IREB Exam

Certified Professional for Requirements Engineering

Advanced Level Requirements Modeling

- Practitioner -

Multiple-choice practice exam

Exam paper:	**Set _Public_DE_v3.0.0**
Syllabus:	**Version 3.0**

Explanation of the practice examination:

This practice examination is an example of a real IREB Requirements Engineering Advanced Level Requirements Modeling examination and provides the opportunity to simulate an examination situation as part of examination preparation.

This practice examination is based on real examinations in terms of form, structure, and style. The main difference is that this practice examination comprises only 18 questions, while real examinations comprise approximately 19 questions. Therefore, to simulate realistic examination conditions, you should complete this examination in approximately 1 hour. For a real examination with approximately 19 questions, 75 minutes are allowed. For more information on the examination, see the examination regulations for the CPRE Advanced Level at http://www.ireb.org/.

If you want to practice an examination under realistic conditions, print out this practice examination and work through it in 1 hour without any aids such as seminar material or books. Make sure that you can work uninterrupted as far as possible in this time.

To pass the examination, you have to achieve 70.00% of the points, i.e., here, 20.3 out of a possible 29 points.

Evaluation of the results:

The document "Answers to the Practice Examination" contains the correct answers to the examination questions. To determine the number of points you have achieved, you have to apply the rules for evaluating the answers as given in the document "Examination Regulations 'Certified Professional for Requirements Engineering' Foundation Level", and there the section "Three Types of Questions" (available at http://www.ireb.org/).

Use the Excel file "Correction Aid for the Practice Exam" to record your answers. The total number of points achieved and the information about whether you have passed the examination are output automatically.

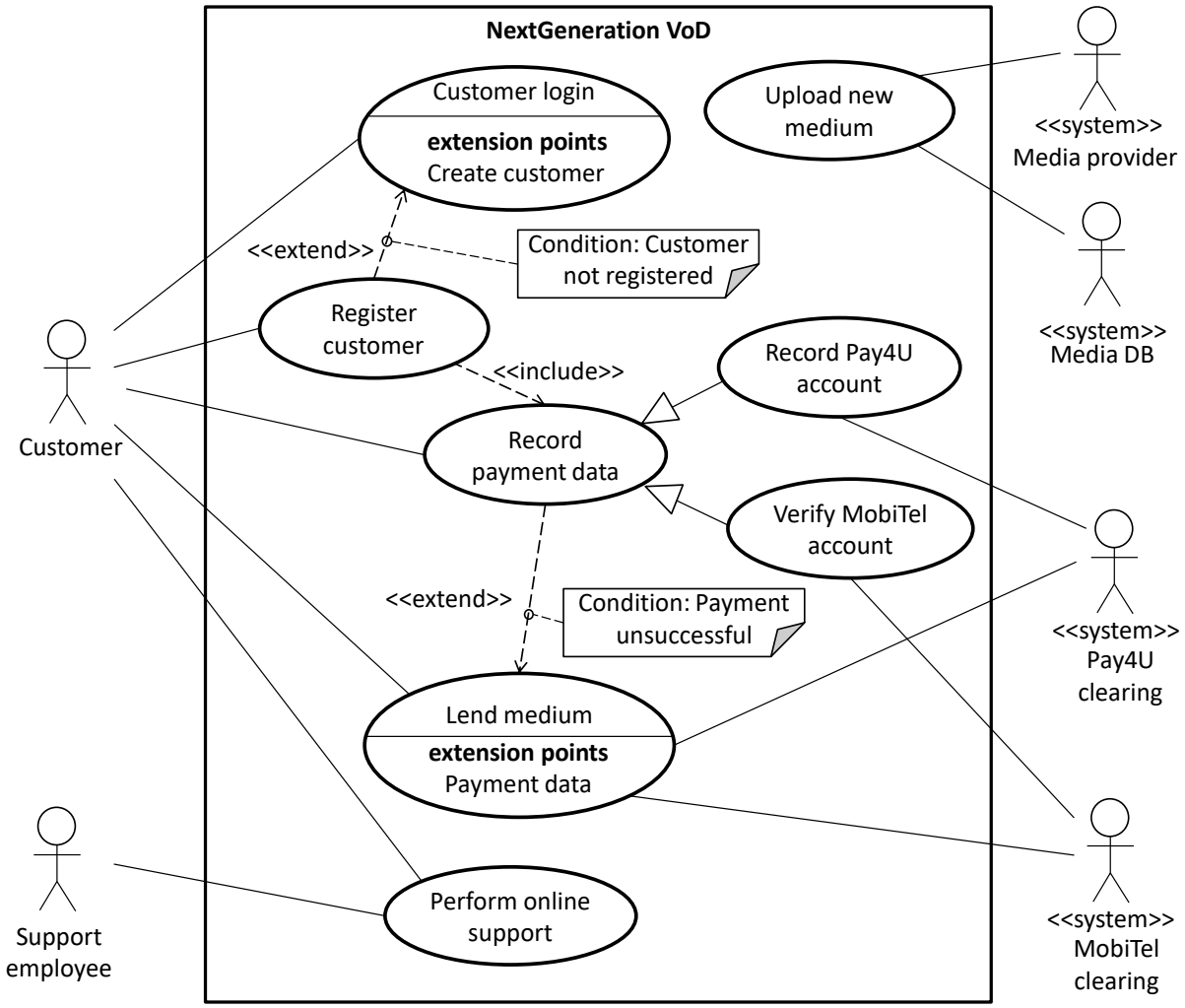
Terms of use:

0. Mini-Cases

This section contains mini-cases which form the basis for the questions in the respective question blocks. When answering the questions, make sure you are answering them based on the correct respective mini-case!

Mini-Case 1

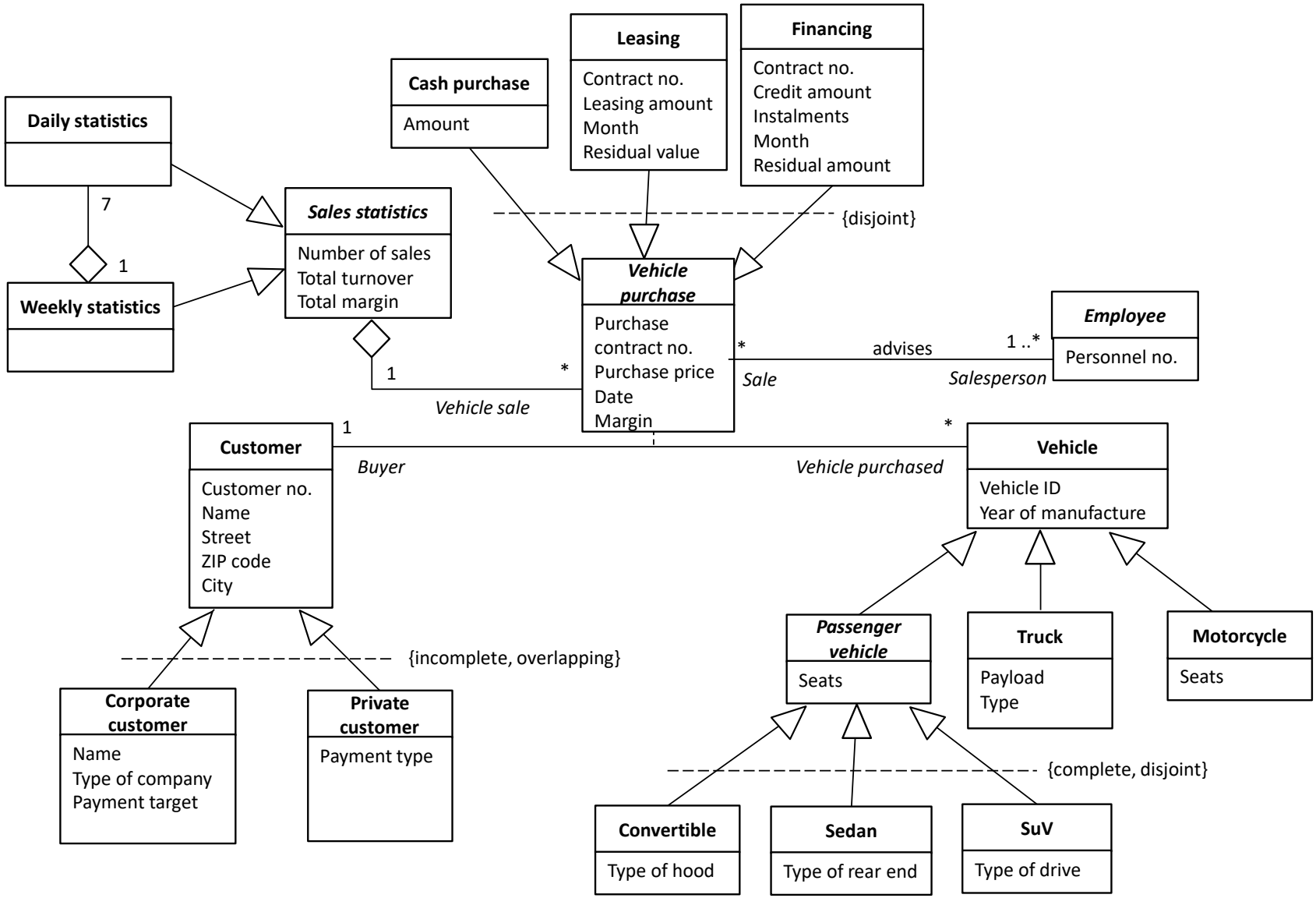
In your role as requirements engineer in the development project for the video on-demand portal "NextGeneration VoD", your task is to determine the requirements for the software based on the system vision for "NextGeneration VoD" and to document the requirements effectively. As a first step, in order to have a better understanding of how the system is embedded in its operational context and the approximate functionalities required from a usage perspective, you have performed a use case analysis which led to the following result:



