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

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 fulfill 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:** What are the social relationships between the stakeholders of the AUTOservice system? To support your answer, create a strategic dependency model (using the i* modelling language), where social viewpoint of the given case is illustrated.

**Task 2:** Use KAOS modelling languages and refine goal “Information about car conditions (e.g., particular defects) is recorded” 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.

**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.

- **NFR.1:** The user will be notified by security alert or bell ring when user will do log in from another device.
- **NFR.2:** All data entered into the system in the last 48h must be fully logged and recoverable.
- **NFR.3:** Patient using the system must have an email and passwords.
- **NFR.4:** All the data in the database of the information system must be backed in cloud to avoid loss of patients’ data during any major crash to the system.
- **NFR.5:** Every booking submission & modification should be updated in Hotel’s common database within 10 seconds after each submission & modification activity.
- **NFR.6:** System should be able to display the most recent inquiry by the user in case of refreshment of page of the system after sudden connection lost for up to 10 minute period.
- **NFR.7:** It will be easier for the customer to order food, thus the system should increase the customer’s satisfaction.
NFR.8: The system should provide IT operational log management and security functions to track access and changes to the system.

(16 points)

Task 4: The correction information system (CIS) requirements are classified to requirements features (see Fig. 1). The feature values are calculated as sums of the requirements’ values. Requirements values 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)

Table 1: Requirements’ values

<table>
<thead>
<tr>
<th>ReqID</th>
<th>Value (EUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BF1. CIS should open document.</td>
<td>14</td>
</tr>
<tr>
<td>BF2. CIS should save document.</td>
<td>13</td>
</tr>
<tr>
<td>BF3. CIS should print document.</td>
<td>14</td>
</tr>
<tr>
<td>BF4. CIS should share document.</td>
<td>13</td>
</tr>
<tr>
<td>BF5. CIS should close document.</td>
<td>10</td>
</tr>
<tr>
<td>DF1. CIS should draw rectangle objects.</td>
<td>15</td>
</tr>
<tr>
<td>DF2. CIS should draw circle objects.</td>
<td>14</td>
</tr>
<tr>
<td>DF3. CIS should have colour pallet.</td>
<td>19</td>
</tr>
<tr>
<td>RF1. CIS should open review window.</td>
<td>13</td>
</tr>
<tr>
<td>RF2. CIS should mark commented text.</td>
<td>13</td>
</tr>
<tr>
<td>RF3. CIS should save comment text.</td>
<td>14</td>
</tr>
<tr>
<td>CF1. CIS should copy document’s text.</td>
<td>16</td>
</tr>
<tr>
<td>CF2. CIS should paste document’s text</td>
<td>17</td>
</tr>
<tr>
<td>SF1. CIS should place digital signature.</td>
<td>11</td>
</tr>
<tr>
<td>SF2. CIS should place biometric signature.</td>
<td>12</td>
</tr>
<tr>
<td>SF3. CIS should place encrypted text signature.</td>
<td>18</td>
</tr>
<tr>
<td>SF4. CIS should support double signing option.</td>
<td>19</td>
</tr>
</tbody>
</table>

Fig. 1. CIS features and requirements
Task 5: Analyse the following requirement’s specification given Table 2:

Table 2: Extract of the Food ordering system (based on your workshop solutions)

<table>
<thead>
<tr>
<th>Requirements ID#: Req.5</th>
<th>Requirement type: functional</th>
<th>Based on use case ID: UC#2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description: <strong>User should be able to fill in contact information during registration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Originator: <strong>Vello</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assumption: <strong>The data (E-mail, Full Name, Phone number) is stored on mobile and sent to server when an order is placed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer satisfaction: 4</td>
<td>Customer dissatisfaction: 5</td>
<td></td>
</tr>
<tr>
<td>Priority: <strong>High</strong></td>
<td>Conflicts: Req.7</td>
<td></td>
</tr>
<tr>
<td>Refines: Goal#1, Goal#5, Goal#3,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Realised in: CDia5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subrequirements: Req.5.1, Req.5.2, Req.5.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History: <strong>Created 13.10.2018</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Modified 06.12.2018 - edited description</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Version: v3.0.req5.v3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 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 given in Table 2. Refine requirement Req.5 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)
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. How is the development of cost effective solutions to practical problems through the application of scientific knowledge, called?
   - Live-cycle
   - Building
   - Engineering
   - Application

2. What are things in the application domain that are true or not when we ever build the proposed systems?
   - Requirements
   - Specification
   - Domain properties
   - Assumptions and expectations

3. How are aspects which concern the operational or technical environment where the system is deployed, called?
   - Subject facet
   - Usage facet
   - Development facet
   - IT system facet

4. Is elicitation difficult because of the existing bias?
   - Yes
   - No
   - Yes, and also because of the thin spread of knowledge and tacit knowledge
   - No, it is difficult because of the thin spread of knowledge and tacit knowledge

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

6. What are the major stakeholder interests?
   - Financial interests
   - Observational interests
   - Development interests
   - Usage interests
7. Which elicitation techniques are used for summarization and feedback, i.e., to conclude on a set of the requirements, to discuss the results of the information gathering, etc.

- Meetings
- Interviews
- Groups elicitation techniques
- Joint/rapid application development

8. What concerns should be included in requirement specification (document)?

- Functionality
- Performance
- Attributes
- Design constraints imposed on and implementation

9. What are the major goals of requirements management?

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

10. During which activities requirements inconsistencies can be found?

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

11. Which requirements negotiation activity might include decision (by authority) making?

- Conflict identification
- Conflict analysis
- Conflict resolution
- Conflict documentation