ASSIGNMENT (1)

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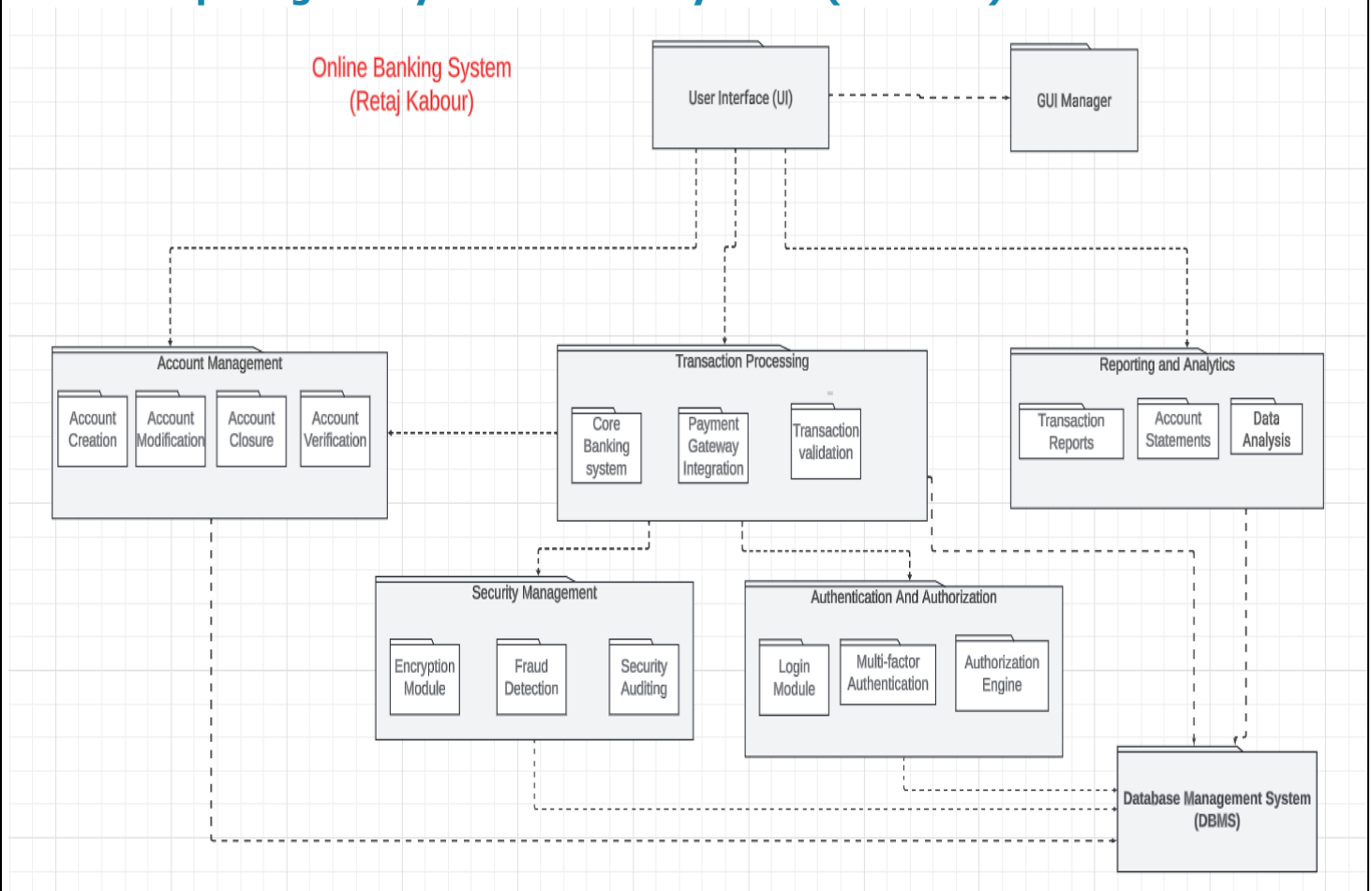**System Title**: online Banking System

What is the online banking system?