Mini-Case 2 **(Continued on the next page)**

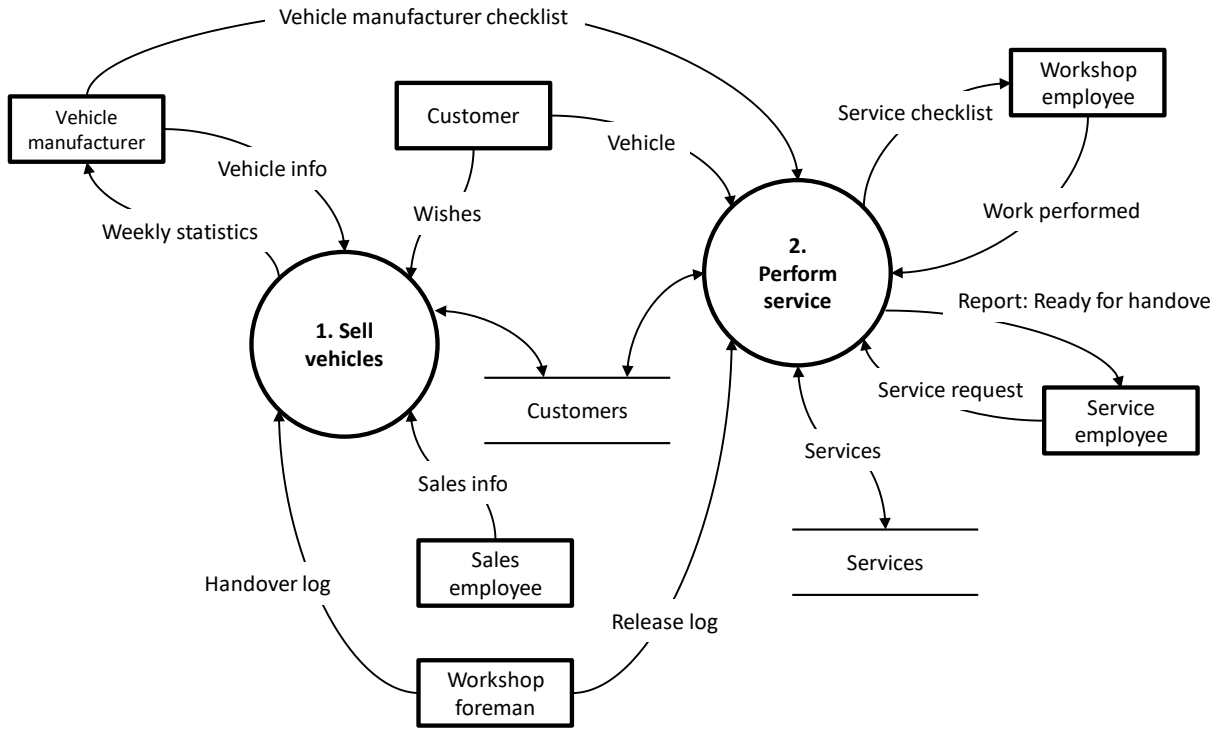
You are a requirements engineer in a development project. The goal of this project is to replace a software for sales support in a vehicle dealership that has been in use since 1995 with a new software system. The new software should include the main functionalities provided by the software currently in use, but should also offer some advanced functionalities for evaluating and analyzing the sales figures. As part of the analysis of the system currently in use, one of your team members, Mr. Sanders, has created the class diagram shown on the next page and presented this to you:

Mini-Case 2 (continuation)



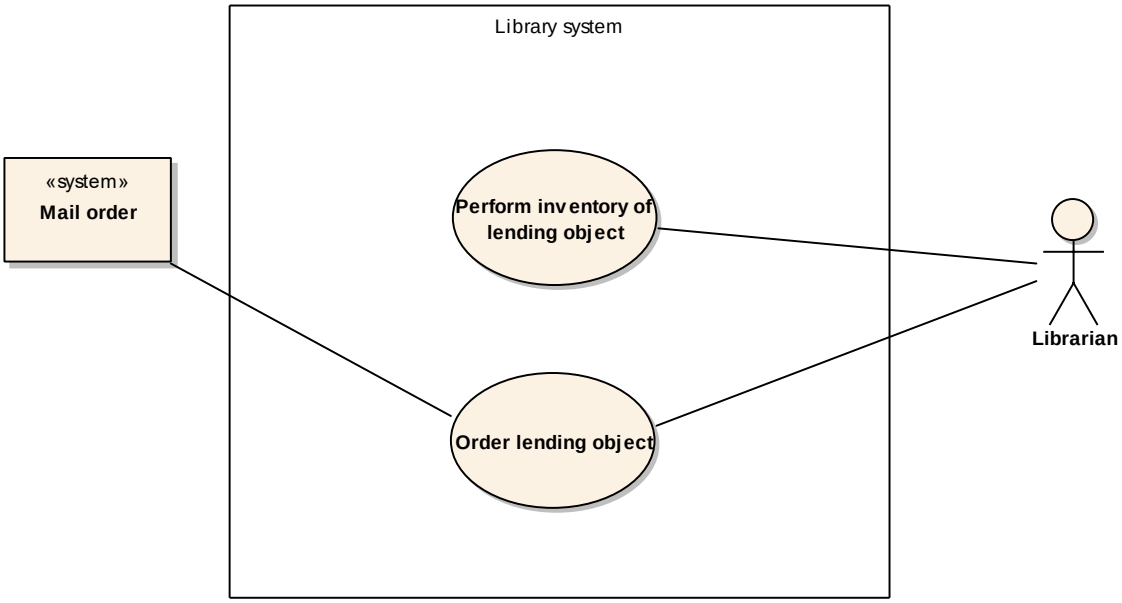
Mini-Case 3

In a development project you are responsible for requirements engineering. The goal of this project is to replace a software for customer service in a vehicle dealership that has been in use since 1993 with a new software system. The new software should have the main functionalities provided by the software currently in use, but should also have innovative features for further improving the quality of customer service. In order to specify the requirements for the new system, you have performed an initial data flow-based analysis of the software currently in use. This analysis also allows you to assess the scope of the software currently in use. The results of this analysis are documented in the following data flow diagram:



