Test 1

Métodos de Desenvolvimento de Software
2014/2015
30th of October 2014
19h00
Departamento de Informática
Universidade Nova de Lisboa
(duration 2h00)

Attention: This test, with some few exceptions, is mainly multiple choice. Wrong answers will have a proportional negative impact on the question result.

I For multiple choice questions where it is required to select just one, each wrong answer discounts half of the question's value in the overall grade.
II
Múltiplas afirmações para indicar todas as que se aplicam – cada opção errada desconta: VALOR DA PERGUNTA / NÚMERO DE OPÇÕES até 0 valores na pergunta, nunca atingindo valores negativos (ex. Em 5 opções acertar 3 e falhar 1, não responder 1, significa ter 2/5 da cotação da pergunta).

For multiple choice questions where it is supposed to determine which options are true and which are false, or don't know, each wrong answer discount: (Value of the question)/(Number of Options) until it reaches 0, never being negative (eg. In 5 questions, when you have 3 correct, 1 wrong and 1 don't know, the result is 2/5 of the value for that question).

All the questions must be answered in the sheets of papers given by the teacher.

All the sheets of paper must have name and number in order to be considered for evaluation.

You can use both pencil and pen.

It is allowed to quit the Test only 30 minutes after it started. You should write that you quit in the first page and notify the teacher.

After 2 hours the teacher will collect the papers with the answers.

Parte I – Software Engineering

1. Which model is popular for students small projects. These projects can be caraterized as being: small sized, team composed by unexperienced staff, using unknown or new technology, no clear interpretation of the requirements because there is the learning phase during the semester when the project is being developed. ? (choose one)

(a) Waterfall Model
(b) Spiral Model
(c) Quick and Fix model
(d) Prototyping Model
(e) Rapid Application Development (RAD)
(f) Jacuzzi

2. The project risk factor is not explicitely considered in ? (choose all that apply, mark as T -true F -false, or nothing if you don't know)

(a) Waterfall Model
(b) Spiral Model
(c) Prototyping Model
(d) Iterative enhancement Model
(e) Rapid Application Development (RAD)

3. Waterfall model is not suitable for ? (choose all that apply, mark as T -true F -false, or nothing if you don't know)

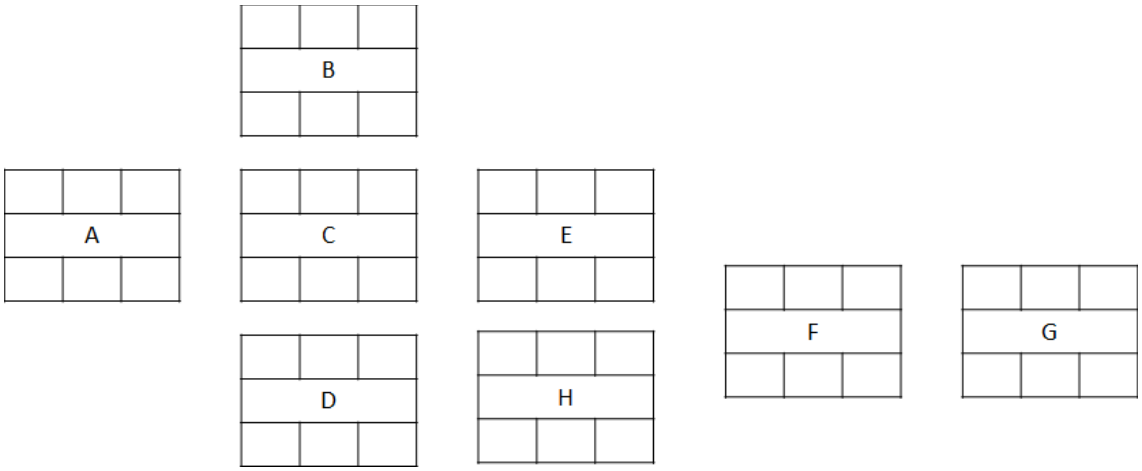
(a) Small Projects
(b) Complex Projects
(c) Accommodating change
(d) None of Above

4. The spiral model of software development (choose one)
(a) Ends with the delivery of the software product
(b) Is more chaotic than the incremental model
(c) Includes project risks evaluation during each iteration
(d) All of the above

II – Project Planning

1. Complete according to the following table the corresponding Activity On Node (AON) Diagram below:

Task	Predecessors	Duration (days)
A	-	5
B	A	5
C	A	20
D	A	10
E	B,C	20
F	D,E	15
G	F	5
H	D	15



a) Identify the critical path (task IDs followed by arrows):

b) The estimated duration of this project is ___ days.

