

UNIVERSITY OF **WATERLOO**



SE464 Assignment 3

Revised Fall 2023

Context

You work for JAMLKEA, a new company that sells furniture using their online shopping platform. Black Friday is coming up, and the company anticipates that user traffic to their website will greatly exceed the usual amount of traffic. As such, their infrastructure is unequipped to handle the load that Black Friday shoppers will bring. Using the knowledge you learned from the labs and lectures, you will design a real-world production-level online shopping application with the following requirements:

- The system should be able to handle a large (1M+) user base
- The system should not crash or slow down despite the high user load
- Users all around the world should not experience high latency to view available products
- The company does not want to overspend on infrastructure, so the system should not incur any extra unnecessary costs.

For this problem, do not focus on the payment system. You can just abstract this as a payment service. Focus on the web-system aspects—hint: for full marks, you will need to design a system with similar components to the web system you built in the labs.

Questions

1. Draw a system diagram of the system you are proposing.
2. For each piece of the system you included in your diagram, describe:
 - a. Its purpose / why you included it in the system
 - b. How its inclusion helps the system meet 1 or more of the requirements
3. Name 3 kinds of attacks that could affect your web system, describe them and suggest what you can implement in your system to prevent them.
4. What are some things you could do to remediate an issue with the system if something were to go wrong? For this, consider the scenarios when there is a security breach, and the system crashes.
5. Suppose that JAMLKEA now wants to add a service to their platform which allows users to receive notifications from a mobile app when a product is restocked.
 - a. Add the components to support this service to **a copy** of your system diagram.
 - b. Explain why you have chosen each of the specific components and denote their purpose.
6. **NOTE:** For this question, ignore the requirement and components you added to your system in question 5. Now suppose that your client is a startup. They do not have nearly as many users as JAMLKEA and they do not have a lot of money to spend on infrastructure. What aspects of the system you designed for JAMLKEA would you add / remove / replace to fit the requirements of the startup? Draw a system diagram to accompany your explanation.