Test 2

Métodos de Desenvolvimento de Software
2014/2015
19th of October 2014
17h00
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
Multiple choice questions to choose all that apply – each wrong option discounts: total value / nr of options where the minimum value of the hole question is 0. (I.e. if a question has 5 options and you heve 3 answers correct and one fails , leavin one unsanwered, means that you have 2/5 of the total value of the question).

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.

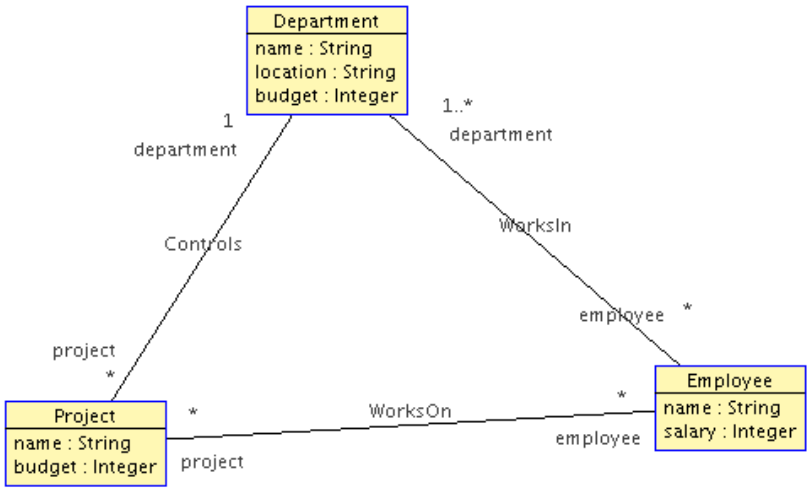
You can use both pencil and pen.

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.

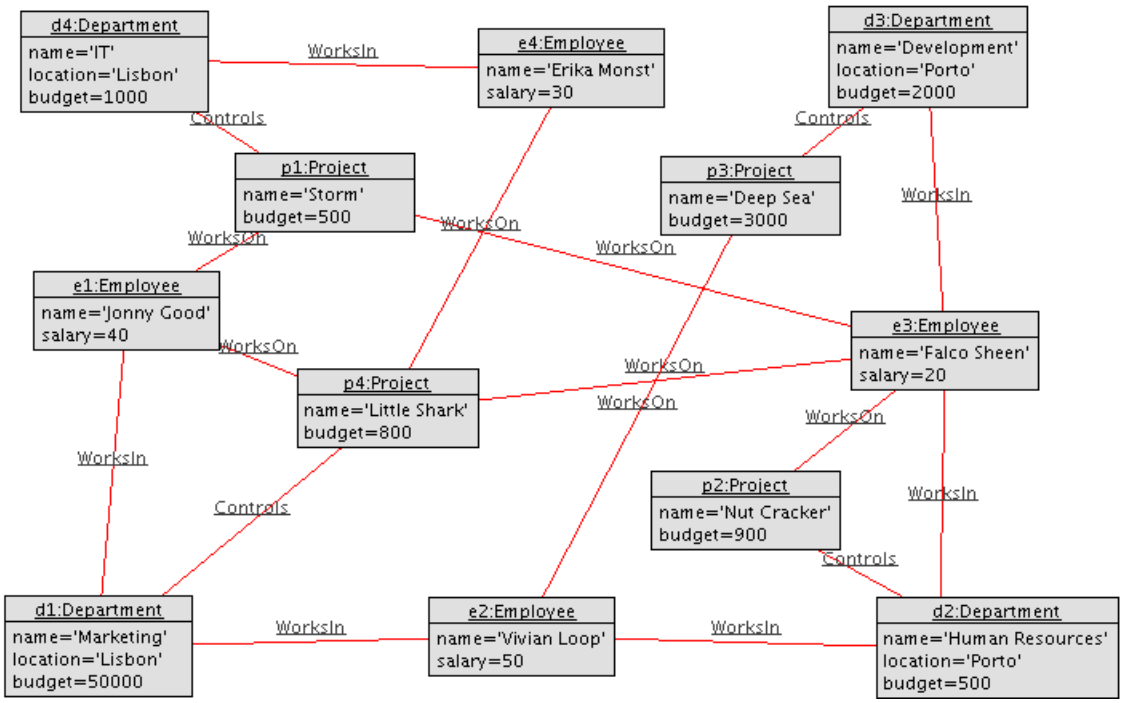
After 2 hours the teacher will collect the papers with the answers.

Parte I – Class Diagrams and OCL

Suppose that a System Analyst, after doing a domain analysis, designs the following class diagram related to a specific company:



Consider that we have the following object diagram (instances that conform to the previous model):



Taking into consideration the previous diagrams:

1- Consider the following OCL expression:

p1.department.employee.forAll(e:Employee| e.salary<=50)

The result of evaluating the previous expression is (choose one):

a) Bag{'Erica Monst','Falko Sheen','Johny Good'} : Bag(String)
b) 'Erica Monst' : String
c) Bag{'Erica Monst'} : Bag(String)
e) @e4: Employee
f) 30 : Integer
g) Set{30} : Set(Integer)
h) Bag{@e4} : Bag(Employee)
i) Set{@e4} : Set(Employee)
j) True: Boolean
k) False: Boolean

2- Given the following OCL expressions identify which is true (T) or false OCL, in the context of the previous diagrams:

T F a)Context Department inv: not Department.allInstances->forAll(d1,d2| d1.budget<>d2.budget)

T F b) Context Department inv:
not Department.allInstances->exists(
d1,d2| d1<>d2 implies d1.budget<>d2.budget)

T F c) context Project inv:
(self.budget <= self.department.budget)

T F d) context Department inv:
(self.employee->size > self.project->size)

T F e) context Project inv:
self.department.employee->includesAll(self.employee)

T F f) context Employee inv:
self.department.select(budget>1000)->isEmpty()

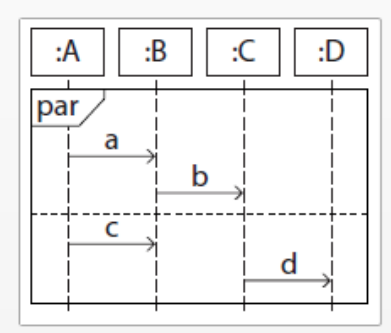
T F g) context Departament inv:
self.employee.select(salary<50)->forAll(v|v.salary>30)

T F h) context Departament inv:
self.employee.select(salary20)->forAll(v|v.project->isEmpty())

3- Write in OCL the invariant constraint that says that the employees names are unique:

II – Sequence Diagrams

1 - You are given the following sequence diagram. Which traces are possible? (select which are true T and which are False)



a) T F c → a → d → b

b) T F a → c → b → d

c) T F c → d → a → b

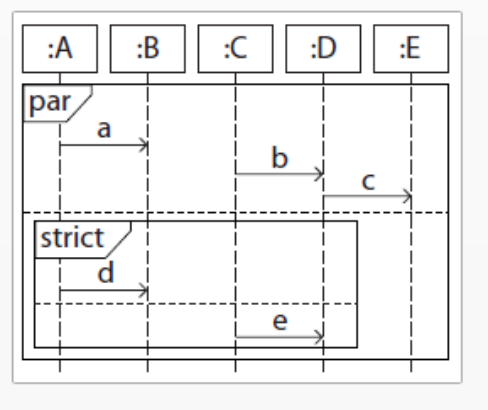
d) T F a → b → d → c

e) T F a → b → c → d

f) T F b → a → c → d

g) T F d → a → b → c

2 - You are given the following sequence diagram. Which traces are possible? (select which are true T and which are False)



a) T F b → a → d → c → e

b) T F b → c → d → a → e

c) T F a → e → b → c → d

d) T F a → d → b → e → c

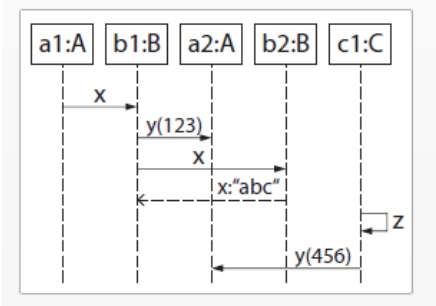
e) T F a → d → c → b → e

f) T F e → d → a → b → c

g) T F d → e → a → b → c

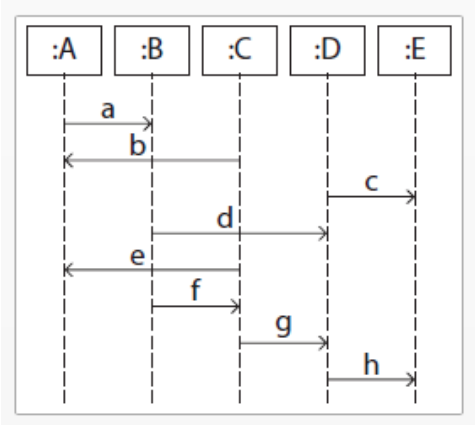
h) T F a → d → e → b → c

3 - You are given the following sequence diagram. Which operations does class B have according to the diagram?(select which are true T and which are False none if you do not know)



a)	T	F	x():void
b)	T	F	x(void)
c)	T	F	x(String):void
d)	T	F	z():void
e)	T	F	y():void
f)	T	F	x():String
g)	T	F	y(int):void
h)	T	F	z():int
i)	T	F	x():int
j)	T	F	y():int

4 - You are given the following sequence diagram. Which traces are possible?(select which are true T and which are False)

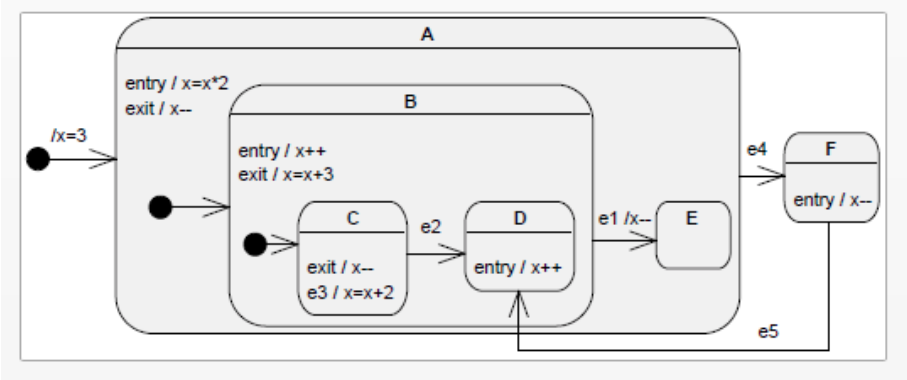


a)	T	F	a → b → d → c → e → f → g → h
b)	T	F	a → b → c → e → d → f → g → h
c)	T	F	a → b → c → d → e → f → g → h
d)	T	F	c → a → d → b → e → f → g → h
e)	T	F	a → b → c → d → e → f → h → g
f)	T	F	b → a → c → e → d
g)	T	F	a → b → c → d → e
h)	T	F	b → e → a → c → d

5 – Imagine that a colleague of yours at your work involved in a project passes you a sketch of his Sequence diagram describing the use case “Pay Goods” from a “Supermarket” Information System. He want to have your feedback about its quality. Which advice would you give to him regarding the problems this diagram might have? (point out in the diagram the mistakes and explain them in text)

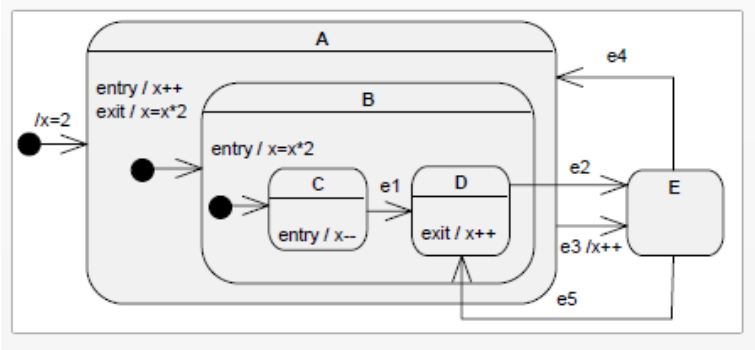
III – State Charts

1- You are given the following state machine diagram. What is the value of x after the occurrence of the event chain e4 e5 e1?



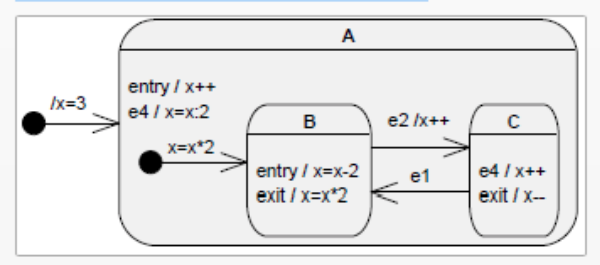
Answer (value):

2- You are given the following state machine diagram. What is the value of x after the occurrence of the event chain e1 e2 e5 ?



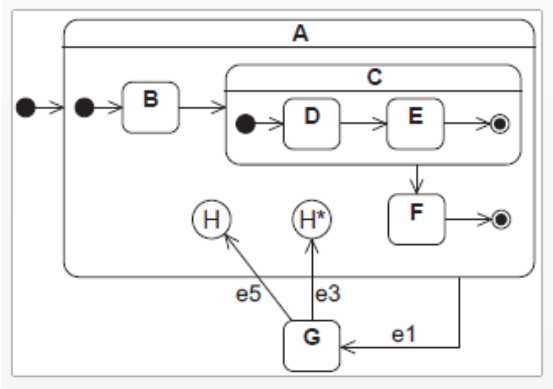
Answer (value):

3- You are given the following state machine diagram. What is the value of x after the occurrence of the event chain e2 e4 e4 e1 e4 e2?



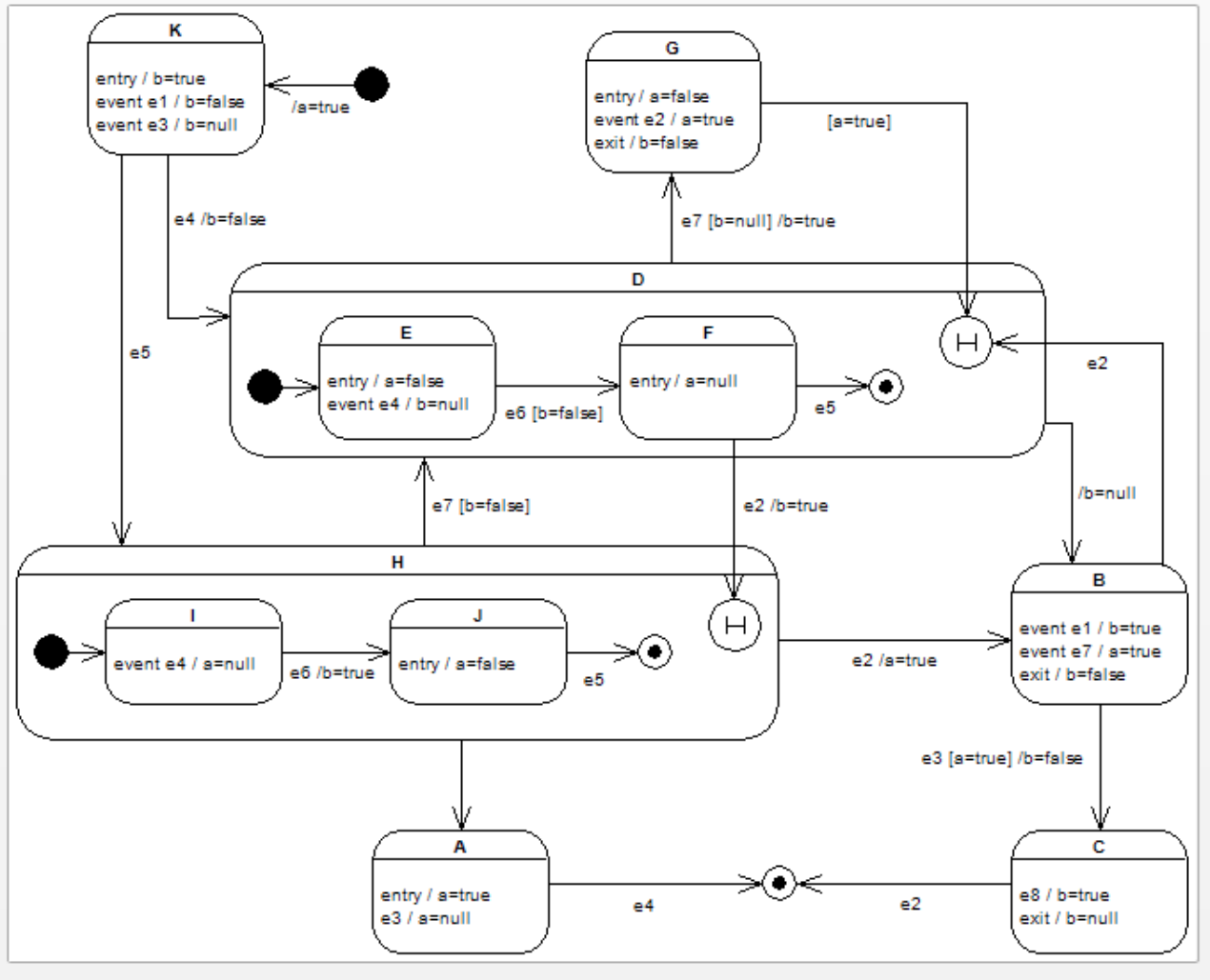
Answer (value):

4- You are given the following state machine diagram. Which of the following statements are correct?



a) T F Assuming state E is active and the event e1 occurs, then G becomes the next active state. As soon as e5 occurs, C and more specifically D becomes active.
b) T F It is possible, that C and F are active at the same time.
c) T F Assuming state E is active and the event e1 occurs, G becomes the next active state. If now e3 occurs, C and more concretely D becomes the next active state.
d) T F In the beginning, state B is active.
e) T F Assuming state G is active and the event e5 occurs, then B becomes the next active state - regardless of which substate was active before.

5- You are given the following state machine diagram. After the occurrence of each of the event chains identify the corresponding active state.



a) State:___ e1 e3 e4 e4 e6 e2 e5
b) State:___ e1 e2 e3 e4 e5 e6 e5 e4 e3
c) State:___ e1 e5 e3 e2 e3 e4 e5
d) State:___ e3 e2 e1 e3 e2 e3 e4 e7 e2
e) State:___ e5 e7 e4 e6 e2 e1 e2 e6 e2 e2