III – Project Monitoring

1. Consider the following information regarding the evolution and current status of the project you are currently supervising :

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	
Planned Value	500	3000	5500	8000	10500	13000	14000	16500	19000	21500	24000	
Actual costs (	1500	1500	3000	4500	6000	7500	9000	10500	12750	15000	15666,66667	
Earned Value	500	500	5500	5500	5500	5500	5500	10500	12250	14000	19000	
CPI (EV/AC)	0,33	0,33	1,83	1,22	0,92	0,73	0,61	1,00	0,96	0,93	1,21	
SPI (EV/PV)	1,00	0,17	1,00	0,69	0,52	0,42	0,39	0,64	0,64	0,65	0,79	

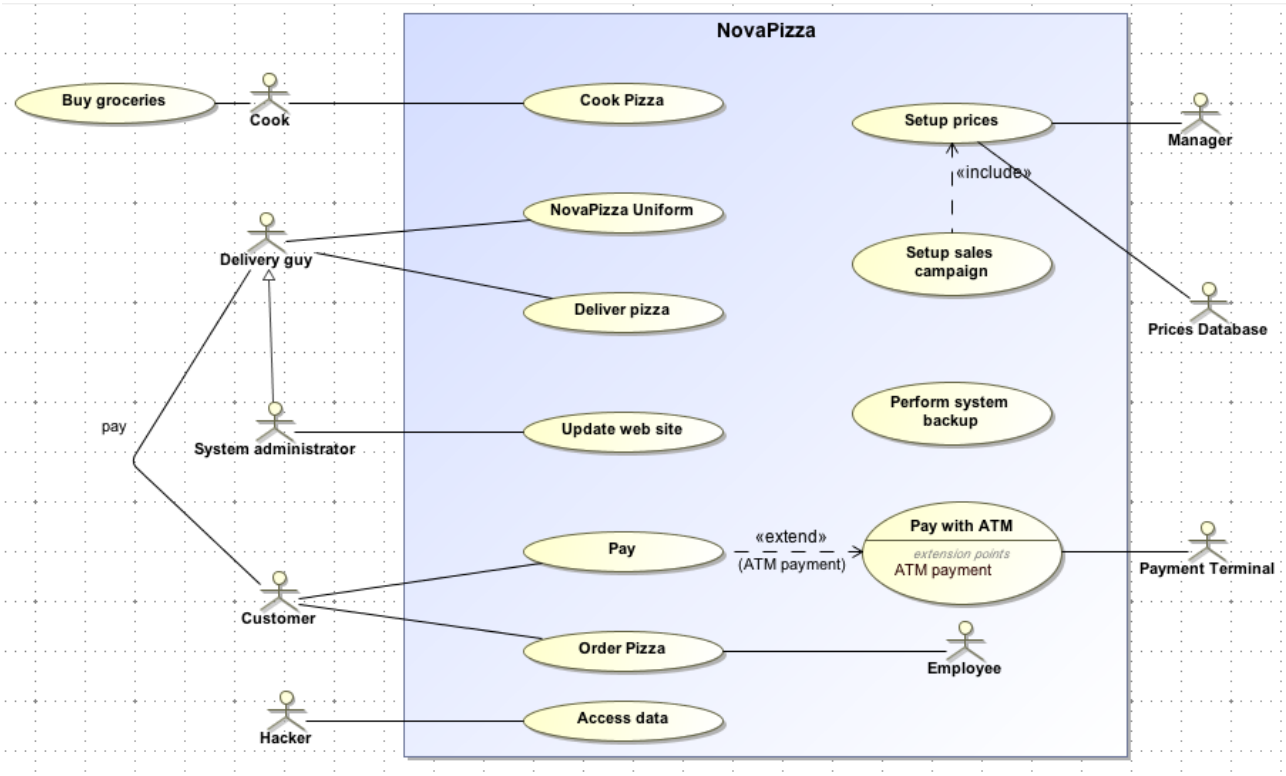
Attention: Consider a relative error margin of ±10% in the indexes values, meaning that values between 0,9 and 1,1 can be considered approximated to 1.