1. Question Block — Use Case Diagrams

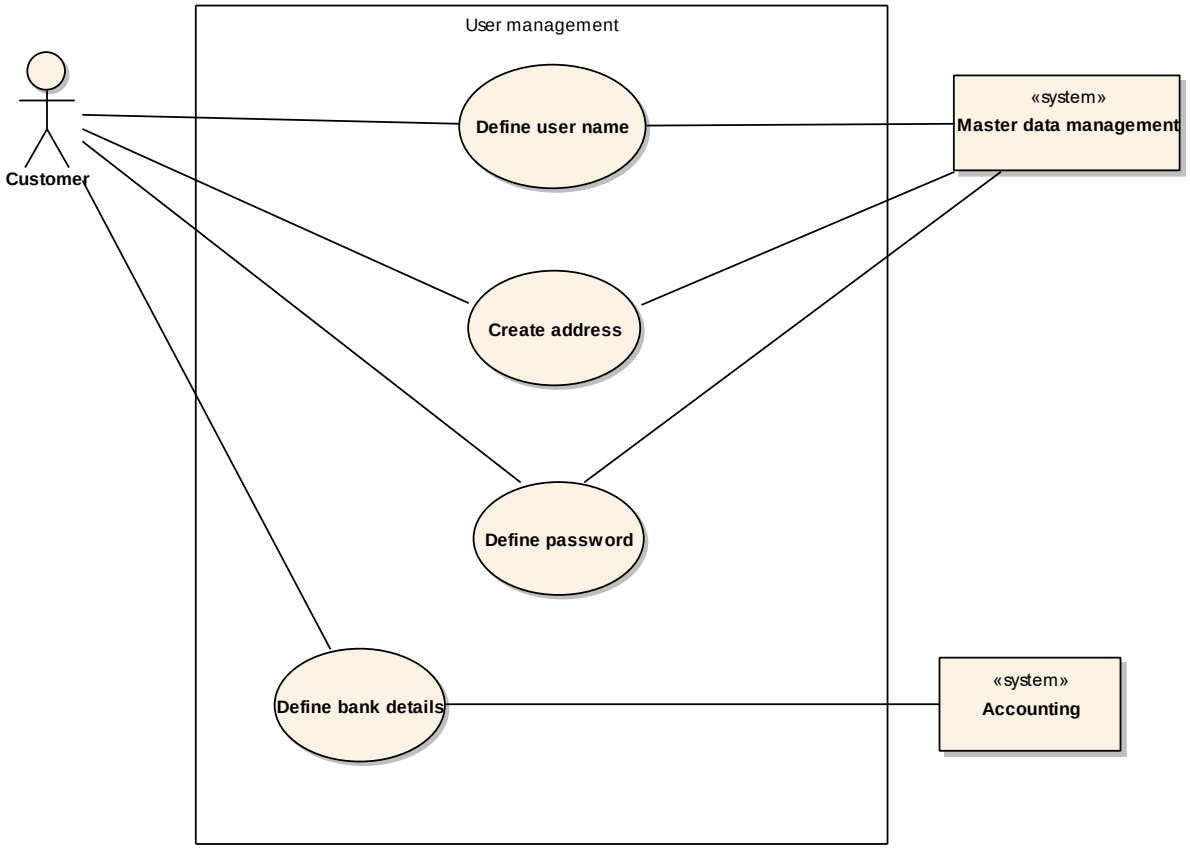
1. **A library system allows a user (librarian) to take an inventory of the lending objects. This library system also allows the user to order lending objects via an externally connected system. Assume the following use case diagram:** **A2A0104 1 point**



Your task is to add new functionalities to the use case diagram. Which of the following possible extensions of the system would you model in the use case diagram? (Choose 1 answer)

☐	A) The "Mail order" system must send a dispatch confirmation.
☐	B) The library system must allow the librarian to categorize lending objects retrospectively.
☐	C) For "Order lending object", the librarian must always specify a delivery address for the library.
☐	D) When performing an inventory, the librarian can adopt an automatically proposed inventory number or change it manually.

2. **As part of a survey of various employees at the Internet auction site "Amabay", you have noted a number of statements on the use case diagram presented.** **A2A0105 1 point**



Which of the statements listed below can be confirmed most likely with respect to the requirements modeled in the use case diagram? (Choose 1 answer)

☐	A) The customer can view his order history in the master data management system.
☐	B) All person-specific data can be stored in a "Customer management" system.
☐	C) To create a user name, bank details have to be stored.
☐	D) The bank details of a customer are stored in an external accounting system.

Questions on Mini-Case 1

3. For each of the statements listed below, state whether it is correct or incorrect with reference to the use case diagram from Mini-Case 1. **A2K0106 2 points**

Correct	Incorrect	
☐	☐	A) When a customer is registered, the payment data of the customer is also recorded.
☐	☐	B) Each time a medium is lent out, the payment data of the customer is also recorded.
☐	☐	C) When a new medium is made available by the media provider, it is also displayed to customers who are not registered.
☐	☐	D) A support employee can only perform online support for registered customers.

4. **After you have presented and explained the use case diagram from Mini-Case 1 to the specialist at the VoD portal operator, the discussion reveals that the software should also implement the following content:** **A2A0107 2 points**

- ***When a customer is logged in, they should also be able to use the software to search through the media database (media DB) systematically.***

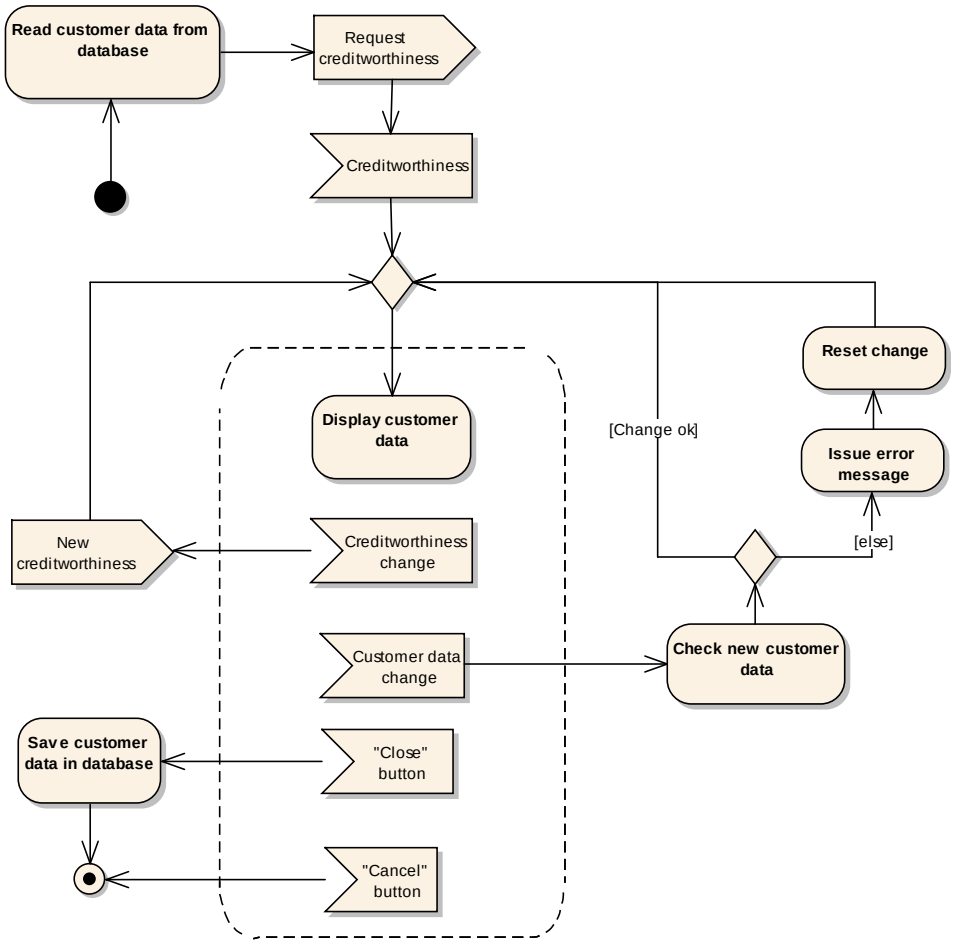
Which of the modeling alternatives listed below implements the above situation the most precisely in the use case diagram from Mini-Case 1? (Please note: the alternatives given are not necessarily complete!) (Choose 1 answer)

☐	A) A new use case "Search media catalog" with an association to "Media DB" and an include relationship from the use case "Customer login" to the use case "Search media catalog"
☐	B) A new use case "Search media catalog" with an association to "Media DB" and "Support employee"
☐	C) A new use case "Search media catalog" with an association to "Media DB" and an include relationship to the use case "Customer login"
☐	D) A new use case "Search media catalog" with an association to "Customer" and "Media DB"

2. Question Block — Modeling Activities

Activity diagram 1

5. Please check whether the statements below are correctly represented in the diagram.



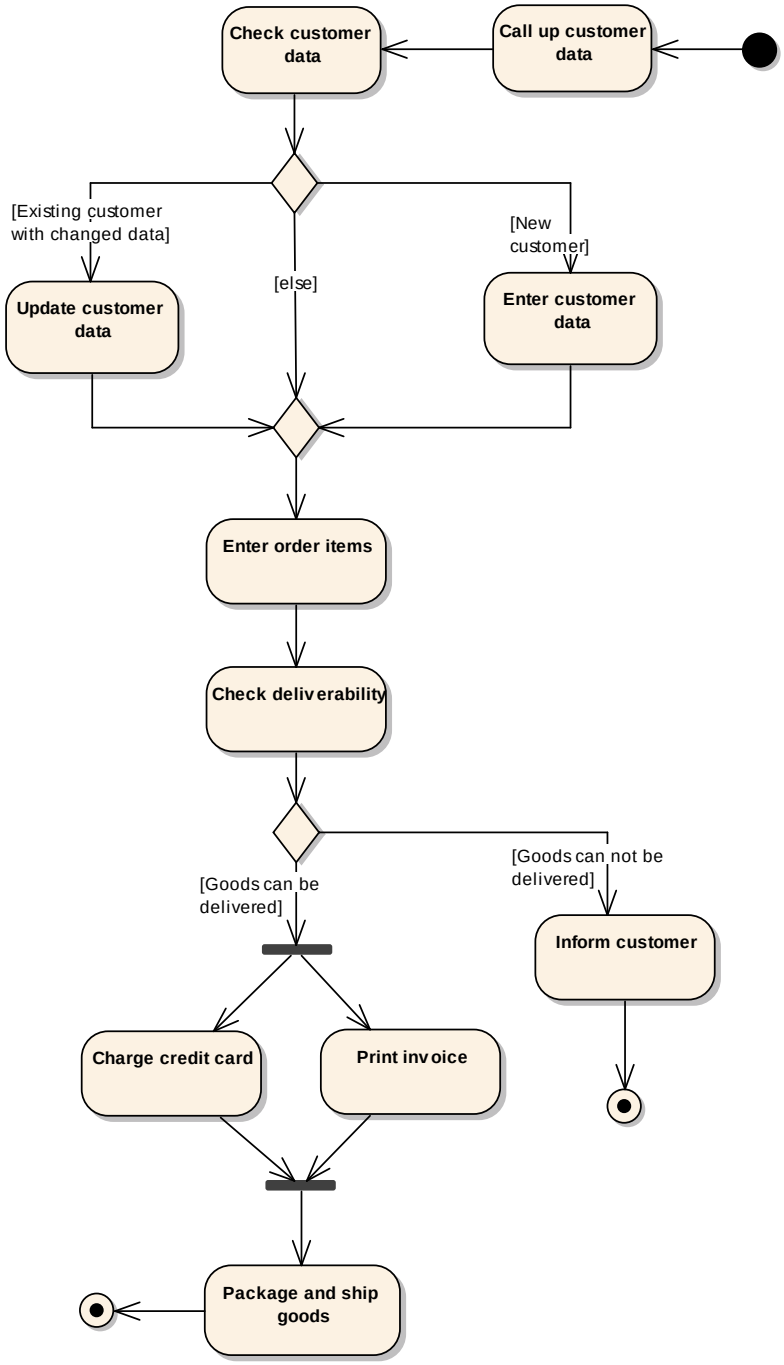
A2K0204

1 point

Correct	Incorrect	
☐	☐	A) If the program crashes, all of the changes made up to that point are lost.
☐	☐	B) Before customer data is displayed it is always read from the database.
☐	☐	C) Changes made to the customer data by the user are not changed in the database until closure.
☐	☐	D) If no feedback on the creditworthiness is received after a certain time, the process terminates.

Activity diagram 2

6. A shipping company processes orders according to the activity diagram shown below. Please check the statements listed and decide whether they are correct or incorrect with reference to the activity diagram.



A2K0205

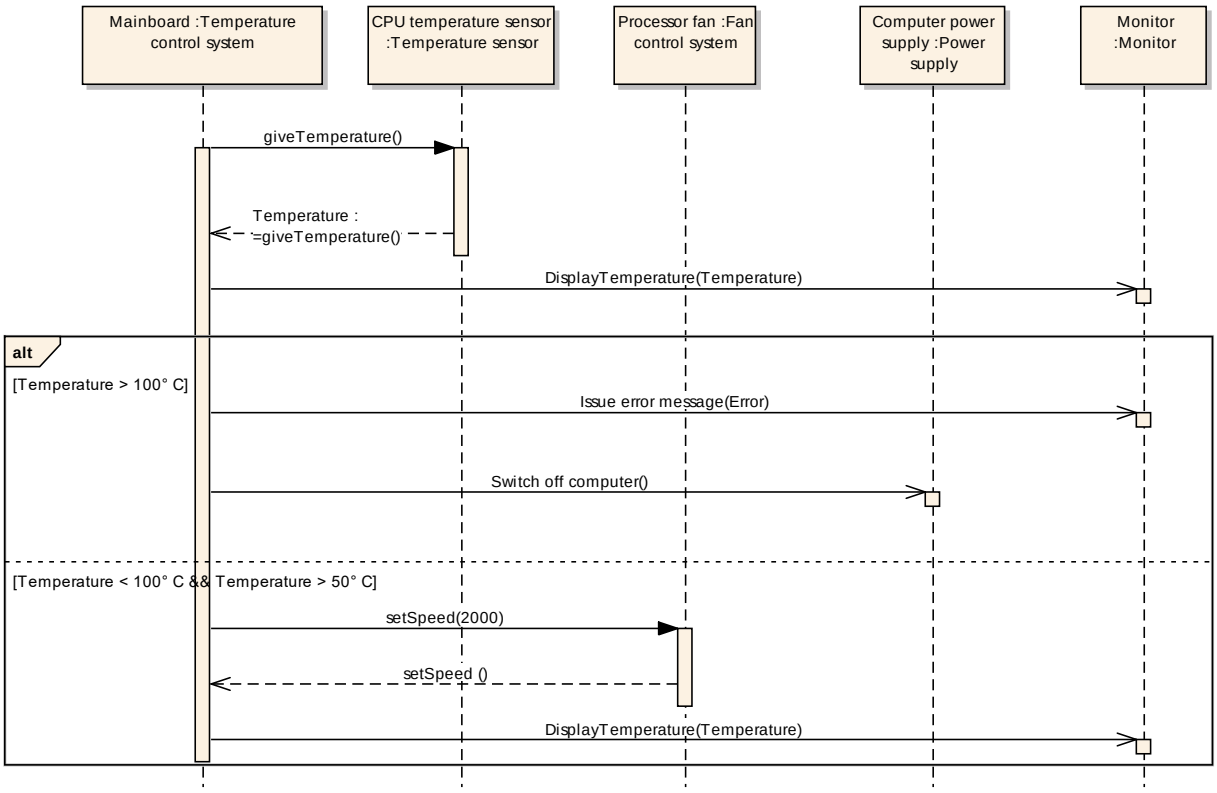
1 point

Correct	Incorrect	
☐	☐	A) The customer data is always updated before an order is recorded.
☐	☐	B) If the goods cannot be delivered, the customer is informed and the order is not executed.
☐	☐	C) If the goods can be delivered, first the credit card is charged and then an invoice is printed.
☐	☐	D) The goods are packaged and shipped if at least one of the activities (credit card charged, invoice printed) is executed successfully.

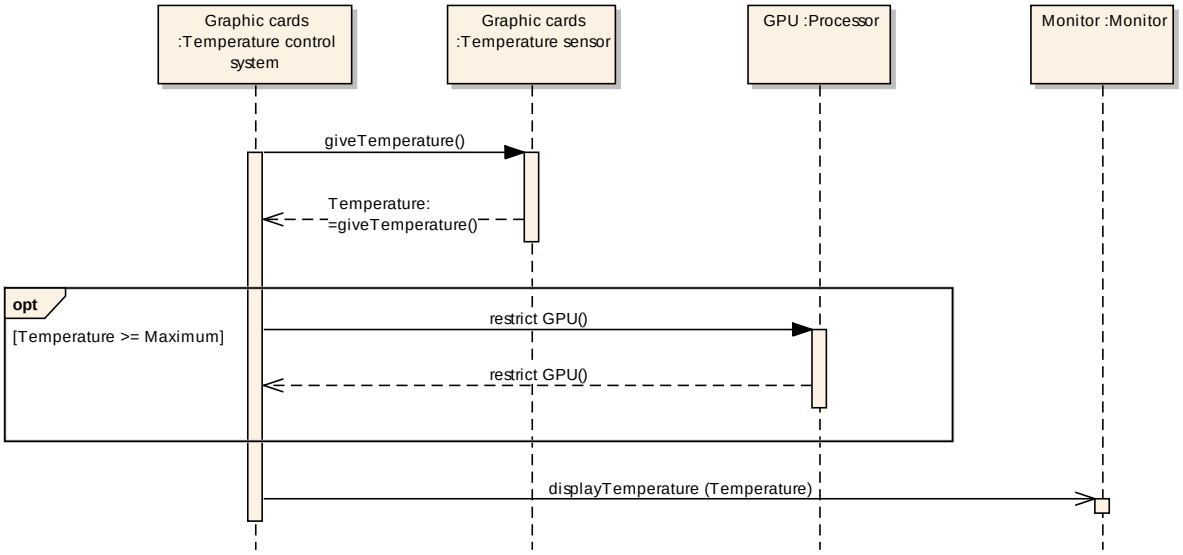
3. Modeling Scenarios

7. **Two interaction diagrams (sequence diagrams) have been modeled for a scenario-based description of the CPU temperature monitoring and the graphics card of a computer. These diagrams are the basis for discussion between you, the requirements engineer, and your stakeholders. However, before you go to the next coordination meeting, you want to check the quality of the scenarios and compare the statements below with the individual scenarios.** **A2K0203 2 points**

Interaction diagram (sequence diagram) 1



Interaction diagram (sequence diagram) 2



Assess whether the following statements are correct or incorrect based on the scenarios given.

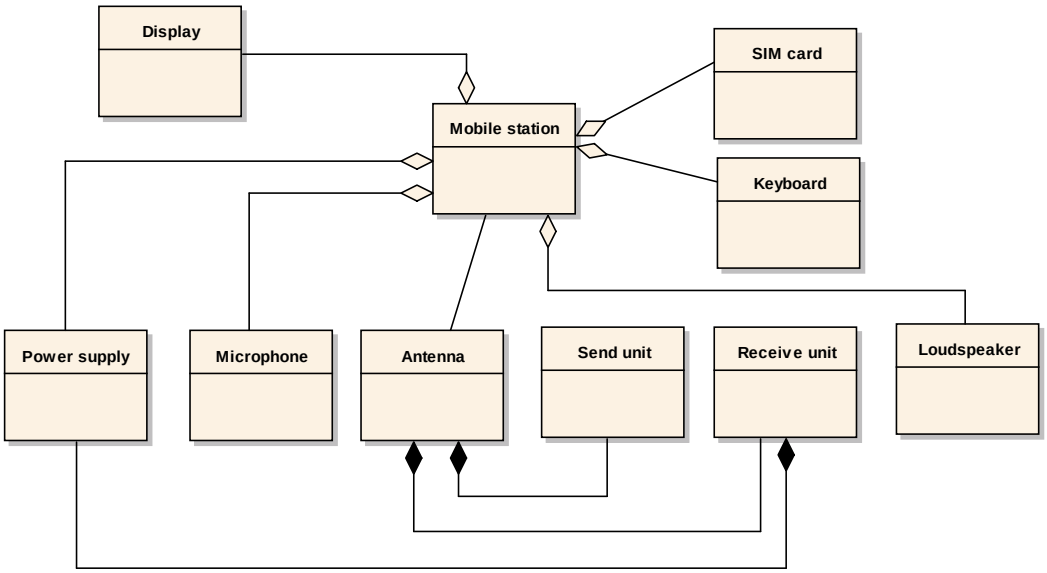
Correct	Incorrect	
☐	☐	A) As long as the computer is switched on, the current temperature of the CPU is displayed.
☐	☐	B) If the temperature of the CPU > 100°C, the temperature control system issues an error message on the monitor and switches the computer off.
☐	☐	C) The current temperature of the CPU is displayed regardless of whether the temperature has been exceeded.
☐	☐	D) If the temperature is too high, the graphics card slows down its cycle and issues an error message on the monitor.

4. Question Block — Information Structure Diagrams

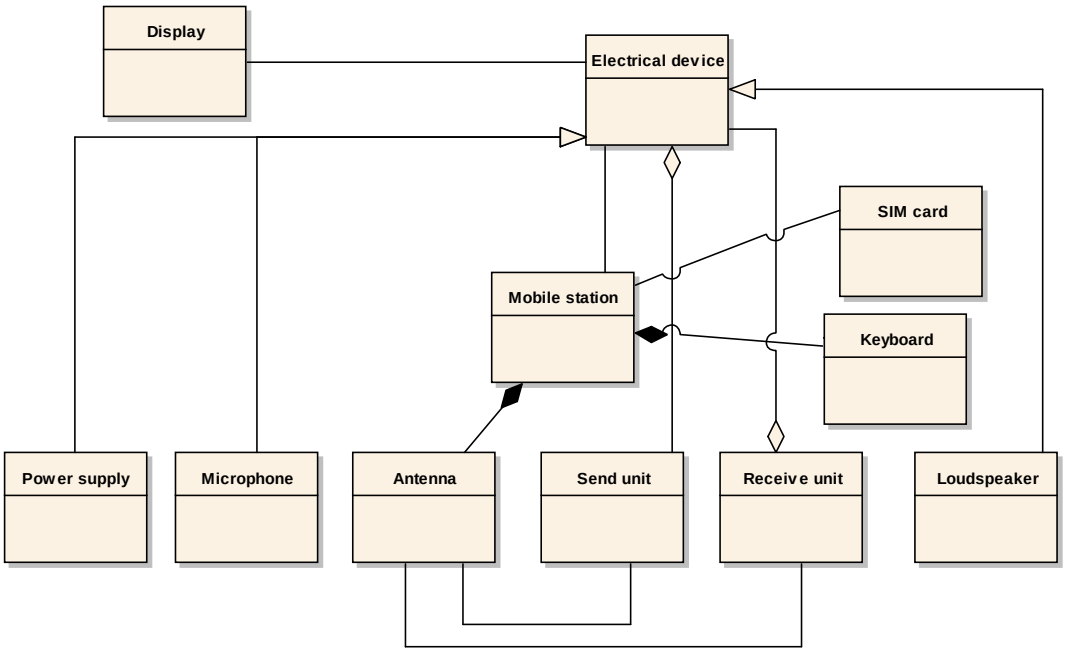
8. **The mobile station consists of an antenna, a power supply, a loudspeaker, and a microphone. A send-receive-unit is connected to the antenna.. It is also possible to select another subscriber (typically via keyboard or voice entry). The mobile station usually also contains a display for showing the telephone number of the caller as well as short text messages (SMS). A further important component of the mobile station is the SIM card.** **A2A0304**
2 points

The following alternatives exist for describing the facts:

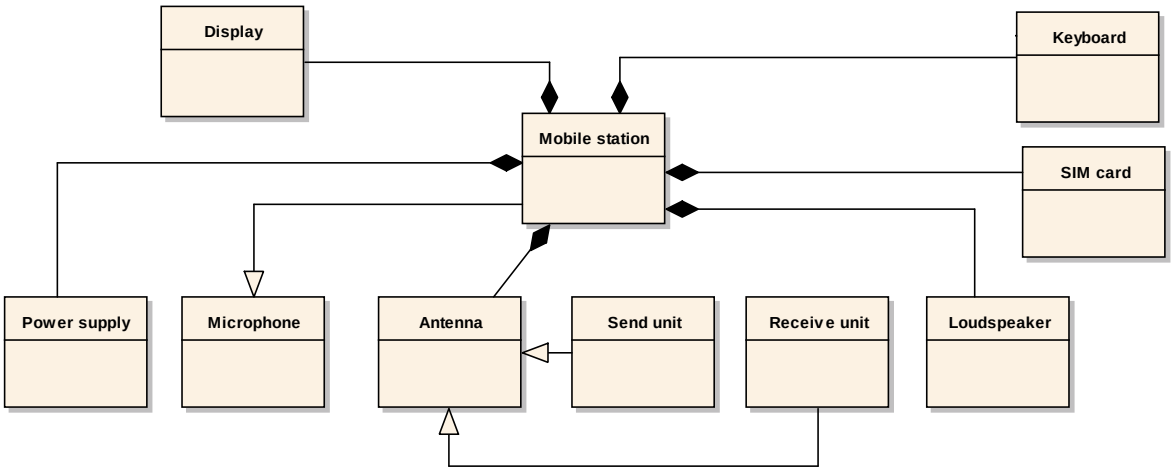
Alternative A



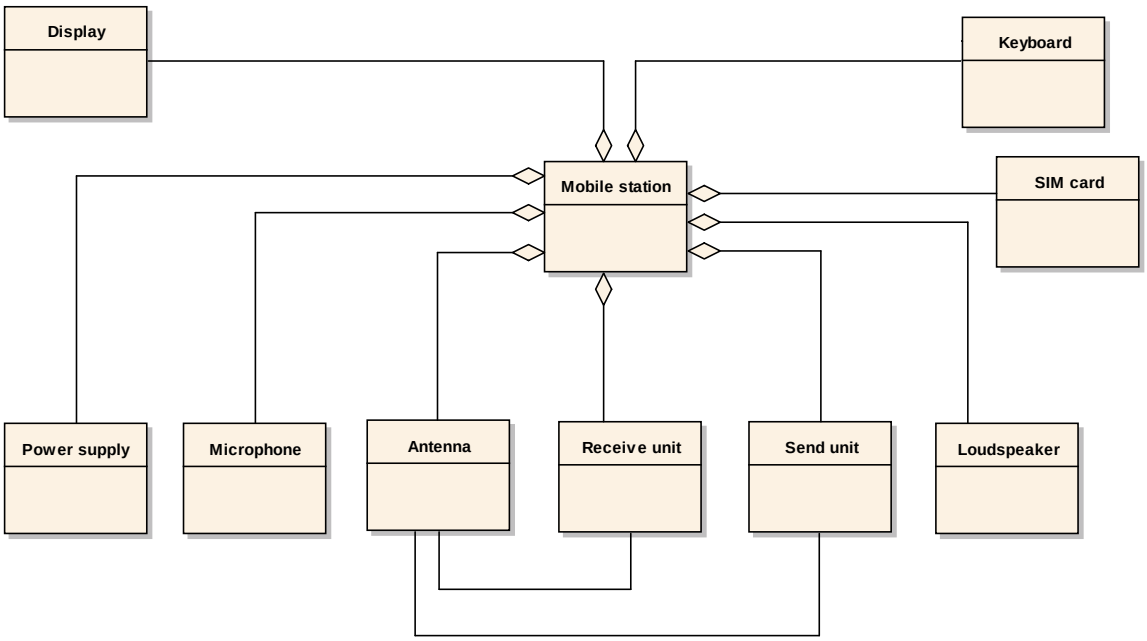
Alternative B



Alternative C



Alternative D



Which of the alternatives correctly describes the facts from the description (even if not completely)? (Choose 1 answer)

☐	A) Alternative A
☐	B) Alternative B
☐	C) Alternative C
☐	D) Alternative D

Questions on Mini-Case 2

9. **In a discussion, another colleague, Mr. Morris, who was also involved in the analysis, makes a number of statements about relevant information structures he believes to have discovered during the analysis. For each of the statements from Mr. Morris below, please decide whether it is semantically correct with reference to the class diagram from Mini-Case 2 presented to you by Mr. Sanders.** **A2K0305** **2 points**

Correct	Incorrect	
☐	☐	A) A vehicle purchase always relates to exactly one vehicle.
☐	☐	B) An employee advises exactly one customer in connection with a vehicle sale.
☐	☐	C) Each customer can be managed as both a private customer and a corporate customer.
☐	☐	D) One vehicle purchase can involve both cash payment and financing.

10. **In a discussion, another colleague, Mr. Morris, who was also involved in the analysis, makes a number of statements about relevant information structures he believes to have discovered during the analysis. Which of the statements listed below is <u>not</u> mapped in the class diagram from Mini-Case 2 presented by Mr. Sanders? (Choose 1 answer)** **A2A0306** **1 point**

☐	A) A vehicle purchase always relates to exactly one customer.
☐	B) A customer does not necessarily have to have purchased a vehicle.
☐	C) Motorcycles can only be sold to private customers.
☐	D) There can be no passenger vehicles that are also sedan cars and SUVs at the same time.

11. **Mr. Sanders informs you of new facts discovered:** **A2A0307**

2 points

- ***The system should take into account that for a vehicle purchase, the employee can take either the role of the salesperson or, in the negotiation of the vehicle purchase, the role of the negotiator.***
- ***One vehicle purchase can have a maximum of one negotiator, whereby relevant employees can negotiate in multiple or no vehicle purchases.***

Which of the possible extensions of the information model from Mini-Case 2 detailed below implements the above facts most precisely in the model? (Choose 1 answer)

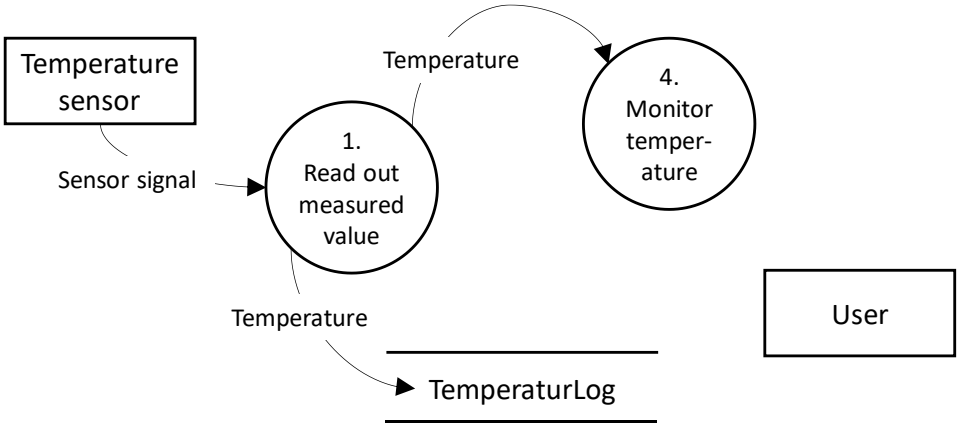
☐	A) An additional class "Negotiating employee" and an association "negotiates" between the class "Negotiating employee" and "Employee"
☐	B) An additional association "negotiates" between the class "Employee" and the class "Vehicle" with the role name "Negotiator" at the association end to the class "Employee"
☐	C) An additional attribute "negotiating employee" in the class "Employee" of the type boolean and an additional association "negotiates" between the classes "Employee" and "Vehicle type"
☐	D) Two additional subclasses "Salesperson" and "Negotiator"

5. Question Block — Data Flow Diagrams

12. **Your task is to add the processes "Shut down computer" and "Display temperature progression" to the given diagram based on the following information:** **A2A0402 1 point**

The process "Display temperature progression" reads the current temperature from the temperature log and displays it to the user as a "Temperature curve". The process "Monitor temperature" delivers a "Shutdown signal" to the process "Shut down computer". The process "Shut down computer" then issues a message to the user.

Assume the following data flow diagram:



Which is the correct, but not necessarily complete, extension of the given data flow diagram? (Choose 1 answer)

☐	A)	• An additional process "Display temperature progression" • A data flow "Temperature curve" from the data store "Temperature log" to the terminator "User" • A data flow "Shutdown signal" from the process "Monitor temperature" to the process "Shut down computer" • A data flow "Message" from the process "Shut down computer" to the terminator "User"
☐	B)	• Two additional processes "Display temperature progression" and "Shut down computer" • A data flow "Shutdown signal" from the process "Monitor temperature" to the process "Shut down computer" • A data flow "Message" from the process "Shut down computer" to the terminator "User" • A data flow "Temperature curve" from the process "Display temperature progression" to the terminator "User"
☐	C)	• An additional terminator "Display temperature progression" • A data flow "Shutdown signal" from the process "Monitor temperature" to the process "Shut down computer" • A data flow "Message" from the process "Shut down computer" to the terminator "User" • An additional terminator "Monitor temperature" • A data flow "Temperature curve" from the process "Display temperature progression" to the terminator "User"
☐	D)	• An additional terminator "Shut down computer" • An additional process "Display temperature progression" • A data flow "Shutdown signal" from the process "Monitor temperature" to the terminator "Shut down computer" • A data flow "Message" from the terminator "Shut down computer" to the terminator "User"

Questions on Mini-Case 3

13. **A member of your team, Mr. Morris, had a discussion yesterday with the IT manager and an employee from the Customer Service department. Mr. Morris explains some new facts which may mean you have to adapt the diagram from Mini-Case 3.** **A2K0403** **2 points**

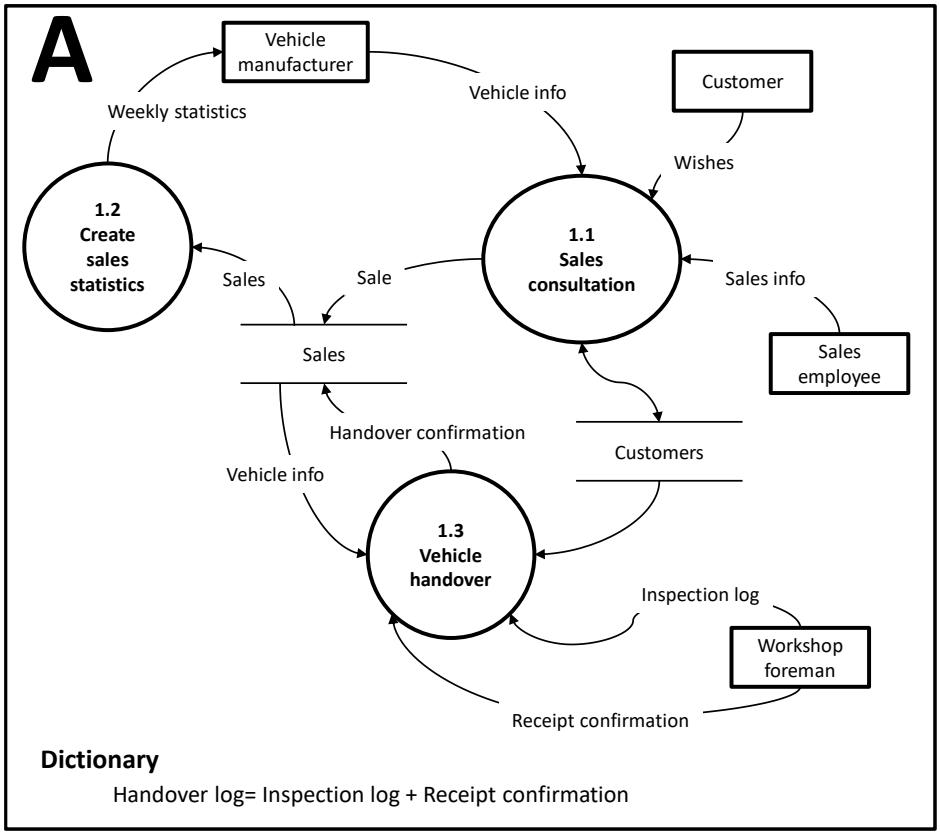
- ***The vehicle manufacturer's checklists for vehicle service are also stored locally in the system. If a checklist is missing, it is downloaded automatically by the vehicle manufacturer.***

For each of the possible changes to the data flow diagram from Mini-Case 3 detailed below, please specify whether the change would correctly map the above facts in the model. Please note that the changes are not necessarily given in their entirety!

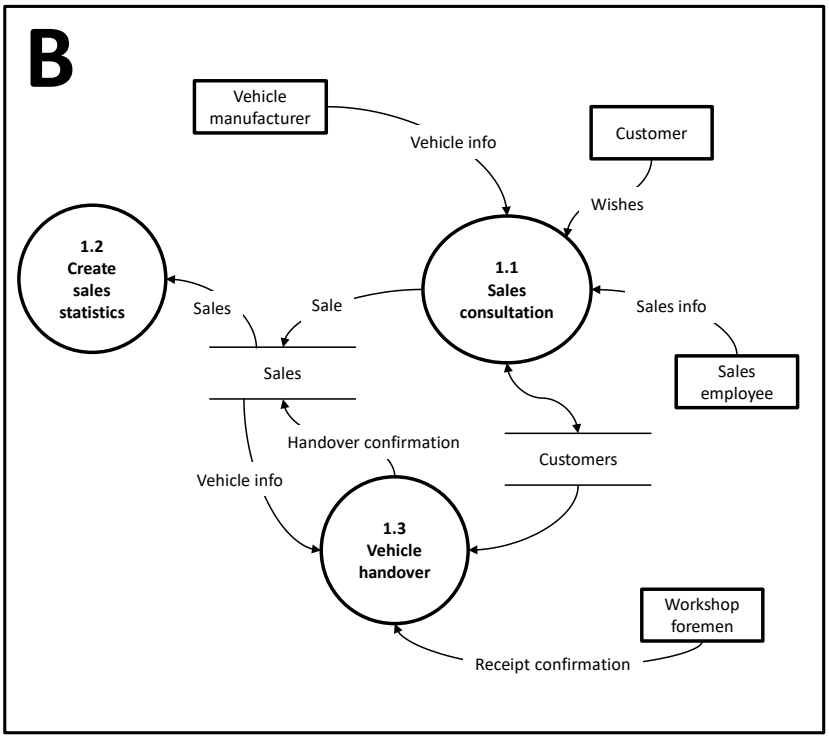
Correct	Incorrect	
☐	☐	A) The data flow "Vehicle manufacturer checklist" between the terminator "Vehicle manufacturer" and the system under consideration must be removed from the data flow diagram.
☐	☐	B) An additional data store "Service checklists" is accessed in both read and write mode by the process "2. Perform service".
☐	☐	C) An additional process "3. Download checklists" and an additional data store "Service checklists" which is accessed (with write access) by the process "3. Download checklists".
☐	☐	D) An additional terminator "Service checklists" and a data flow "Vehicle manufacturer checklist" that starts from this terminator and goes to the process "2. Perform service".

14. **You have asked a relatively inexperienced employee to further refine the process "1. Sell vehicle" in the data flow diagram from Mini-Case 3 that you created at the beginning.** **A2A0404 2 points**

Refinement A:



Refinement B:



Please select the statement that is correct with reference to the consistent refinement of the process "1. Sell vehicle" in the diagram from Mini-Case 3.

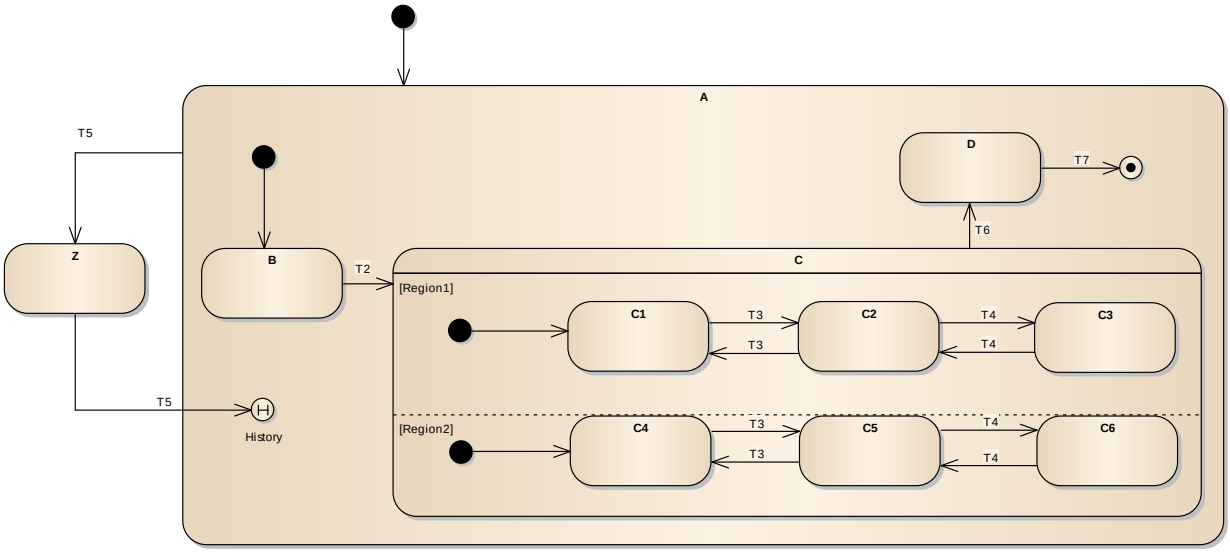
(Choose 1 answer)

☐	A) Neither diagram A nor diagram B is a consistent refinement.
☐	B) Only diagram A is a consistent refinement.
☐	C) Only diagram B is a consistent refinement.
☐	D) Diagram A and diagram B are both consistent refinements.

6. Question Block — State-Transition Diagrams

15. Assume the following state machine with hierarchical states: **A2A0503**

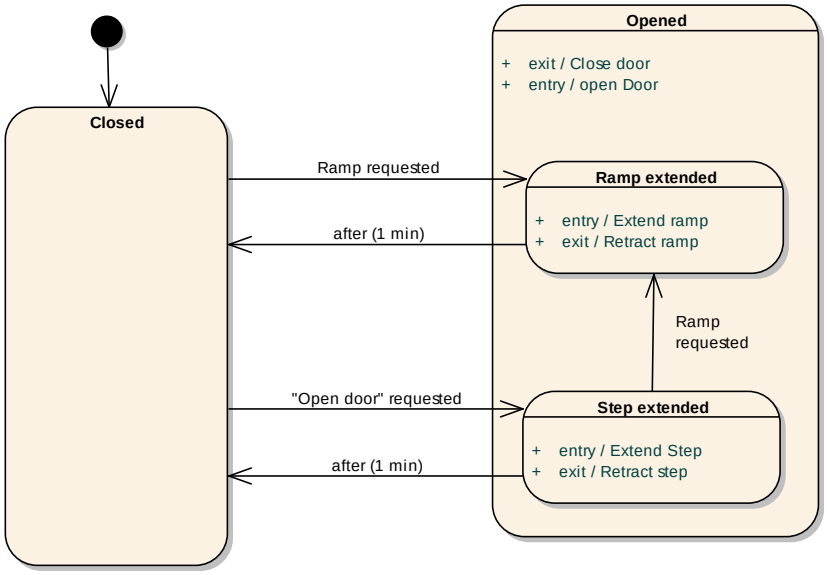
1 point



In which state is the machine once the following sequence of events has been received? T2, T3, T4, T5, T5? (Choose 1 answer)

☐	A) In state C with substates C3 and C6
☐	B) In state C with substates C2 and C5
☐	C) In state C with substates C1 and C4
☐	D) In state B

16. **A colleague has modeled the following state machine that reflects the currently realized behavior of a train door. The specialist department has given you a description of the required behavior and you must now check whether this behavior is correctly modeled in the state machine.** **A2K0504 2 points**



Correctly modeled	Incorrectly modeled	
☐	☐	A) When the "Open door" function is activated, the step is extended automatically. When the door is closed, the step is retracted.
☐	☐	B) When a ramp is requested, if necessary the step at this door is automatically retracted and the ramp extended. When the door is closed, the ramp is then automatically retracted.
☐	☐	C) When the door is closed and the ramp is requested, the door is opened automatically.
☐	☐	D) Once opened, the door closes automatically after one minute.

7. Question Block — Use of Diagram Types

17. **In a development project you are responsible for requirements engineering. An employee gives you some advice about how and in which situation you should use certain diagram types for modeling requirements in requirements engineering.** **A2K0603** **2 points**

For each of the following pieces of advice, state whether it is correct or not.

Correct	Incorrect	
☐	☐	A) You can use sequence diagrams to document the control flow within a scenario.
☐	☐	B) You can use data flow diagrams to document the sequence of system functions.
☐	☐	C) You can use activity diagrams to document the control flow of all scenarios of a use case in an overall context.
☐	☐	D) You can use state-transition diagrams to document the sequence of all scenarios of a use case in an overall context.

18. **In a development project you are responsible for requirements engineering. An employee gives you some advice about how and in which situation you should use certain diagram types for modeling requirements in requirements engineering.**

For each of the following pieces of advice, state whether it is correct or not.

A2K0604
2 points

Correct	Incorrect	
☐	☐	A) You can use information models to document the states and related events that the system assumes when executing a scenario.
☐	☐	B) You can use information models to detail the input and output parameters of activities precisely.
☐	☐	C) You can use information models to document the structure of the data store within data flow diagrams.
☐	☐	D) You can use information models to document the structure of the information exchanged between processes (functions) in data flow diagrams.