**FINAL PROJECT REPORT**

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**PROJECT TITLE: URL SHORTENER SERVICE**

**INTRODUCTION:**

The URL Shortener Service is a RESTful web application built using Java and spring Boot. Its primary purpose is to convert long, complicated URLs into shortener and more manageable links. This application supports redirection to the original URL and provide basic analytics such as click tracking.

**ABSTRACT:**

In today’s digital landscape, lengthy URLs are often inconvenient for sharing and tracking. This project demonstrates how to build a scalable, database-backend URL shortener that uses a base62 hash to generate short codes for long URLs. A user can input a long URL, receive a shortened version, and then use that shortened URL for redirection. All data is persisted using an H2 in-memory database for simplicity.

**TOOLS USED:**

* Programming language: Java
* Framework: Spring Boot
* Database: H2
* IDE: VS Code
* API Documentation: Swagger UI
* Testing tool: Postman

**STEPS INVOLVED IN BUILDING THE PROJECT:**

**PROJECT SETUP:**  
Created a Spring Boot project with dependencies for Spring Web, Spring Data JPA, and H2 Database.

**ENTITY CREATION:**

Defined a URLMapping entity with fields for the original URL, short code, and click count.

**REPOSITORY LAYER:**

Created URLRepository to interact with the H2 database.

**SERVICE LOGIC:**

Implemented logic to generate base62 short codes and increments click counts on each redirection.

**REST API ENDPOINTS:**

“POST /api/shorten” - Accepts original URL and returns short URL.

“GET /api/{shortCode}” - Redirects to the original URL and logs clicks.

**SWAGGER INTEGRATION:**

Configured Swagger UI to document and test endpoints interactively.

**TESTING:**  
Verified API functionality using Postman.

Tested valid/invalid redirection and click tracking.

**CONCLUSION:**

The URL Shortener Services effectively showcases how to build a microservice using Spring Boot. It provides core features such as URL shortening, redirection, persistent storage, and click analytics. The project serves as a foundation for building more advanced systems, including user authentication, custom short codes, or analytics dashboards.