According to these figures the current status of this project, presently in **week 11**, is (cross the one that applies):

Performance Measures	**Schedule**		
Cost	a) Ahead of Schedule and Under Budget	d) On Schedule and Under Budget	g) Behind Schedule and Under Budget
	b) Ahead of Schedule and on Budget	e) On Schedule and on Budget	h) Behind Schedule and On Budget
	c) Ahead of Schedule and Over Budget	f) On Schedule and Over Budget	j) Behind Schedule and Over Budget

IV – Use Case Diagrams

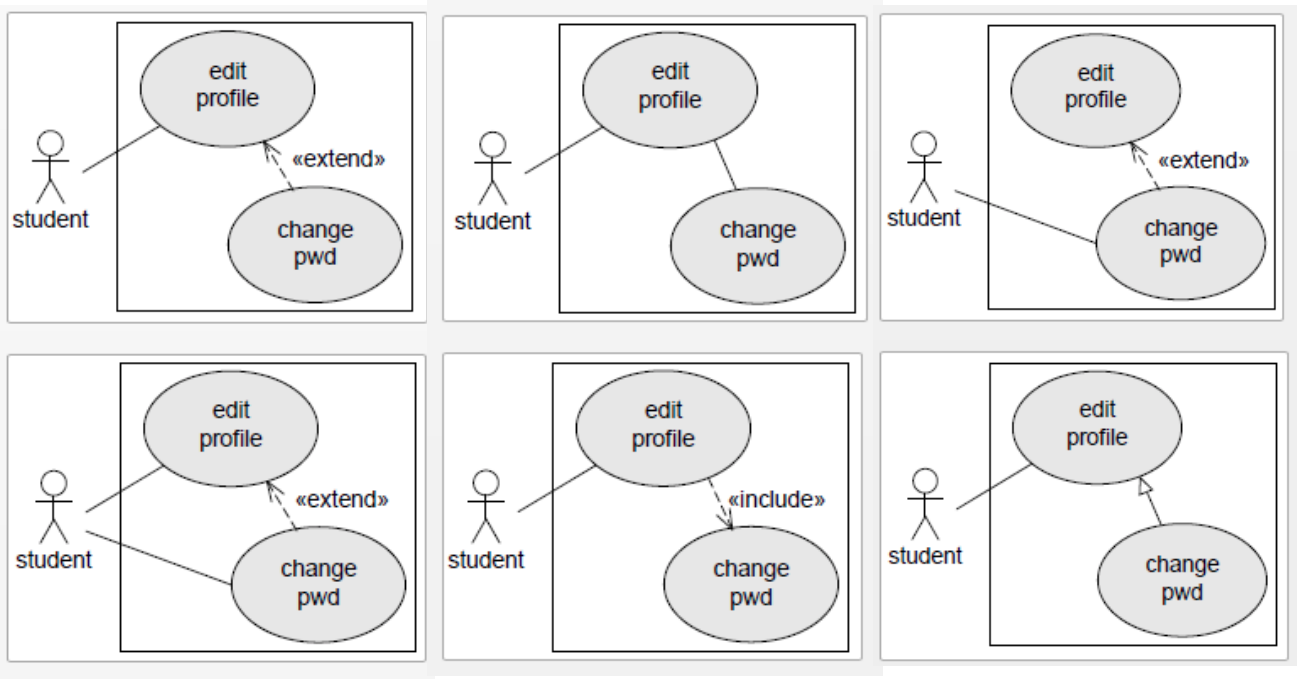
1. Identify all the reasons why the diagram is incorrect. Mark in the picture the incorrections with a code label (e.g. A,B,C,...) and justify below in the open box in one sentence for each one of them.



2. Actors in a use case diagram …
(mark each answer with T true or F false, leave blank if unsure)

(a) … represent roles of the users of the described system
(b) … communicate with use cases and other actors
(c) … can be linked to each other by inheritance
(d) … interact with the system in the form of <<include>>-relationships
(e) … might be used by the described system
(f) … can be linked to abstract and non-abstract use cases via associations
(g) … interact with the described system
(h) … are always located within the described system
(i) … might use the described system.

3. How do you model the following situation with a UML2 use case diagram:
"A student edits his user profile. In the course of that he can also change his password if he likes."



