Name: _____ Nº

First Test

Métodos de Desenvolvimento de Software
2015/2016
31th of October 2016
18h00
Departamento de Informática
Universidade Nova de Lisboa
(duration 2h00)

NOTE: This test, with some exceptions that should be answered in this questions booklet, is mainly composed by multiple choice questions. Both the multiple choice and open questions should be answered in this group of sheets (no extra sheets should be added by the student). To select wrong answers will impact negatively in the mark of the corresponding question. On multiple choice you have to select just one answer, if wrong it will discount in the overall grade 1/3 of the value of the correct answer.

All the questions should be answered in the akindi solutions sheet or in the questions booklet. It is not allowed to remove the staple.

If the answer sheets are not identified with a name and student number it automatically will not be considered for evaluation.

The solution can be marked using pencil or pen.

You can withdraw 45 minutes after starting the test. In a case of withdrawal, please write and sign this cover page with a statement: "I declare that I give up", by this informing the teacher about your decision.

After 2h00 from starting the test the teachers will collect all the answer sheets.

Regras

- Duration of 2h.
- **You can not exit during the test.**.
- Can only enter during the first 30 minutes.
- Must stay 45 minutes even if intended to quit..
- No device allowed.
- Fraud attempt means to fail the course.
- Do not forget to identify with name and number your test..
- can use pencil and pen.
- Do not unstaple.
- Answer giving your best interpretation.
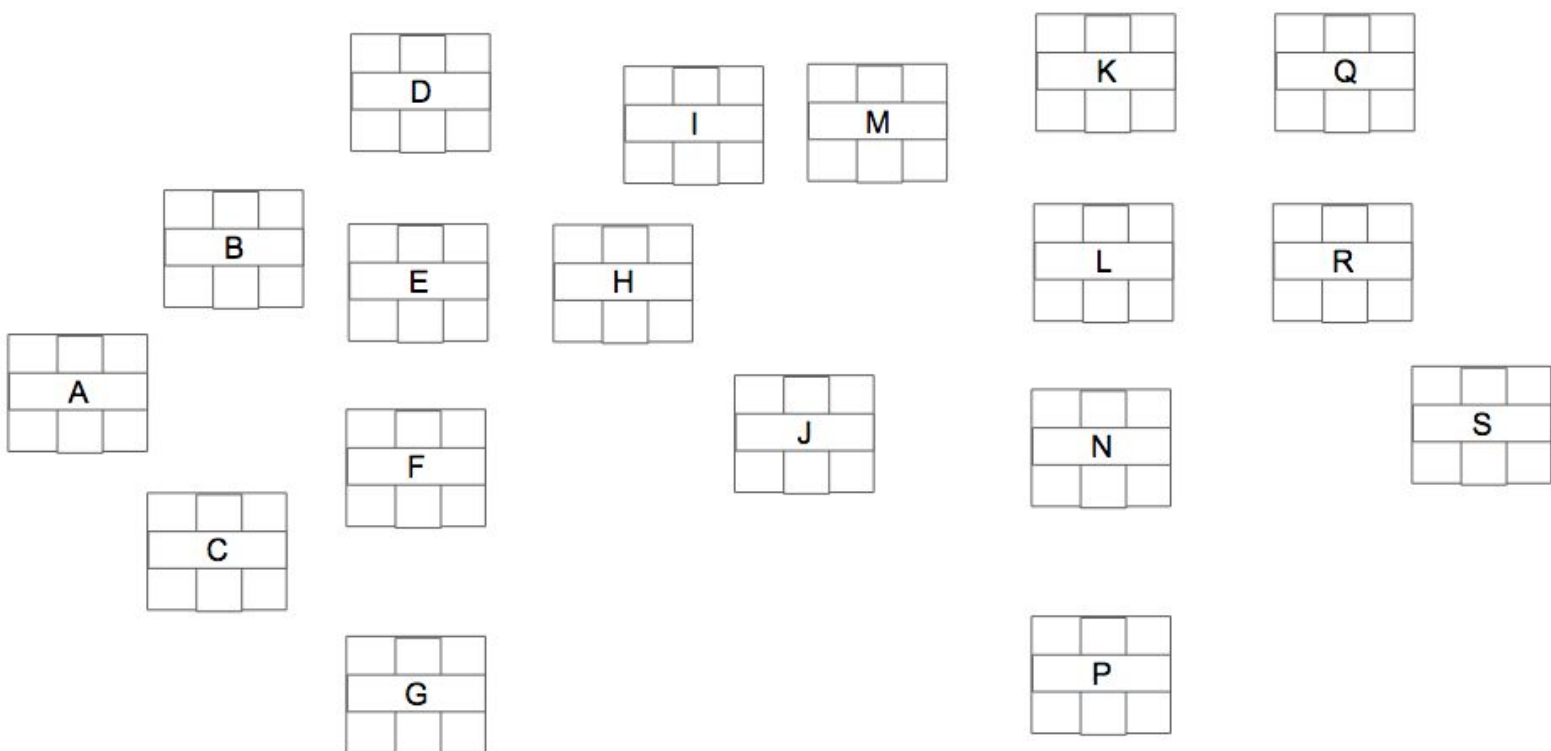- Visually confusing answers will not be corrected.

