Experiment - 1

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Subject Name: System Design
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Aim:

To design and analyze a URL Shortener system by identifying its functional and non-functional requirements and representing the system design using a draw.io diagram.

Objectives:

To understand how a URL Shortener system operates in real-world applications.

To determine the functional requirements of the system.

To analyze non-functional requirements such as scalability and performance.

To create a high-level system architecture using draw.io.

To strengthen knowledge of practical system design concepts.

Procedure-

1. Studied the concept of URL Shortener systems used in real-world applications.
2. Identified the core functionalities required for URL shortening and redirection.
3. Listed the functional requirements such as short URL creation, custom URL support, expiration handling, and redirection.
4. Identified non-functional requirements including low latency and scalability.
5. Designed a structured system diagram using **draw.io**, representing the requirements clearly.
6. Reviewed the diagram to ensure clarity, correctness, and completeness.

Functional Requirements -

Generate a short URL from a given long URL.

Allow users to create custom short URLs.

Support default as well as user-defined expiration dates.

Redirect users from the short URL to the original URL.

Non-functional Requirements

Ensure low latency with response time under 200 milliseconds.

Scale efficiently to handle up to 100 million daily active users.

Support the shortening of up to 1 billion URLs.

Outcome / Result -

Successfully designed the URL Shortener system architecture using draw.io.

Clearly identified both functional and non-functional requirements.

Gained insights into real-world system design challenges related to performance and scalability.

Developed practical understanding of requirement analysis and system architecture design.

REQUIRED SYSTEM DESIGN -