PRIORITISATION TASK

Q1. Consider the given set of requirements (see Listing 1) for the AIS (Airline Information System):

Invoicing
- **Rinv1.** AIS should create an invoice for a booking.
- **Rinv2.** AIS should send a created invoice to the customer.
- **Rinv3.** Customer should pay the invoice using AIS.
- **Rinv4.** AIS should close a paid invoice.

Boarding
- **Rboa1.** AIS should create a boarding pass.
- **Rboa2.** AIS should register a boarded customer.

Booking
- **Rboo1.** AIS should allow the customer to book an available flight.
- **Rboo2.** Customer should query the airline company for available flights.
- **Rboo3.** Customer should choose the number of seats on the available flights.
- **Rboo4.** AIS should book an airline flight based on the booking info.

Listing 1: AIS requirements

Answer the following questions:
1. Which given requirements can be prioritized? Explain your answer.
2. Taking into account that cost of requirements implementation is given in Table 1, how these requirements can be prioritised using the AHP (cost/value) approach?

Table 1: Requirements cost

<table>
<thead>
<tr>
<th>Requirement ID</th>
<th>Cost (EUR)</th>
<th>Requirement ID</th>
<th>Cost (EUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rinv3</td>
<td>20</td>
<td>Rboa2</td>
<td>10</td>
</tr>
<tr>
<td>Rboo4</td>
<td>18</td>
<td>Rinv4</td>
<td>8</td>
</tr>
<tr>
<td>Rboa1</td>
<td>16</td>
<td>Rboo1</td>
<td>6</td>
</tr>
<tr>
<td>Rboo3</td>
<td>14</td>
<td>Rinv1</td>
<td>4</td>
</tr>
<tr>
<td>Rinv2</td>
<td>12</td>
<td>Rboo2</td>
<td>2</td>
</tr>
</tbody>
</table>

REQUIREMENTS MANAGEMENT
(multiple choice questions)

Q2. What are the major goals of requirements management?

- Identifying and eliciting requirements
- Managing requirements artefacts
- Observing system context
- Managing requirements activities

Q3. Ability to describe and follow the life of requirements in both forward and backward directions is called

- Requirements elicitation
- Requirements traceability
- Requirements specification
• Requirements prioritization

**Q4.** Configuration management should be performed at
• Document level
• Requirements artefact level
• Attribute level
• Atomic level

**Q5.** Selected configuration of requirements artefacts where requirements artefacts are stable and realized in a particular system release is called

• Baseline of requirements artefacts
• Configuration management level
• Prioritised requirements
• Requirements selected after changes

**REQUIREMENTS TRACEABILITY**

**Q6.** Define traceability model for
• the given traceability graph (see Fig. 1);
• the given traceability matrix (see Fig. 2);
• the given traceability graph (see Fig. 3);
• the requirements given in Fig. 4.

![Fig. 1. Traceability graph](image-url)
**Q7.** Use the traceability model (see Fig. 5) and define traceability relationships given in Listing 1.

**Q8.** For the driver assistance system (see Listing 2) define non-functional requirements regarding system performance, reliability, security, maintainability, and portability. The non-functional requirements must respect criteria for good requirements.
A driver assistance system includes a (sub-) system for avoiding rear-end collisions. This system comprises distance sensors, that permanently check the distance to the vehicle driving ahead in order to avoid an imminent rear-end collision. If the system detects that the distance falls below the safety distance yet is still outside the critical range, an acoustic warning signal sounds. Alternatively, a symbol or message maybe displayed on the driver display in the cockpit of the car. In the driver has not react to the warning after 2 s and the distance between two cars still decreases, the system reduces the speed of the car. If the distance (in meters) falls below one quarter of the driving speed (in km/h) at any time, the system initiates emergency breaking.