Part I - Project Management

Consider the following activities/task list:

Task	Predecessors	Duration (days)
A	-	3
B	A	5
C	A	13
D	B,C	7
E	B,C	2
F	B,C	5
G	B,C	4
H	D,E,F,G	3
I	H	7
J	H	5
K	M,J	22
L	M,J	12
M	I	0
N	M,J	18
P	M,J	15
Q	K	10
R	L	7
S	Q,R,N,P	2

a) Complete the following Activity on Node (AON) diagram corresponding to the previous tasks:

b) Identify the critical path(s) (please answer giving the names of the tasks followed by arrows as in : X->Y->Z)

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c) Complete the following sentence:

This project is going to take ___ days (identify the exact number).

d) If we can shorten Activity D to 3 days instead of 7 days, how long will the project last? Complete:

___ days

Part II - EVM

Consider the following information regarding to the evolution and status of your project:

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13
Planned Value (PV)	500	3000	5500	8000	10500	13000	14000	16500	19000	21500	24000	28000	32000
Actual Cost (AC)	1500	1500	3000	4500	6000	7500	9000	10500	12750	15000	15667	16333	17000
Earned Value (EV)	500	500	5500	5500	5500	5500	5500	10500	12250	14000	19000	19000	19000

NOTE: consider an error margin of ±10% in the presented indexes, meaning that, for instance we consider to be 1 to values between 0,9 and 1,1.

According to the previous data we can say that in the week of **W5** this project has the values for the following indexes:

Schedule Variance (SV): _____
Schedule performance Index(SPI):____
Cost Variance(CV):_____
Cost performance Index (CPI):____

According to the previous data (on week **W5**) the project is (choose the correct option) :

Performance	Calendário		
Custo	a) Adiantado e abaixo do orçamento	d) Dentro do prazo e abaixo do orçamento	g) Atrasado e abaixo do orçamento
	b) Adiantado e dentro do orçamento	e) Dentro do prazo e do orçamento	h) Atrasado e dentro do orçamento
	c) Adiantado e acima do orçamento	f) Dentro do prazo e acima do orçamento	j) Atrasado e acima do orçamento

Part III -Software Processes and Development methods

[B1] Which of the following sentences is false?
(choose one)

    A. The RAD process model can be problematic when used in projects where it is not possible to modularize and build clear separate components.
    B. The Waterfall process model hardly accommodates change once it has started.
    C. The Waterfall model can have blocking stages during the process.
    D. The Waterfall model explicitly requires expertise in project management and risk analysis.
    E. The RAD process can use a non ideal technological platform to deliver a *quick and dirty product just to prove the concept.*
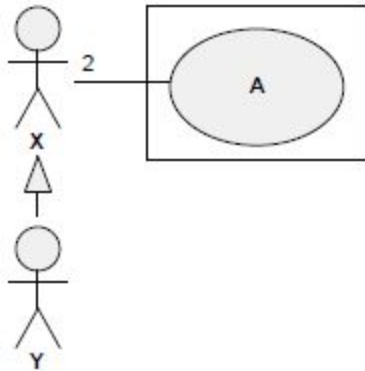