The Online Banking System refers to a digital platform that allows individuals and businesses to conduct financial transactions and manage their accounts over the internet. It provides users with the ability to access their bank accounts, check balances, transfer funds, pay bills, and perform various other banking activities through a secure online portal or mobile application.

The Problem Statement:

The existing online banking system grapples with various challenges hindering widespread adoption and optimal functionality. These issues encompass awareness, ease of use, safety and security concerns, cost implications, reluctance to shift from traditional methods, and disparities in access. Furthermore, efficiency and speed have declined, leading to prolonged loading times and transaction delays, negatively impacting customer satisfaction and trust.

Decomposing the System into subsystems (Modules):

Quality attributes Requirements for online banking system:

- **Availability:** Design the system to be available 24/7 to allow users to access their accounts and perform transactions at any time without significant downtime

- **Performance:**
  The system must provide fast response times for user interactions to ensure a smooth user experience.

- **Scalability:**
  The system should be able to scale horizontally or vertically to accommodate increasing numbers of users and growing transaction volumes.

- **Auditability and Traceability**
  The ability to track and audit user actions is essential for detecting and preventing fraudulent activities.

- **Usability**
  The system should be user-friendly and provide a positive user experience

- **Maintainability**
  The system should be ease of maintenance and updates.

- **Reliability:**
  Ensure the system operates consistently and reliably without unexpected failures.

Some quality attributes Scenarios:

Quality attribute scenario for (performance):
- **Stimulus:** Simultaneous login attempts by a large number of users within a short time frame.
- **Stimulus Source:** Users attempting to access the online banking system during a promotional event offering time-limited discounts or special offers.
- **Response:** The online banking system should handle the surge in login requests without significant degradation in performance.
- **Response Measure:** The system should maintain an average login response time of less than 3 seconds, even when the number of concurrent login attempts increases by 50% compared to normal usage.
- **Environment:** The online banking system is running on its regular servers and infrastructure, including web servers, application servers, and databases. The increased load is due to a specific event or promotional campaign.
- **Artifact:** Components involved in the login process, including authentication servers, database servers storing user credentials, and network infrastructure facilitating user requests.

Quality attribute scenario for the (Availability):
- **Stimulus:** A hardware failure affecting one of the data centers hosting the online banking system.
- **Stimulus Source:** Unexpected technical issues, such as a power outage or a hardware malfunction, impacting the primary data center.
- **Response:** The online banking system should seamlessly switch to a secondary data center to ensure uninterrupted service for users.
- **Response Measure:** The system should achieve a failover time of less than 5 seconds, ensuring that users experience minimal disruption in accessing their accounts and conducting transactions.
- **Environment:** The online banking system operates in a geographically distributed setup with redundant data centers. The primary data center experiences a hardware failure.
- **Artifact:** Components involved in the failover process, including load balancers, redundant servers, and a secondary data center.

Tactics could be used for (Availability) quality attribute:

- **Redundancy and Failover Mechanisms:**

Server Redundancy: Deploy multiple servers and distribute the load among them. In case one server fails, the others can handle the traffic. Data Center Redundancy: Use multiple geographically dispersed data centers to ensure that if one data center experiences issues, the system can failover to another.

- **Backup and Recovery:**

Regularly back up critical data and implement a robust disaster recovery plan. This ensures that in case of data loss or system failure, the system can be quickly restored to a functional state.

- **Fault Tolerance:**

Design the system to gracefully handle faults, errors, or unexpected issues without causing a complete system failure. This may involve implementing retry mechanisms or fallback options.

Tactics could be used for (Performance) quality attribute:

- **Load Balancing:**
  Distribute incoming network traffic across multiple servers to ensure that no single server is overwhelmed. Load balancing helps in maximizing resource utilization and minimizing response time.

- **Database Optimization:**
  Optimize database queries, indexes, and schema design to ensure efficient data retrieval and storage. Use connection pooling to manage database connections effectively.

- **Parallel Processing:**
  Break down complex tasks into smaller, independent subtasks that can be processed in parallel. This can enhance overall system throughput