Short Answer Questions

Q1: Explain how AI-driven code generation tools (e.g., GitHub Copilot) reduce development time. What are the limitations?

They reduce development time by auto-suggesting code snippets, completing function definitions and identifying common logic patterns, cutting down on repetitive tasks and boilerplate code.

Limitations:

- May generate inefficient code
- Sometimes lacks context awareness
- Could encourage over-reliance, reducing critical thinking

Q2: Compare supervised and unsupervised learning in the context of automated bug detection.

Supervised learning uses labeled bug data to train models that identify known patterns and predict similar bugs. It is effective but requires lots of labeled data.

Unsupervised learning identifies anomalies or clusters in code patterns that deviate from the norm, catching new or unknown bugs useful when labeled datasets are scarce.

Q3: Why is bias mitigation critical when using AI for user experience personalization?

Bias in AI can lead to exclusion or negative feedback loops. For example, over-promoting content to specific user type can reinforce stereotypes. Mitigation ensures fairness, avoids alienating users, and upholds ethical standards. Techniques include data balancing and fairness-aware personalization strategies.

Case Study Analysis

How does AlOps improve software deployment efficiency?

- It predicts potential build failures in advance and test cases optimized.
- It allocates resources dynamically according to need, maintaining constant performance and avoiding waste around infrastructure reducing reliance on human intervention and is faster to roll out giving the system greater robustness.
- With the capabilities of AI, security solutions constantly scan the code, automatically detect vulnerabilities an validate compliance standard regulations example Synk uses AI to detect open-source dependencies vulnerabilities and provides security recommendations.
- It predicts real-time analytics and enable proactive decision-making, reducing downtime and improving reliability.
- AlOps analyzes logs and metrics to flag potential issues before release.
- It improves deployment through automated rollbacks where AI can monitor deployment impact and trigger auto-reversion if anomalies appear example Netflix which uses AI to spot streaming anomalies in real time and redirect traffic.