[B2] Which of the following sentences is true about the Waterfall Process Model?
(choose one)

    A. May create pressure from users to deliver earlier
    B. May use a less-than-ideal platform to deliver quick and dirty
    C. Working version not available till late in process
    D. If your management demands fixed-budget development, with clear deliverables, in the beginning of the process, it can be problematic
    E. Suited to new and different systems from previous experience, with bleeding edge technology, because it can deal with the specification uncertainty

Part IV - Casos de uso e cenários

[B3] The following Use Case Diagram was modeled according to UML2 standard. Which combinations of actors communicate with Use Case A?
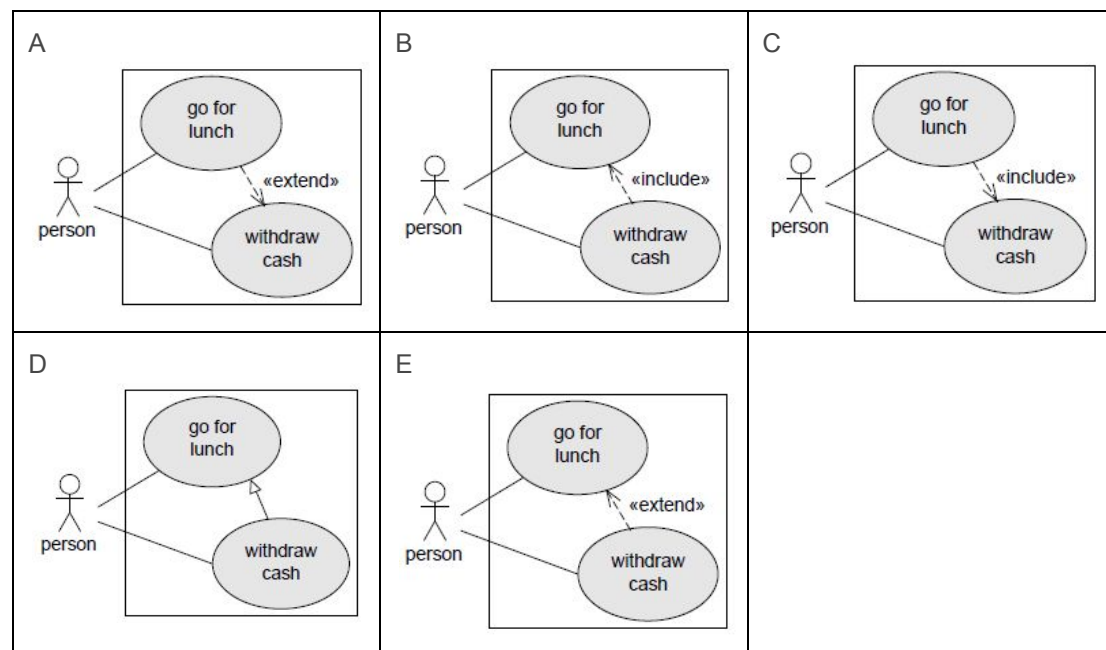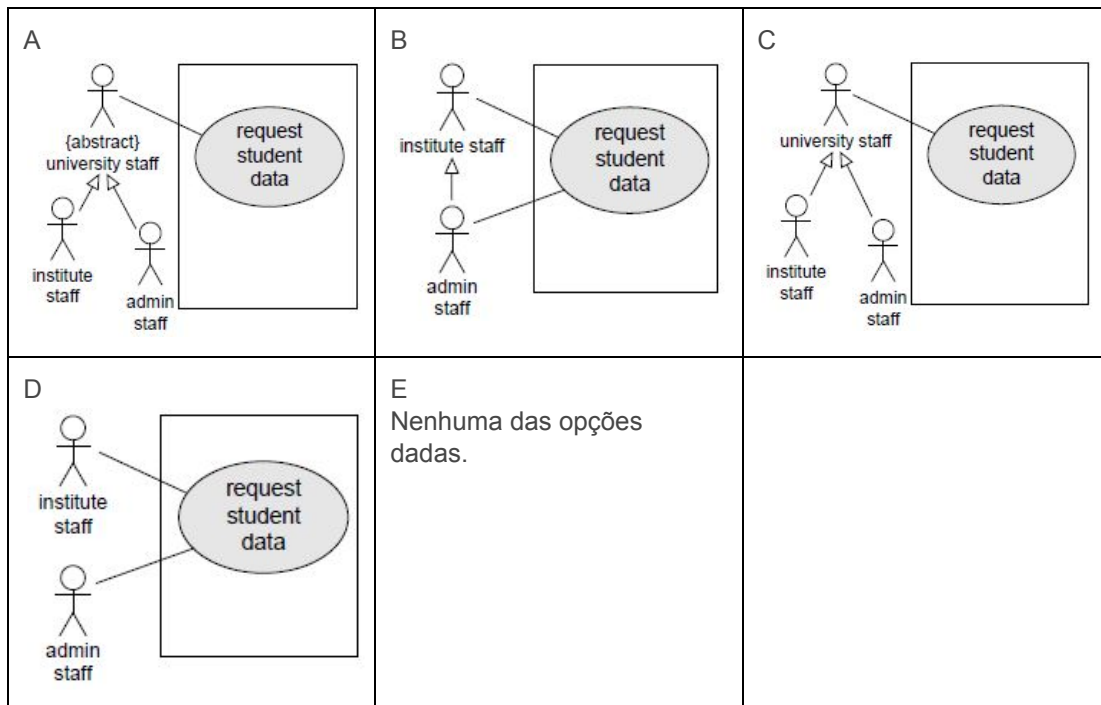

