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AI: Internet Computing

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Exercise Sheet 2

Exercise 1 (Excursus): Requirements Engineering

You're a requirements engineer who is part of a project team that's developing an information system for online lectures and meetings. Define five to ten functional and non-functional requirements each. Please use the provided template for your requirements and focus on a clear and precise use of language: **[<Condition>] <Subject> <Action> <Objects> [<Restriction>]**.

Example:
After the door has been closed, the washing machine must start the washing process, if enough money was inserted.
[after door closed], washing machine, start, washing process, [enough money inserted]

Exercise 2: Quality Attributes

Quality attributes can be evaluated in a quantitative or qualitative manner; quality characteristics, however, encompass one or multiple quality attributes and can't be evaluated themselves. Take a look at the non-functional requirements defined in the previous exercise and derive multiple quality attributes (if necessary, add new non-functional requirements). If appropriate, map the quality attributes to quality characteristics.

Exercise 3: Basic Process Activities

In the book, we described six basic process activities that are found in all architecture design processes and life-cycle models, since these processes and models often deal with the same basic problems. Select an architecture design process or life-cycle model (e.g., Scrum, Waterfall Model, Unified Process, etc.) and analyze it with regard to the six basic process activities.

Exercise 4 (Excursus): Scanning Networks

Please install a network scanner. You can use a tool of your own choosing; Unix-like systems often have *nmap* preinstalled, you can also use the app Fing[1] (or WireShark, etc.).

a) Scan your home network. What kind of information do you see?

b) Now, also, try to scan for open ports. What kind of information do these convey?

c) What is a (network) service?

Exercise 5 (Excursus): Domain Name Service

Use the command-line tool *nslookup*[2] to perform DNS queries (e.g., *nslookup* kit.edu). What kind of results do you see? What happened in the background to fulfill your DNS query?

Exercise 6 (Excursus): IP Routing

The protocol data units transported in IP networks are called packets. In these networks, packets can take different paths, so-called routes, which are determined by routers. Now, we will take a look at these routes. Therefore, we'll utilize the preinstalled network diagnostic commands *traceroute* (for Un*x) and *tracert* (for Windows).

a) Try the command (e.g., *tracert* 129.13.40.10) and discuss the output.

b) Use different IP addresses as arguments for the commands (e.g., IP addresses from other countries) and describe how the output changes.

[1] See https://www.fing.com/products/fing-app

[2] The tool is preinstalled on most operation systems and can be accessed from the command line (on Windows, press the Windows button, type "cmd", and confirm with Enter.