

Software and Security Engineering: Supervision 2

Lectures covered by the supervision: <https://www.cl.cam.ac.uk/teaching/2526/SWSecEng/>

- Lecture 4: Quality Assurance & Reliable Delivery Or: How do we deliver a quality product?
- Lecture 5: Software Evolution Or: How do we keep everything working?
- Lecture 6: Software Engineering in the AI Era

Past exam questions:

<https://www.cl.cam.ac.uk/teaching/exams/pastpapers/t-SoftwareandSecurityEngineering.html>

Relevant examples: <https://www.cl.cam.ac.uk/teaching/2526/SWSecEng/examples.pdf>

Supervision questions:

1. Compare “merge” against “rebase” in Git with an example.
2. Explain different levels of testing (testing pyramid)
3. Explain, with examples, types of bugs that following coverage metrics cannot detect:
 - a. Full statement coverage
 - b. Full decision coverage
4. Explain the differences between DevOps and CI/CD.
5. A bank is launching a new mobile payment feature.
 - a. Contrast a Blue-Green deployment with a Canary deployment. Which is more appropriate for a high-risk database migration?
 - b. How do Feature Flags (Toggles) allow for "Progressive Delivery"?
 - c. Explain the concept of the Error Budget. If a team has exhausted their budget, how does this affect their deployment schedule?
 - d. Use Lehman's Laws to explain why the bank cannot simply "freeze" the code to save money.
6. What are the main challenges with extending legacy code? Can GenAI solve this problem?
7. Explain the difference between code smells and code anti-patterns.
8. Describe the "Chaos Monkey" philosophy. Why would an engineering team intentionally break their own production systems?
9. What is the “context gap” when using AI for software engineering? Explain the "Reasoning Ceiling" of LLMs. Why can't an AI currently replace a Senior Software Architect? Explain the concept of the Context Window.
10. Compare AI code analysis to static analysis for software engineering.
11. Compare AI code generation to compilers.
12. A developer uses AI to generate a function for parsing user-uploaded CSV files. The AI produces code that works but uses a library version with a known security vulnerability. Why did the AI do this, and whose responsibility is the bug?
13. Summarize the main message from lecture 4 in 1-3 sentences?
14. Summarize the main message from lecture 5 in 1-3 sentences?
15. Summarize the main message from lecture 6 in 1-3 sentences?

Bonus task:

1. For the previously established project, create a script that is able to trigger build process and that is able to run all the tests. If you are working in Java, I suggest to use Maven. If you are working in C++, I suggest CMake. If the tests are successful, the script should create a binary and “deploy” it in a folder. Provide a link to the script. Provide the link to the script and instructions how to download it and run it.

2. Create a GitHub page for your project: <https://docs.github.com/en/pages/quickstart>
Provide the link to the page.
3. Discuss quality requirements for your project.

Save your answers into MS Teams or email them to me. Please use the following naming pattern:

SASE_Supervision_2_Answers_<last name>_<first name>_Easter_2026

Send your answers as a pdf, doc, image, or any other format of a document for which there exists an easily available software to open.

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