition, image recognition, security system, and business resource management systems etc.

- If the current state of the central data structure is the main trigger of selecting processes to execute, the repository can be a blackboard and this shared data source is an active agent.

- A major difference with traditional database systems is that the invocation of computational

elements in a blackboard architecture is triggered by the current state of the blackboard, and not by external inputs.

●Attributes:

ADVANTAGES:

- Provides scalability which provides easy to add or update knowledge source.
- Provides concurrency that allows all knowledge sources to work in parallel as they are independent of each other.
- Supports experimentation for hypotheses.
- Supports re usability of knowledge source agents.

DISADVANTAGES:

- The structure change of blackboard may have a significant impact on all of its agents as close dependency exists between blackboard and

knowledge source.

- It can be difficult to decide when to terminate the reasoning as only approximate solution is expected.
- Problems in synchronization of multiple agents.
- Major challenges in designing and testing of system.

THE END