Student Project: URL Shortener

The task is to implement a service, which shortens a given “long” URL to a shorter one and redirects to the original “long” URL when a short URL is given.

# Mandatory Requirements

* The service contains at least 2 endpoints: shorten URL and redirect
* The service follows 3 layers architecture, has a controller, service layer and a repository to store and retrieve data in the database
* The database can be either MySQL, Mongo or Redis (in-memory db)
* The REST endpoints should accept json and return proper data with correct return codes
* The service should be implemented in Java/Spring Boot
* Endpoints in the controller and methods in the service layer must be covered by unit tests with Mockito in order to mock the next layer.

# Optional Requirements

* Consider adding a custom write-through cache to the service layer in order not to hit a database for each redirect request.
* Add a third endpoint for statistics, which shows all the long/short URL with an amount of redirects followed. The endpoint returns JSON with statistics data.
* Consider statistics collection in asynchronous mode and employing Kafka broker.
* Add a front end page, which allows to enter a long URL and receive a short one as well as a page for the statistics.
* Consider designing and executing a load test for the developed service (vegeta, or some other tool can be used)

# General recommendations

* The project should demonstrate basic system design skills to apply 3 layer architecture and Spring concepts like beans, DI, IoC, etc in practice.
* The outcome of the project is not only the running code but fully documented code on GitHb with README.md.
* While working with students on the project, facilitate a discussion on architecture, caching mechanisms (mfu, lfu caches), REST API design, performance.
* [This link gives](https://medium.com/hackernoon/url-shortening-service-in-java-spring-boot-and-redis-d2a0f8848a1d) a simplistic implementation, but fails in many needed aspects like proper definition of beans for the project as well as advanced functionality.