Read the extract of the Zoo case (be used in Tasks 1-3):

The new Zoo has no software intensive system to manage and organize the Zoo work and to store information about the residents. The major goals to achieve are:

- New animals registered;
- Track of animals health indicators is up to date;
- Track of feeding rations and schedules is up to date;
- Track of the cleaning schedules is up to date;
- Information about animals (e.g. unusual behaviour) is recorded.

The major stakeholders are

- owner who would like to know all the information about the Zoo inhabitants but she has no other tasks to fulfil in or intention to use the information system.
- caretaker who can read data related to animals such as general data, health, feeding ration. She will be also able to work with schedules (e.g., for feeding, cleaning) and add other notes.
- veterinarian who can read, insert and update general and health information about animal, its feeding ration and schedule. He also can print generated reports.
- manager who can enter and update information about new specimens in the zoo, create cleaning schedules, print generated reports.

(adapted from some RE workshop solution)

Task 1: What type of interests have different Zoo system stakeholders? 

(5 points)

Task 2: How software intensive system can help to achieve the goals of the Zoo system? To support your answer, create a strategic dependency model (using the i* modelling language), where technical viewpoint of the given case is illustrated.

(10 points)

Task 3: Use KAOS modelling languages and refine goal “New animal registered” to the goal hierarchy (containing at least 4 hierarchy levels and including at least 2 alternative refinements). Your model should separate between requirements and expectations.

(10 points)

Task 4: These non-functional requirements (see below) are adapted from your requirements specifications. Do they correspond to the criteria for good requirements? If not, correct them.

NFR.1: The system should launch appropriate functions according to user timely input
NFR.2: The system should be available for almost 1h in a month
NFR.3: Time taken should be minimal for simple report preparation in most of the cases.
NFR.4: The system shall identify all users before allowing them to use some system capabilities.
NFR.5: System shall be accessible on Google Chrome, Firefox, Safari, Opera and Internet explorer and other browsers
NFR.6: Warning messages about entrance data out of defined standard ISO27001 must remain on the screen for 3 seconds
NFR.7: The system should be user oriented and have an automatic matching during information retrieval
NFR.8: A software developer with 1 or more years of experience must be able to fix any defect that occurs in the system within every 2 working days during the month.

(16 points)

Task 5: The ACS system requirements are classified to requirements features (see Fig. 1). The feature costs are calculated as sums of the requirements’ costs. Requirements costs are given in Table 1.

Taking into account that Customer Basics is a mandatory feature and others are optional, explain which two requirements’ features should be implemented in the next ACS release. Use value-cost (AHP) approach to reason about your answer.

(20 points)

![ACS features and requirements](image)

Fig. 1. ACS features and requirements

<table>
<thead>
<tr>
<th>ReqID</th>
<th>Cost (EUR)</th>
<th>ReqID</th>
<th>Cost (EUR)</th>
<th>ReqID</th>
<th>Cost (EUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB-FR-03</td>
<td>2</td>
<td>CE-FR-01</td>
<td>5</td>
<td>AE-FR-01</td>
<td>6</td>
</tr>
<tr>
<td>CB-FR-04</td>
<td>3</td>
<td>CE-FR-02</td>
<td>4</td>
<td>AE-FR-02</td>
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<td>CB-FR-05</td>
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<td>CE-FR-03</td>
<td>6</td>
<td>AI-FR-01</td>
<td>1</td>
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<tr>
<td>CB-FR-06</td>
<td>3</td>
<td>CS-FR-01</td>
<td>3</td>
<td>AI-FR-02</td>
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<td>CS-FR-03</td>
<td>4</td>
<td></td>
<td></td>
<td>AI-FR-04</td>
<td>9</td>
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</tbody>
</table>

Task 6: Analyse the extract of the requirements specification given in Table 2.

- Create the traceability model (where all eligible requirements artefacts and relationships among them are listed)
- Create a traceability graph (another visualisation of traceability), which would correspond to traceability relationships defined in Table 2.

(20 points)
Task 7: Analyse the extract of requirements specification given in Table 2. Refine requirement III-10 (and if within the scope, its sub-requirements) to models which express solution-oriented requirements:

- UML class diagram to capture data or conceptual viewpoint
- UML state diagram (one) to capture (some) behavioural viewpoint
- UML sequence diagram to capture functional viewpoint

(33 points)

Table 2. Extract of requirements specification (adapted from some RE workshop solution)

<table>
<thead>
<tr>
<th>ID:</th>
<th>III-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Functional requirement</td>
</tr>
<tr>
<td>Description:</td>
<td><strong>System should allow to document service acceptance between developer and customer</strong></td>
</tr>
<tr>
<td>Rationale:</td>
<td>It would be very comfortable and spare a lot of time if service acceptance could be arranged through the system electronically</td>
</tr>
<tr>
<td>Priority:</td>
<td>Medium</td>
</tr>
<tr>
<td>Traceability:</td>
<td>Based on → I-01, II-04, III-09</td>
</tr>
<tr>
<td>Related goals:</td>
<td>Satisfies → G123, G12, G1</td>
</tr>
<tr>
<td>Related use case:</td>
<td>Based on → UC3, UC4</td>
</tr>
</tbody>
</table>

**Sub-requirements**

<table>
<thead>
<tr>
<th>III-10-01</th>
<th>Developer should receive a notification when subcontractor has marked a claim solved</th>
</tr>
</thead>
<tbody>
<tr>
<td>III-10-02</td>
<td>Developer should be able to view files uploaded by the subcontractor</td>
</tr>
<tr>
<td>III-10-03</td>
<td>Developer should be able to add scanned version of hand-signed service acceptance act</td>
</tr>
<tr>
<td>III-10-04</td>
<td>Developer should be able to digitally sign the service acceptance act</td>
</tr>
<tr>
<td>III-10-05</td>
<td>Customer should be able to digitally sign service acceptance act in the WSS</td>
</tr>
</tbody>
</table>
Task 8. What are the major goals of requirements management?

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

(2 points)

Task 9. Ability to describe and follow the life of requirements in both forward and backward directions is called

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

(2 points)

Task 10. Configuration management should be performed at

- Requirements artefact level
- Atomic level
- Attribute level
- Document level

(2 points)