Homework for Backend Engineer

Task 1 [Coding]:

Build a URL shortener service with basic analytics.

- Define and clarify requirements along with technical specifications.

- Dockerize the application.

- Integrate GitHub Actions to perform linting and testing.

- Optional: Provide configurations for running on the Kubernetes cluster.

- Provide instructions to run and deploy the service to the README.md.

You can implement the service either Golang (with a framework of your choice) or Java with Spring Boot.

Task 2 [System architecture design]:

Design a system for selling products

Statement:

We are going to develop a commercial website for selling products where:

- Each product has a number of available items in stock.
- The system should be able to process at least N = 6000 concurrent requests for viewing or purchasing products.
- The system is only allowed to have at most S = 6 servers, where up to 3 servers can be used as relational databases.
- One relational database can serve at most C = 300 concurrent connections.

The system must: (main requirements)

- ensure data consistency, which means that there will be never such a case where the number of successful purchased items is more than the number of available items in stock.
- provide real-time feedback to its users with the lowest possible latency.

It will be good to: (bonus requirements)

- have the highest availability with no point of failure.
- be easily scalable in the future when the number of products and users increase.

Requirement:

- Design (draw) the high level architecture of the system.
- Describe what technologies you will use to develop the system.
- Explain in detail how the system works, and how it meets all the listed requirements.
- Note that you must design and analyze base on numbers (N, C, S) provided in the statement.