V – Activity Diagrams

1 - A decision node in an activity diagram …
(choose True or False the following options that complete the sentence, don't put nothing in case you don't know)

(a) ... passes control to one of several outputs
(b) ... is noted as a diamond with one incoming and multiple outgoing edges
(c) ... should have mutually exclusive guard conditions on all outgoing edges
(d) ... can be used to model loops if combined with a merge node.
(e) ... together with the outgoing edges and guard conditions specify the direction of the control flow.

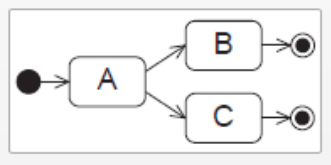
2 - A fork node of an activity diagram …
(choose True or False the following options that complete the sentence, don't put nothing in case you don't know)

(a) ... is an equivalent alternative to the decision node.
(b) ... is only valid when combined with a join node.
(c) ... is used for modeling parallel threads.
(d) ... produces tokens for all outgoing edges.
(e) ... deletes tokens which are not accepted.

3 - Which of the following nodes are elements of a activity diagram? (mark each answer with T true or F false, leave blank if unsure)

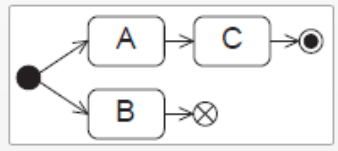
(a) knife node
(b) action node
(c) decision node
(d) flow final node
(e) distribution node
(f) fork node
(g) join node
(h) control node
(i) object node
(j) communication node

4- You are given the following activity diagram. Which of the following action sequences are possible during one execution of the activity diagram?
(mark each answer with T true or F false, leave blank if unsure)



(a) A → C → B
(b) A → B
(c) A → C
(d) A → B → C

5- You are given the following activity diagram. Which of the following action sequences are possible during one execution of the activity diagram?(mark each answer with T true or F false, leave blank if unsure)



(a) B
(b) A → B → C
(c) A → C
(d) A → B
(e) A → C → B

6- Draw, in the next page, the activity diagrams corresponding to the following Use case description of a Drink Vending Machine:

Name: Get Drink
Description: The customer pays to get a drink
Main Actors: Customer
Secondary Actors: None
Pre-condition:

Main Flow:
1. The use case starts with the Customer pushing the “Get Drink” button.
2. The Machine asks for the code of the drink to be retrieved
3. The Customer inserts code
4. The Machine shows price to be payed
5. The Customer inserts coins
6. The Machine does simultaneously:
    a. drops the drink in the basket
    b. gives change
7. The Machine shows a message: “Please take your change and drink. Have a nice day”
8. The Use Case ends

Post-conditions: None

Alternative Scenarios: *Problem with drink, Cancel*

Use Case: Get Drink: *Problem with drink*
Description: The customer has inserted a code that is incorrect or the requested drink is not available
Main Actor: Customer
Secondary Actor: None

Main Flow:
1. The Alternative flow starts before step 4.
2. If the code does not exist: The Machine shows a message saying that “The drink's id does not exist, please try again.”
3. If the drink is no longer available: The machine shows a message saying “This drink is not available on stock.”
4. Return to step 2.

Post-conditions: None

Use Case: *Get Drink: Cancel*
Description: The Customer presses the “Cancel” button.
Main Actor: Customer
Secondary Actor: None

Main Flow:
1. The Alternative flow starts at any step.
2. If there are coins inserted: The Machine gives coins back
3. Return to step 2.

Post-conditions: None

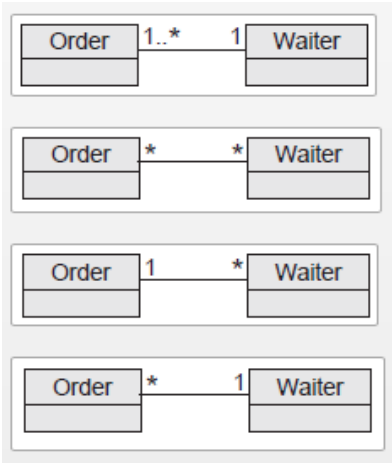
VII – Class and Object Diagrams

1. Which of the following statements about the given diagram are true?
(mark each answer with T true or F false, leave blank if unsure)

