Read the extract of the AUTOservice case (be used in Tasks 1-2):

The new AUTOservice organisation has no software intensive system to manage and organize the AUTOservice work and to store information about the car to repair. The major goals to achieve are:

- New car to repair registered;
- Car repairing status is up to date;
- Maintaining tracking of repairing schedules;
- Information about car conditions (e.g., particular defects) is recorded.

The major stakeholders are

- owner who would like to know all the information about the cars to repair but she has no other tasks to fulfil in or intention to use the information system.
- technician who can read data related to the car such as general data, repairing status, particular defects. She will be also able to work with schedules (e.g., for repairing) and add other notes.
- manager who can enter and update information about new car to repair in the AUTOservice, create repairing schedules, print generated reports.

(adapted from some RE workshop solution)

**Task 1**: How software intensive system can help to achieve the goals of the AUTOservice 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 2**: Use KAOS modelling languages and refine goal “New car to repair 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)*

<end of AUTOservice scenario!>

**Task 3**: These requirements (see below) are adapted from your requirements specifications. Do they correspond to the criteria for good requirements? If not, correct them.

R.1: The system should launch appropriate functions according to user timely input.
R.2: The system should be available for almost 1h in a month.
R.3: Time taken should be minimal for simple report preparation in most of the cases.
R.4: The system shall identify all users before allowing them to use some system capabilities.
R.5: System shall be accessible on Google Chrome, Firefox, Safari, Opera and Internet explorer and other browsers.
R.6: Warning messages about entrance data out of defined standard ISO27001 must remain on the screen for 3 seconds.
R.7: The system should be user oriented and have an automatic matching during information retrieval.
R.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 4: The Correction information system (CIS) 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 Basic functions is a mandatory feature and others are optional, explain which two requirements’ features should be implemented in the next CIS release. Use value-cost (AHP) approach to reason about your answer.

(20 points)

Fig. 1. CIS features and requirements

Table 1: Requirements costs

<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>BF1</td>
<td>2</td>
<td>DF1</td>
<td>5</td>
<td>CF1</td>
<td>6</td>
</tr>
<tr>
<td>BF2</td>
<td>3</td>
<td>DF2</td>
<td>4</td>
<td>CF2</td>
<td>7</td>
</tr>
<tr>
<td>BF3</td>
<td>4</td>
<td>DF3</td>
<td>6</td>
<td>SF1</td>
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<tr>
<td>BF4</td>
<td>3</td>
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<td>3</td>
<td>SF2</td>
<td>2</td>
</tr>
<tr>
<td>BF5</td>
<td>2</td>
<td>RF2</td>
<td>3</td>
<td>SF3</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RF3</td>
<td>4</td>
<td>SF4</td>
<td>9</td>
</tr>
</tbody>
</table>

Task 5: Analyse the following requirement’s specification:

RequirementID: F5
Description: A user would be able to edit the created adventure using voice command
Depends on: F9, F10
Relationship: UseCase#3, Goal2, Goal2.2, Goal2.4
Sub-requirements: F5.1, F5.2, F5.3
Priority: High
Version: V2.2.F5.V1.2

- Create the traceability model (where all eligible requirements artefacts from this requirement and relationships among these artefacts are listed);
- Create a traceability graph (another visualization of traceability), which would correspond to traceability relationships defined in this requirement.

(20 points)

Task 6: Analyse the extract of requirements specification (use case “Book and appointment”) given in Table 2. Refine use case “Book an appointment” 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>UC.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Book an appointment</td>
</tr>
<tr>
<td>Created by</td>
<td>Katsiaryna L.</td>
</tr>
<tr>
<td>Scope</td>
<td>Hospital Information System (HIS)</td>
</tr>
<tr>
<td>Level</td>
<td>User goal</td>
</tr>
<tr>
<td>Primary actor</td>
<td>Patient</td>
</tr>
</tbody>
</table>
| Stakeholders and interests | Patient: Wants to visit a doctor.  
Hospital: Wants to get booking information from patient. |
| Preconditions | Patient has logged into the HIS. |
| Postconditions | Appointment is booked. |
| Main Flow | 1. Patient initiates an appointment booking process.  
2. HIS displays available hospital departments.  
3. Patient selects a department.  
4. HIS displays available doctors of the selected department.  
5. Patient selects a doctor.  
6. HIS displays available day options of the selected doctor.  
7. Patient selects a day option.  
8. HIS displays available time options of the selected day.  
9. Patient selects a time option.  
10. Patient submits a confirmation for booking.  
11. HIS creates the appointment.  
12. HIS reserves the day and time for the appointment in doctor schedule.  
13. HIS updates a hospital schedule.  
14. HIS displays a notification about a successful appointment booking.  
15. HIS sends the patient a confirmation via the email. |
| Alternative Flow | Patient books an appointment by contacting the hospital receptionist. |
| Exceptional Flow | 1-9. Patient cancels the appointment booking process. |
| Traceability | Satisfies: G01.1 |
| Version    | UC.01v.2       |
Task 7: Multiple choice questionnaire

(11 points)

A question might have several correct answers. Answer is answered correctly, if all correct answers are marked.

1. Which requirements engineering activity does help to achieve progress in the content dimension by detailing information about existing requirements?
   - Requirements elicitation
   - Requirements management
   - Requirements validation
   - Requirements specification

2. Which requirements artefacts do specify requirements at the required level of detail, the desired properties and features of the system to be developed?
   - Scenarios
   - Domain properties
   - Solution-oriented requirements
   - Goals

3. What are the major stakeholder interests?
   - Usage interests
   - Financial interests
   - Observational interests
   - Development interests

4. How are systems that are useful in the context of some human activities supported by the software, which is run on some hardware, called?
   - Software-intensive systems
   - Software systems
   - Computer systems
   - Information systems

5. What is the part of the system environment relevant for defining, understanding and interpreting the system requirements?
   - System boundary
   - Requirement engineering
   - Requirements specification
   - System context

6. What type of conflict does exist if stakeholders are wrongly or incompletely informed about the requirements?
   - Values conflict
   - Data conflict
7. During which activities requirements inconsistencies can be found?

- Requirements management
- Requirements validation
- Requirements elicitation
- Requirements documentation

8. What should be validated during requirements engineering?

- Execution of requirements activities
- Requirements activity outputs
- Requirements activity inputs
- Requirements competitors

9. During which activity does requirement engineer establish requirements traceability, prioritise requirements, and manage changes of requirements artefacts?

- Requirements representation
- Requirements validation
- Requirements management
- Requirements documentation

10. Which software system development lifecycle is primarily used to understand the requirements for the user interface, to examine feasibility of a proposed design approach and/or to explore system performance issues?

- Prototyping
- Spiral model
- V model
- Agile model

11. How are aspects which concern the operational or technical environment where the system is deployed, called?

- Usage facet
- Development facet
- Subject facet
- IT facet