

F24 Midterm 2

Sample Questions

Scenario

You work for an on-demand beverage delivery company called BobaFetch. Customers in the Doha area download the *BobaFetch* mobile app and use it to order bubble tea and other drinks from local cafes. They pay for their drinks on the app at order time. Once the beverages are prepared, they are home-delivered to customers by *droids*. The droids are clumsy but secure and are universally loved by locals. BobaFetch owns a fleet of droids that can be dispatched to cafes as orders are received and then routed to customers' homes.



- 3. BobaFetch is celebrating International Robot Day by offering free delivery for all orders, which is expected to increase order volume significantly. Your team is concerned about the system's reliability under this high load. What dynamic analysis technique could you use to evaluate the system's performance during this event, and how would you apply it to identify and address potential reliability issues?**

CI/CD and Cloud Computing:

- 1. BobaFetch's backend system coordinates orders, payments, and droid deliveries. The company wants to improve its continuous integration (CI) pipeline to ensure the system can handle growth and deliver reliable updates. How can BobaFetch leverage cloud computing to enhance its backend CI process? Your answer should include the role of virtualization or containerization in streamlining development, testing, and deployment.**

- 2. BobaFetch recently deployed an update to their backend system, which unexpectedly caused a storm of customer complaints about failed orders, disrupting droid deliveries and causing significant downtime. Based on the tools and techniques discussed in class, which tools would you recommend to your manager to prevent similar incidents in the future? Explain how these tools can help identify issues early, ensure smoother deployments,**

Software Quality

- 1. Your manager claims that achieving full coverage with unit tests for a given function is sufficient to ensure the code is bugs-free. Do you agree or disagree?**

- 2. The BobaFetch team is working on a user story to develop a droid routing algorithm that determines efficient delivery routes. Due to time constraints, the manager has proposed implementing a simplified version of the algorithm, stating that the company cannot afford to hire an optimization expert at this time. Using the technical debt metaphor, classify the type of debt this decision represents and assess the potential risks of implementing a simplified version. Propose a plan for managing this technical debt while ensuring the algorithm can evolve to meet future business and technical requirements.**

Software Engineering for ML

- 1. BobaFetch is developing a machine-learning model to allocate delivery droids to customer orders. The model will consider delivery location, order priority, and customer ratings to determine delivery times. However, some team members have raised concerns about potential fairness issues, such as specific neighborhoods consistently receiving slower deliveries or low-priority orders being overlooked entirely.**

How would you identify and measure potential fairness concerns in the model?

Open Source and Dependencies

BobaFetch utilizes an external, open-source computer vision package that assists the droids in determining where to place the packages.

- 1. Identify two risks associated with reliance on this external package and how to mitigate them.**

- 2. Evaluate the trade-offs of utilizing an open-source computer vision package for BobaFetch compared to a proprietary alternative.**

3. If BobaFetch is proprietary, what licenses must the open-source packages we use comply with?