A. Y and Y
B. X and X
C. X or Y
D. Y
E. X

[B4] How do you model the following situation with a UML2 use case diagram:
"A person goes for lunch. In the course of that it might be necessary that the person withdraws cash from an ATM."
(choose one answer)

[B5] How do you model the following situation with a UML2 use case diagram:
"Student data is requested by either institute staff or administration staff, but not both at each time."
(escolha uma resposta)

A	B	C

D	E	
	Nenhuma das opções dadas.	

Consider now the following scenario of the use case "Book a hotel":

Name: Book a hotel
Description: The client inserts information to book a room in the system
Actors: Client
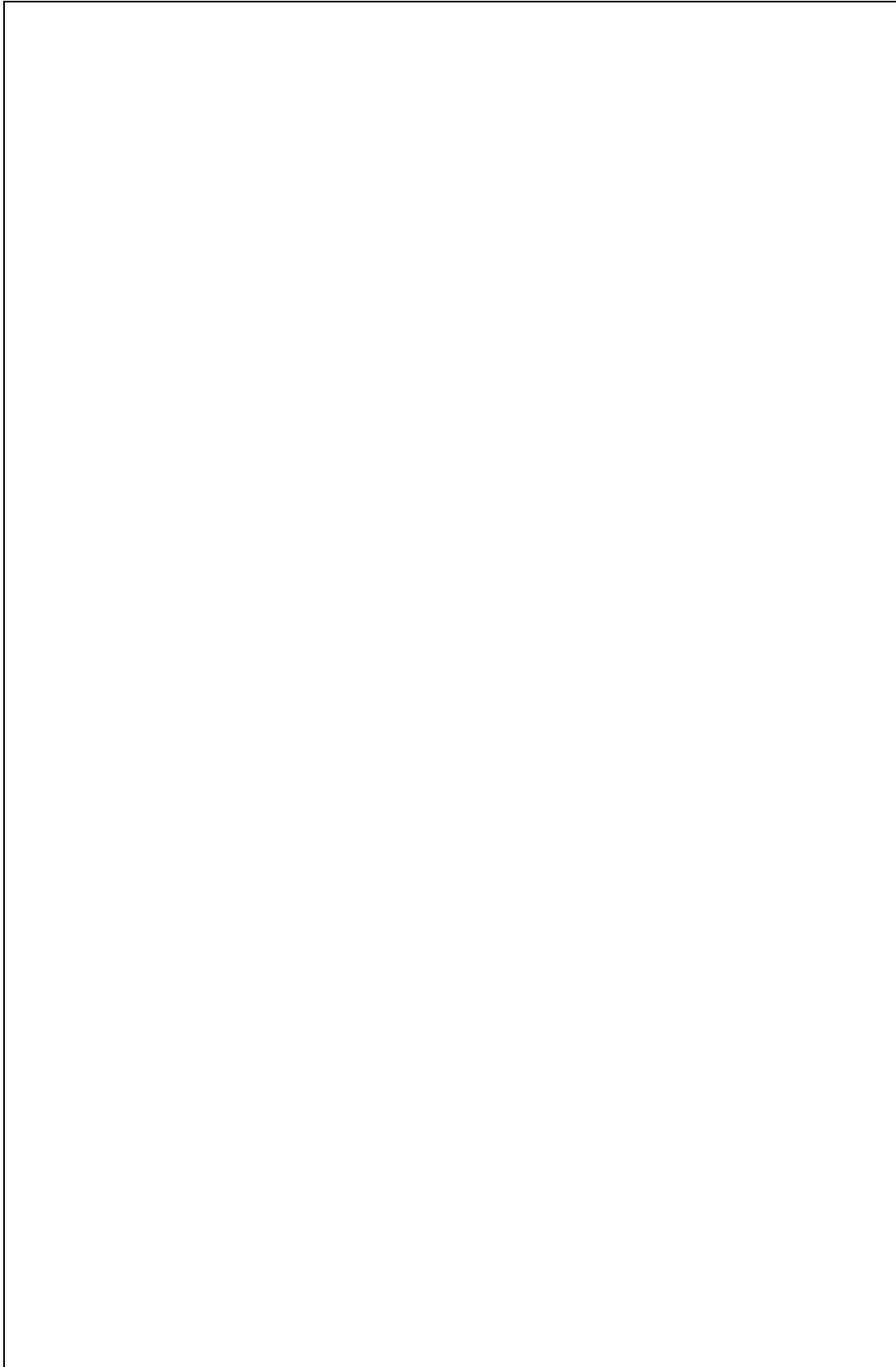**Pre-conditions:** None

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Main scenario:

1. The client starts by choosing the hotel he/she wants to book
2. The system shows the details of the hotel
3. The client selects the option to book the hotel
4. The system asks the client his/hers information
5. If the client has an account
    5.1. If the client signs in using his/hers account
        5.1.1. The system uses the saved data
    5.2. Else
        5.2.1. The client inserts his/hers information
        5.2.2. The system uses the inserted information
6. Else
    6.1. The client inserts his/hers information
    6.2. The system uses the inserted information
7. The system asks the client for the check-in and check-out dates
8. If there are available rooms
    8.1. The system asks the user to confirm the booking
    8.2. If the client confirms the booking
        8.1. The system shows the details of the booking concluding the use case
9. Else
    9.1. The use cases goes to step 7.
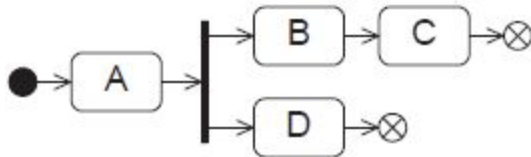10. The use case finishes.

Post-conditions: None

Define and add an extension point to the previous use case so that the client can create an account during the booking process.

Represent the corresponding Use Case Diagram and describe the extension using the scenario description textual notation as before. If necessary, add details to the Use Case above.
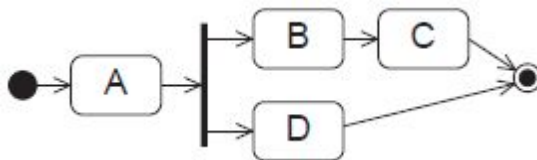
Part V - Activity Diagrams

[B6] You are given the following activity diagram. Which of the following action sequences **is not** possible to finish the entire activity during one execution of the activity diagram (choose one)?

   A.   A → D → B → C
   B.   A → B → C
   C.   A → B → D → C
   D.   A → B → C → D
   E.   none of the above

[B7] Tendo em conta o diagrama de atividade seguinte, quais das seguintes sequências de ações **não será** possível de acabar durante uma execução completa do sistema descrito (escolher uma afirmação)?

   A.   A->B->D->C
   B.   A->B->D
   C.   A->B->C
   D.   A->D
   E.   … Nenhuma das anteriores.

[B8] A decision node in a UML2 activity diagram …

(choose the false statement)
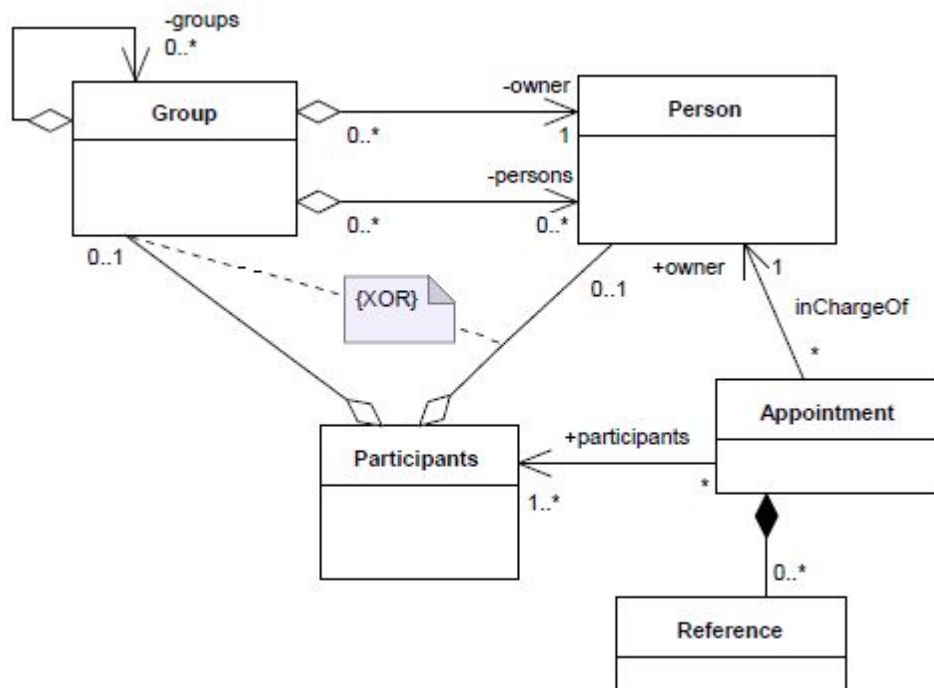
   A.   ... can be used to model loops if combined with a merge node.
   B.   ... specifies the direction of the control flow with guard conditions.
   C.   ... is noted as a diamond with one incoming and multiple outgoing edges.
   D.   ... should have mutually exclusive guard conditions on all outgoing edges.
   E.   ... passes control to all outputs at the same time.

Build an activity diagram to enter a Car Parking, with the following characteristics. Firstly, the driver can only access the park if there are places available. He/she can enter the car park selecting only one of 3 options: getting an ordinary ticket, choosing "Via Verde" or using a card of frequent user. If the ticket option is selected, the ticket is printed and must be collected from the machine otherwise after 15 seconds the machine gets it back and the driver is not allowed to enter. If Via Verde is selected, the identifier, that must exist on the windscreen of the vehicle, must be validated by the Via Verde sensor – if it is valid, the car can enter, otherwise an error message is displayed to the driver and he cannot access the park. If a card is used, this is also validated where the expiration date is checked. Once the entrance option is chosen and validated, simultaneously the entrance is saved in the system and the barrier is lifted. Only when the vehicle passage is detected the barrier goes down.

Part VI - Object and Class Diagrams
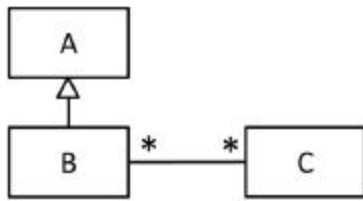
Consider the following UML2 Class Diagram:

[B9] Which of the following sentences is false? (choose one)

A- An appointment can be made for multiple participants.
B- One group can consist of several persons.
C- One person can be included in several groups.
D- There are groups that do not have any persons assigned.
E- It is possible to navigate from a person to the appointments that he is in charge of.

[B10] Still related to the previous figure, which of the following sentences is true? (choose one)

A- Several persons are in charge of one appointment.
B- If an appointment is deleted all references linked with it are deleted as well.
C- A participant that has been assigned to an appointment can be group and person at the same time.
D- A reference can be assigned to multiple appointments.
E- There are appointments that do not have any participants assigned yet.

[B11] You are given the following clipping of a UML2 class diagram. Which of the following object diagrams are consistent with the class diagram?
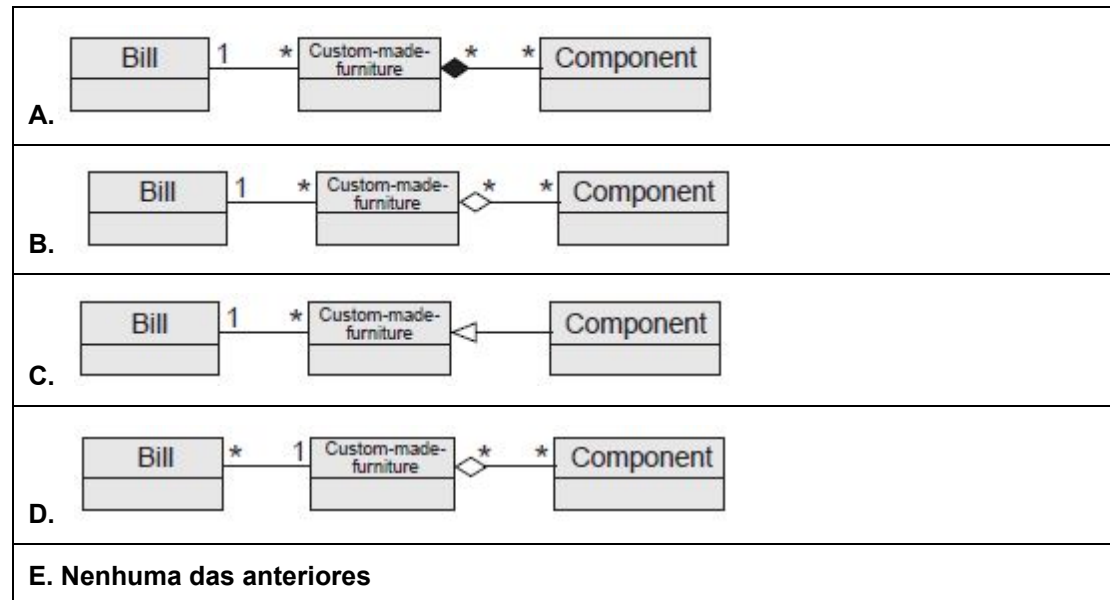

(choose one)

A.	**B.**	**C.**
<u>a1 : A</u> —— <u>b1 : B</u>	<u>b1 : B</u> —— <u>c1 : C</u>	<u>b1 : B</u> === <u>c1 : C</u>
D.	**E. none of the above**	
<u>a1 : A</u> —— <u>c1 : C</u>		

[B12] - How do you model the following situation with a UML2 class diagram:

