RealHack 4.0
INTER UNIVERSITY HACKATHON

SYSTEM DESIGN QUESTION

Problem:
Design a hospital management system to more effectively manage hospital-related activities.

World is evolving fast with technology. The involvement of this technology with healthcare is one of the best achievements of mankind. In this combination, a hospital management system is now considered a tiny particle of a big storm. Even so, Sri Lanka as a country is still waiting for a proper hospital management system.
Effective management of patient information and medical records is critical for hospitals to ensure timely and accurate diagnoses and treatments. A hospital management system can automate numerous administrative tasks, provide real-time patient tracking and analysis, and reduce human error while improving productivity.

Scope of the system:

1. **Patient management:** The system will allow easy management of patient records, including demographic information, medical history, medications, and test results.
2. **Billing and Payment Processing:** The system will automate billing and payment processing, reducing errors while improving efficiency.
3. **Inventory Management:** The system will track and manage inventory, including medical supplies and equipment, to ensure that adequate supplies are always available.

General System design goals are mentioned below. Provide answers to the questions while following them as closely as possible whenever appropriate.

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Performance Criteria

- Response time: How quickly are patient updates reflected in the system?
- Throughput: How many patient updates can the system handle in a given period?
- Memory requirements: How much space is required to store the patient and medical data?

Dependability Criteria

- Robustness: How does the system handle invalid or incomplete patient data?
- Reliability: How often does the system experience downtime or errors?
- Availability: What percentage of the time is the system available for use?
- Fault tolerance entails how the system handles errors or unexpected events.
- Security: How does the system protect against unauthorized access or data breaches?
- Safety: How does the system ensure that patient information is not shared without authorization?

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Cost criteria

- Development cost: What are the costs associated with developing the system?
- Deployment cost: What are the costs associated with installing and training employees to use the system?
- Upgrade cost: What are the costs associated with upgrading the system as new technologies become available?
- Maintenance cost: What are the costs associated with maintaining and updating the system?
- Administration cost: What are the costs associated with running the system on a day-to-day basis?

Maintenance criteria

- Extensibility: How easy is it to add new features to the system?
- Modifiability: How easy is it to modify existing features in the system?
- Adaptability: How easy is it to adapt the system to new medical domains?
- Portability: How easy is it to port the system to a different cloud platform?
- Readability: How easy is it to understand the system's code?
- Traceability: How well does the system's code map to the original requirements?

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End-user criteria

- Utility: How well does the system support the end-user's needs for hospital management?
- Usability: How easy is the system to use for non-technical employees?
- Privacy and ethics (both highly important): How does the system protect the privacy of patient information and medical records?

Deliverables

1. Provide a High-level architecture diagram (HLD) for the system.
2. Write a brief report explaining the components of the HLD in the below format, including their purpose and how they interact with each other.
    a. Name
    b. Description
    c. Possible technologies that can be used, along with justification for the chosen technology.
    d. Clearly mention assumptions made during the design.