Listing 2: A Driver Assistance System

**Q9.** Correct the given non-functional requirements so that they would respect criteria for good requirements:

Q1: It should be easy for novice users to do tasks Q and R.
Q2: Novice users should perform tasks Q and R in a short time.
Q3: Experienced users complete tasks Q, R, and S quicker than novice users
Q4: Recording breakfast shall be easy using keyboard
Q6: Supplier’s hotline shall analyse almost all reports in a short period
Q7: When repairing a defect, a number of related non-repaired defects should be very low
Q8: Every program module must be assessed for maintainability according to organisation's standards OST-1.12.x. Majority of the modules have to be “High maintainable” (as defined in the standard) and none “poor” (as defined in the standard)
Q9: Development must use regression test allowing full re-testing in a short period
Q10: No method in any object may contain a lot of code lines

**GOAL MODELLING**

**Q10.** Meetings are organised by the Meeting initiator, who is using Meeting scheduler system to invite Meeting participants, to set meeting agenda and to find the suitable meeting date. Create a strategic dependency model (using the i* modelling language) to represent the given case. Please separate between

- Social viewpoint, and
- Technical viewpoint

**Q11.** Refine “Meeting be scheduled” goal to the goal hierarchy (containing at least 4 hierarchy levels and including at least 2 alternative refinements).

**SCENARIO MODELLING**

**Q12.** Create use case diagram for the driver assistance system given in Listing 2.

**Q13.** Select one use case from Fig. 6 and fill in the use case template (see Table 2). Documented scenarios must respect rules of scenario documentation.

**Q14.** Select one use case from Fig. 6 and UML sequence modelling language to visualize its scenario.
Q15. Refine requirement “If a glass break detector attached to the entrance door detects that the entrance door has been damaged, the system shall enter the alarm state and inform the security company” (see Fig. 7) to
- Data model using UML class diagrams
- Behavioral model using UML state diagrams
- Functional model using UML sequence diagrams

Your models must be consistent.

Elicit (and write down) at least four requirements and define traceability relationships between the models and the elicited requirements.
Q16. From the given glossary create system perspective models using UML class diagrams, sequence diagrams and state diagrams. Your models must be consistent. Elicit (and write down) at least four requirements and define traceability relationships between the models and the elicited requirements.

Table 3: System glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment System</td>
<td>Currently developed system and is the operational network that links bank accounts and provides for monetary exchange</td>
</tr>
<tr>
<td>Personal data</td>
<td>Any information that relates to an identified or identifiable living individual. In this scope, name, telephone number and addresses provided by the Customer.</td>
</tr>
<tr>
<td>Processed payments</td>
<td>The transactions that have been confirmed successful by the bank from customer to the e-shop</td>
</tr>
<tr>
<td>Product catalogue</td>
<td>A database of information about all the products that you have ready for launch on your website</td>
</tr>
<tr>
<td>Six Sigma</td>
<td>Is a set of techniques and tools for process improvement</td>
</tr>
<tr>
<td>Summary of the order</td>
<td>Every product that the Customer has chosen to buy is shown</td>
</tr>
<tr>
<td>Technical support</td>
<td>People, who have built the system and who can help with technical questions regarding the built System</td>
</tr>
<tr>
<td>Terms of sales</td>
<td>The obligations, risks, and costs of both the buyer and seller involving the delivery of good</td>
</tr>
<tr>
<td>Test environment</td>
<td>Consists of elements that support test execution with software, hardware and network configured</td>
</tr>
<tr>
<td>User</td>
<td>Someone who interacts with the System</td>
</tr>
<tr>
<td>Web Catalogue</td>
<td>Offers a search functionality, that allows easy, advanced browsing through a vast amount</td>
</tr>
</tbody>
</table>
<Imagine some samples from your workshop solutions, answer the following questions>

**Q17.** Is the given goal model / scenario / requirements model (including class diagram, state diagram, scenario diagram):
- Pragmatically correct;
- Syntactically correct;
- Semantically correct;
- Empirically correct?

If not – explain why.
If not – correct them.