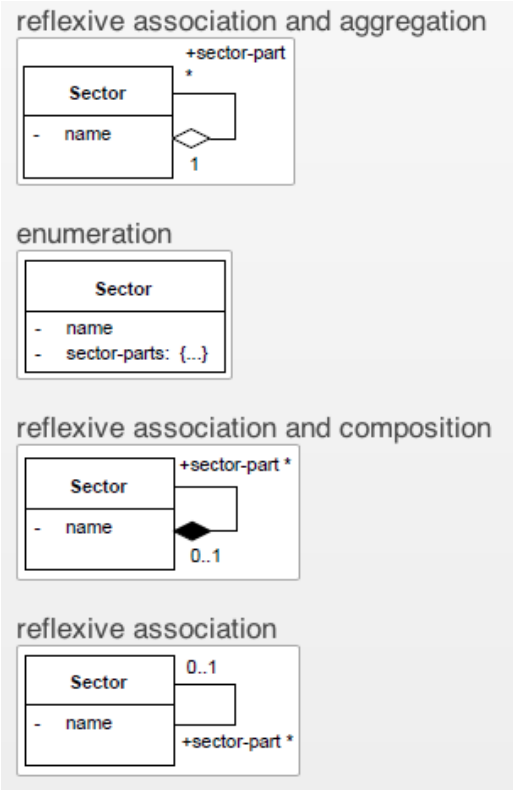
(a) B is part of A.
(b) The composite objects form a tree structure.
(c) A is part of B.
(d) The chains of aggregation links form a directed, acyclic graph.
(e) If an instance of A is deleted, the contained instances of B are not affected.
(f) If an instance of B is deleted, all contained instances of A are also deleted.
(g) If an instance of A is deleted, all contained instances of B are also deleted.

(h)

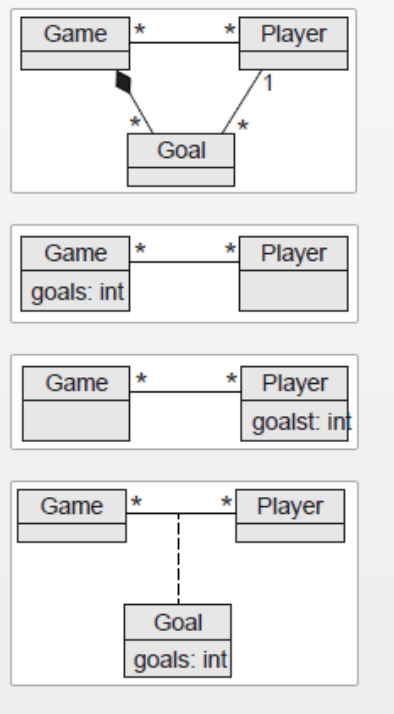
2- *How do you model the following situation with a UML2 class diagram:*
An order is made with exactly one waiter, one waiter can handle multiple orders. (choose one)



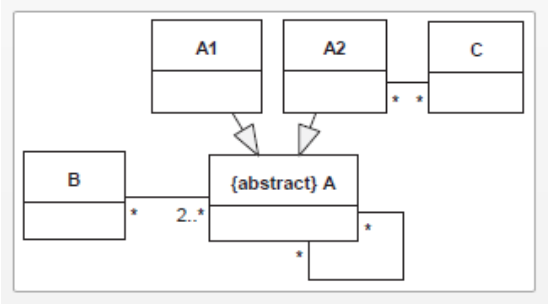
3- How do you model the following situation with a UML2 class diagram:
"A fitness center consists of several sectors. One sector may be divided into several sectors which might as well be divided into sectors and so on." (choose one)



4 - How do you model the following situation with a UML2 class diagram:
During one soccer season, multiple players participate in multiple games. Each player scores in each game a certain number of goals. (choose one)

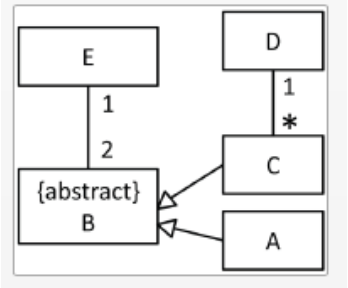


5 - You are given the following clipping of a UML2 class diagram. Which of the following statements are true?
(mark each answer with T true or F false, leave blank if unsure)



(a) An object of A1 can be associated with an object of B.
(b) Each object of A1 has to be an instance of A.
(c) One object of A1 may be associated with an object of A2.
(d) There exist objects of class B that are not associated with objects of class A2.

6- 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)



Options: