Software Engineering
Design - 2025
Prof. Dr. Lokaiczyk

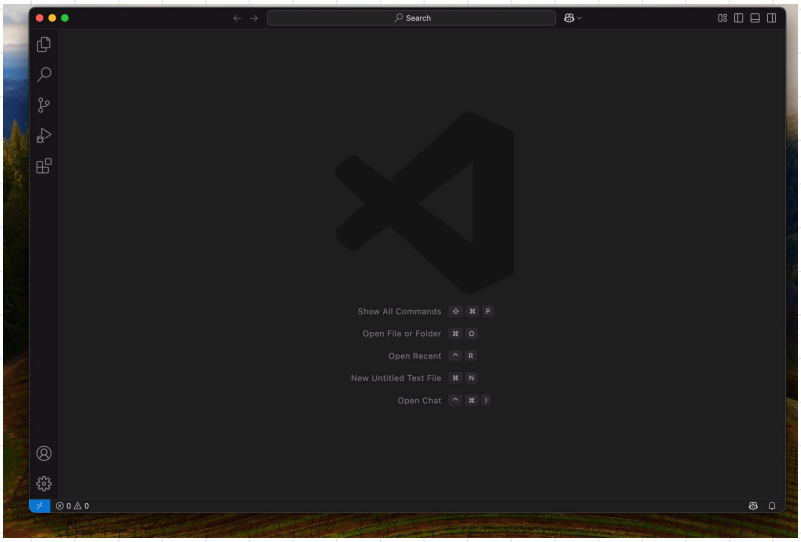
Exercise 1

Please prepare a written documentation for each task *before* the exercise date. Repeated failure to prepare the worksheet may result in not being admitted to the exam. You may also be asked to present your solution in class.

1. Please install an IDE (integrated development environment) of your choice on your computer and document this with a screenshot. Please name 10 advantages of an IDE compared to a simple text editor.
2. Prove that the Ulam function defined as
    1. Start with a positive integer n.
    2. If n is even, divide it by 2.
    3. If n is odd, multiply it by 3 and add 1.
    4. Repeat steps 2 and 3 with the resulting number.

    terminates with 1 for any given positive integer n<1M.
3. Create a github.com account and commit your software to a new repository.
4. Please install the MagicDraw UML Editor on your computer (see instructions in the CampUAS course) or any other UML/CASE tools of your choice that is compliant to the UML 2.0 standard or above. Document this with a screenshot.
5. Draw a UML class diagram for a class *developer* with at least 5 suitable attributes and 5 methods. Draw an object diagram with corresponding values for yourself. Implement this class in Java with integrity checks in the setter methods.
6. Define the term software design. Explain how this differs from software analysis.
7. Explain why a software design is necessary for a software project. Can you think of a project without this step? What could be the consequences?
8. Are the design activities of architectural design, database design, user interface design and component design independent or interdependent? Using an example, explain why.

A.1



1) **Debugger** – Helps find and fix bugs step by step.
2) **Syntax highlighting** – Uses colors to make code clearer.
3) **Project management** – Organizes all files in one place.
4) **Code navigation** – Jump to functions, classes, or files easily.
5) **Integrated terminal** – Run commands without switching windows.
6) **Version control tools** – Built-in Git support.
7) **Code templates** – Ready-to-use code snippets.
8) **Plugins and extensions** – Add more features as needed.
9) **Auto-completion** – Suggests code as you type.
10) **Live error checking** – Shows errors instantly.

A.3: