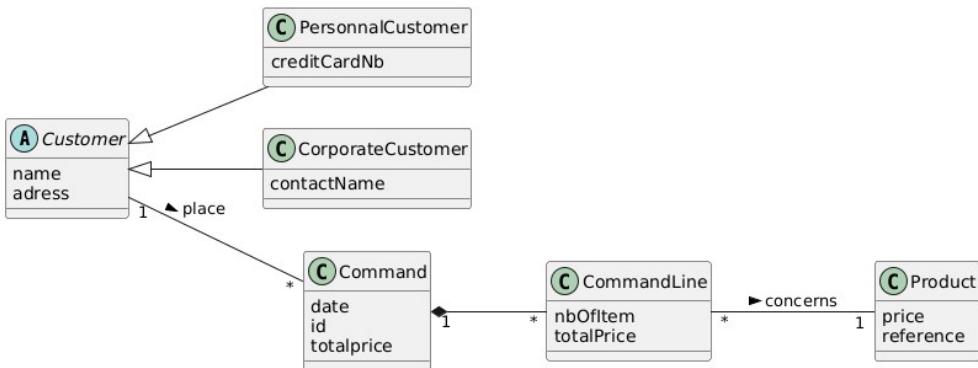


Correction For MCQ, 0.5 by good answer	1.1 D	1.2 A	1.3 E	1.4 A
1.5 Expected 2 reasons among the following: (0.5 by acceptable reason)				
- problem can be complex - analyst and stakeholder can speak different languages - stakeholders might not know what they want - stakeholders might not make the difference between what they want and what they need - There might be some conflicts between the responses of the stakeholders				
1.6 C	1.7 D	1.8 D	1.12 0.5 for each cardinality, 0.5 for the name of the association.	
1.9 neutralized	1.10 C	1.11 E		<p>Office <math>\rightarrow</math> 0..1      * Employee</p> <p style="text-align: center;">One of the two     &lt; has     isAllowedTo</p>
2.1				
A person has a name A person can be a man or a woman (exclusive) A person has two parents A person has 1 father and it is a man A person has 1 mother and it is a woman A person may have (0 to) several children When a child is a man, it is called a son. When a child is a woman, it is called a daughter Children are ordered				
2 points; => -0.25 by forgotten elements				
2.2				
In the class diagram, it is written that a Person has exactly 2 parents. This generates an "infinite loop" that makes impossible the representation with an object diagram. In the example, you have to give the parents of Leon and Louise. If you give them, you have to give the parents of their parents as well, and the parents of their grandparents...				
1 point => 0 if you give the object diagram or an incorrect explanation. 1 if you give the correct explanation.				
3 A solution similar to the following one was expected.				
	<pre> classDiagram     actor Customer     actor VendingMachineSystem     useCase SelectProduct     useCase PayProduct     useCase CheckExpiryDate     useCase PayByCash     useCase PayByCard      Customer --&gt; VendingMachineSystem     VendingMachineSystem --&gt; SelectProduct     VendingMachineSystem --&gt; PayProduct     SelectProduct --&gt;--&gt; CheckExpiryDate     PayProduct --&gt;--&gt; PayByCash     PayProduct --&gt;--&gt; PayByCard   </pre>			
Other solutions were possible. 2.5 points =>				
<ul style="list-style-type: none"> <li>• System should not be represented as an actor: -0.5</li> <li>• Duplication of UC (from user point of view and from system point of view): -0.5</li> <li>• Extend and Include without arrows or in the wrong direction: -0.5</li> <li>• Include used when extend were expected: -0.5</li> <li>• Inheritance used when it has no sen: -0.5</li> <li>• For payment, if extend is used instead of Inheritance: -0.25 (not completely wrong, but less meaningful)</li> </ul>				

#### 4.1 & 4.2

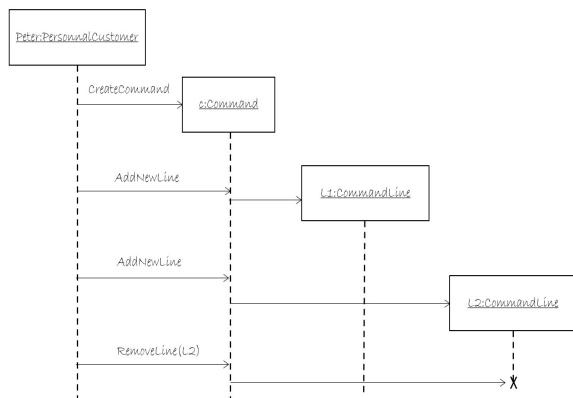
A solution similar to the following one was expected.



Other solutions were possible. On 3 points

- Product should be a class: -0.5
- -0.25 by missing association names. An association name is not necessary in case of aggregation
- -0.25 by missing/incorrect cardinality.  
Cardinality above the diamond is not necessary in case of aggregation.  
There is no cardinality in inheritance link (-0.5)
- -0.25 by Missing attribute

#### 4.3

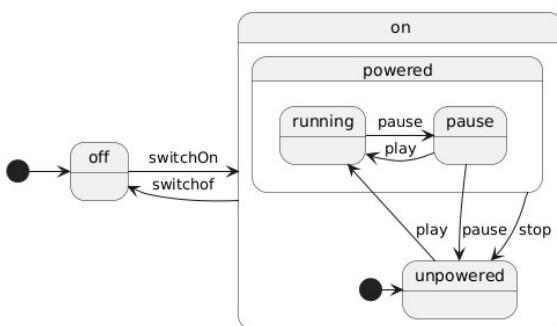


On 1 point. Syntax inappropriate for creation -0.25, Syntax for deletion -0.25

CommandLine L1 and L2 should be 2 different objects to be consistent with the class diagram. => 1

Note that in my class diagram, I modeled that a command has no command line, so I can create the command, and then the commandLine.

#### 5



On 3,5 point.

-0.5 if on level of hierarchy is missing, -1 if two levels of hierarchy are missing.

-0.5 by incorrect or missing transition

-1 if some states are confused, -0.5 is off state is not identified

-1 if // sections are used instead of hierarchy

-0.5 if pause twice is used

**MoSIG 1 - Software Engineering Mid-term Exam 2025-26**  
**No document, no electronic devices**

**Exercise 1 (7)**

**Q.1.1** What is the main principle behind the Waterfall model?

(A) Continuous integration of portion of the system      (B) Emphasis on risk management  
 (C) Minimal documentation      (D) Sequential development

**Q.1.2** What is the main **disadvantage** of the V-shape model?

(A) Difficulty in accommodating changes      (B) Emphasis on user involvement  
 (C) Emphasis on validation      (D) Rapid development pace

**Q.1.3** The incremental processes **promote**:

(A) deep architectural refactoring steps for each increment      (B) detailed documentation  
 (C) rapid development pace      (D) technical excellence      (E) **None of the previous**

*It promotes dev with increments*

**Q.1.4** I'm a requirement elicitation technique used to **make emerge new ideas through discussions**. What is my name?

(A) Brainstorming      (B) Focus Group      (C) Interview      (D) Introspection      (E) Questionnaire      (F) None of the previous

**Q.1.5** Give 2 reasons why requirement elicitation is a difficult task. One simple sentence by reason.

**Q.1.6** Which of the following requirements can be considered to be related to maintainability?

(A) Each page must load within 2 seconds.  
 (B) The back-up process must finish within 3 hours.  
 (C) **The technical documentation should include a description of the detailed design.** *(because it helps for modifications)*  
 (D) The system must meet Web Content Accessibility Guidelines WCAG 2.1.  
 (E) The application must support Windows 11 operating system and above.  
 (F) None of the previous

**Q.1.7** Choose the correct affirmation(s) about UML

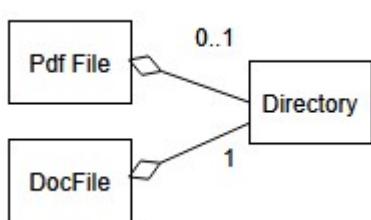
(A) It is an elicitation method      (B) It is a development method      (C) It is a development process  
 (D) **It is a language**      (E) None of the previous      *(UML = Unified Model Language)*

**Q.1.8** In UML, which of the following statement(s) are true w.r.t. the following diagram?



(A) A is a kind of B  
 (B) B is a kind of A  
 (C) A is a part of B  
 (D) **B is a part of A**  
 (E) None of the previous

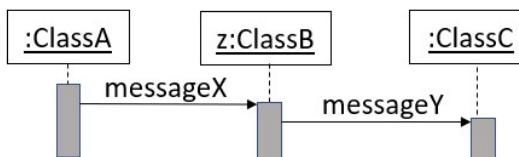
**Q.1.9** You want to draw an object diagram that satisfies the following class diagram. How many objects you can associate to a **Directory** object?