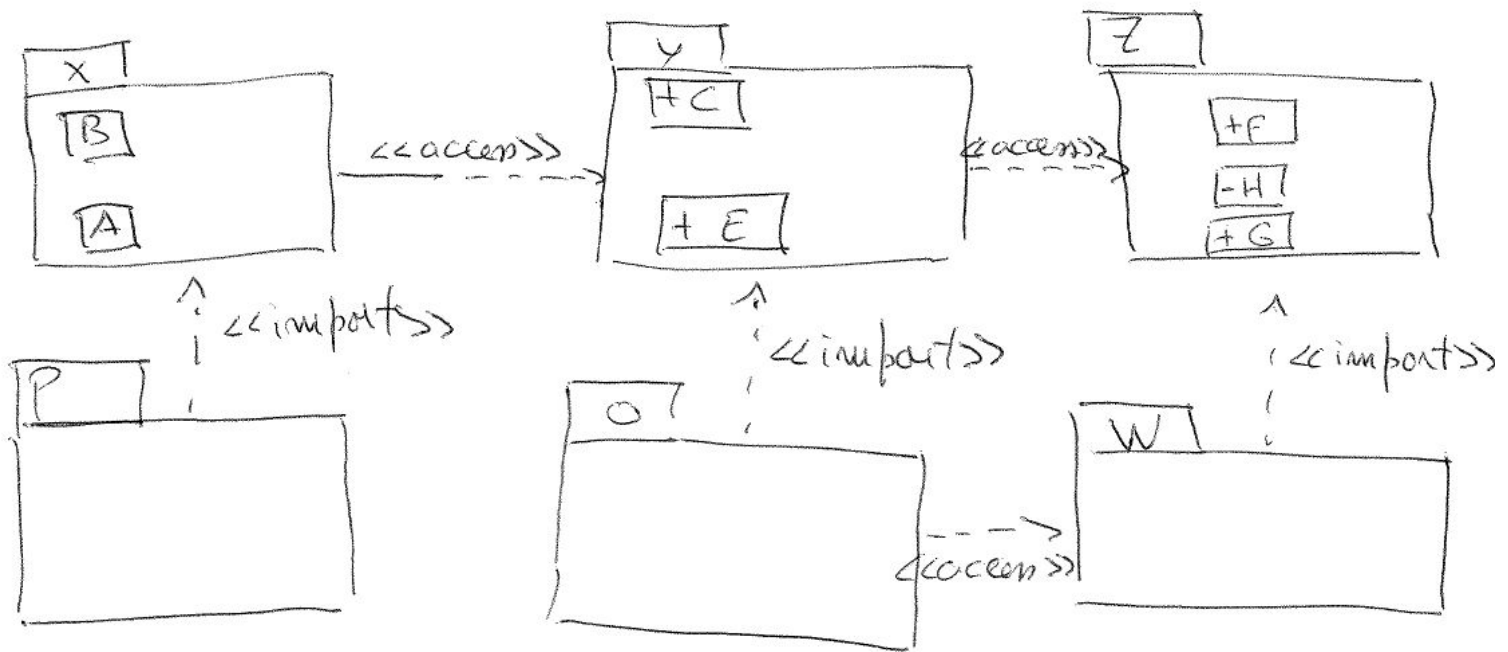*"I-Q-A charges custom-made furniture which is assembled from prefabricated components."*

(choose the most correct answer)

A.	Bill —1 * Custom-made-furniture ◆—* * Component
B.	Bill —1 * Custom-made-furniture ◇—* * Component
C.	Bill —1 * Custom-made-furniture ◁— Component
D.	Bill —* 1 Custom-made-furniture ◇—* * Component
E. Nenhuma das anteriores	

Part VII - Package Diagrams

Consider the following package diagram::

[B13] Which of the following statements is true?
(choose one)

    A. O can see C and E and F
    B. W can see F and H and G
    C. X can see H
    D. X can see C and F
    E. none of the above

[B14] Consider now that we add an import relation where P imports W. Which of the following statements is true?
(choose one)

    A. P can see F
    B. P can see C and G
    C. P can see A and B
    D. O can see C and E
    E. O can see F and H and G