(A) 0  
 (B) 0 or 1  
 (C) Exactly 1  
 (D) 1 or 2  
 (E) Exactly 2  
 (F) 2 and more  
 (G) None of the previous

*The diagram is wrong. Aggregation should be reversed as well as the cardinalities. The question was neutralised.*

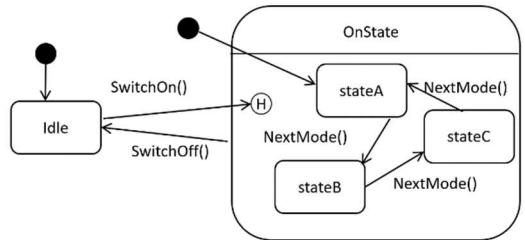
**Q.1.10** In the following diagram, “**:ClassA**” represents



(A) an agent  
 (B) an interaction  
 (C) **an object**  
 (D) a class  
 (E) None of the previous

**Q.1.11** In which state is the system after the method call sequence “SwitchOn(), NextMode(), SwitchOff(), SwitchOn(), NextMode(),” ?

(A) Idle      (B) H  
(C) StateA    (D) StateB    (E) StateC  
(F) error (impossible sequence)    (G) None of the previous



## Idle at the beginning

when `SwitchOn()` state becomes `stateA`, because there is no history and it is the initial state of `Onstate`,

when `NextMode()`, state becomes `stateB`

when `SwitchOff()`, `stateB` is memorized, `state` becomes `Idle`

when `SwitchOn()`, state becomes `stateB` because of the history

when `NextMode()`, state becomes `stateC`

**Q.1.12 Draw an adequate diagram to express that:** “An office can be allocated several employees or empty (this means that the office is allocated to no employee). An employee has at most one office.”

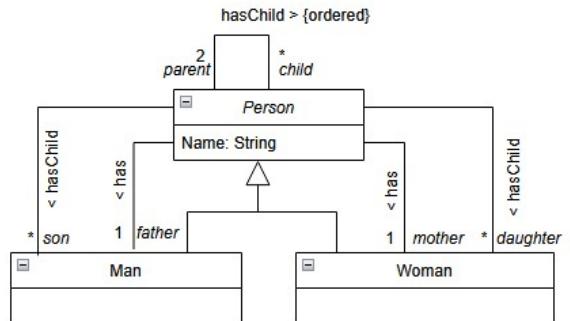
### Exercise 2 (3)

**Q.2.1** Rephrase the diagram on the right in English or in French. One sentence by line. Keep them simple.

**Q.2.2** Draw an object diagram that satisfies the previous class diagram and that represents the sentence “Annie (a woman) is the daughter of Leon (a man) and Louise (a woman)”.

If it is not possible, explain why.

### **Exercise 3 (2,5)**



Let's study a vending machine system. This system sells food products (drinks, sweets) and other types of everyday objects (toothbrush, soap, etc.). Once the customer has selected what he wants to buy, he has to pay it. Payment can be done by credit card or by cash. When a food product has been selected, the machine must check the expiry date of the product.

**Q.3 Propose a use case diagram to model for this text.**

### Exercise 4 (4)

The customers of a company have a name and an address. They can be either personal customers or corporate customers. A contact name for a corporate customer should be defined, as well as the credit card number for the personal customer. Any customer can place commands. A command can be placed by a single customer. Each command has a date, an identification number and a total price. A command is composed of command lines. A command line indicates how many items of one product are asked. Thus, a command line indicates the quantity of this product, and the total price of the line. For each product, its reference and its unitary price are known.

**Q.4.1 Give a class diagram to model this text.** Feel free to ask non-trivial questions if needed.

Peter is a personal customer. He creates a command, in which he creates two different command lines before removing the second one.

**Q.4.2 Give a sequence diagram to model this text.** Your proposition has to be consistent with your class diagram. In your proposition you can omit the representation of the product objects.

### Exercise 5 (3.5)

In this exercise, we want to model the behaviour of the motor controlled by a DVD player. This DVD player has a set of buttons including “switch-on”, “play”, “pause”, “stop”, and “switch-off”.

When the DVD player is switched on, the motor is unpowered. When the “play” button is used, the motor is powered and starts running. The motor is unpowered whenever the “stop” button is used. The pause button can be used to suspend the DVD reading: the motor is still powered, but it is no longer running. If the “play” button is used at this step, the motor runs again. If the pause button is used twice consecutively, the motor is unpowered. It is always possible to “switch-off” the DVD player.

**Q.5 Propose a model to capture the behaviour of the engine.** Use hierarchy whenever it is possible. Feel free to ask non-trivial questions if needed.