ECE PARIS
ÉCOLE D'INGÉNIEURS

Prénom : .....
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Groupe : .....

ING 4
Génie logiciel avec UML
Devoir surveillé

Int.

15 décembre 2017
08:30 - 10:00
Durée : 01:30

Sujet proposé par : ZIADI Tewfik
Calculatrice autorisée : NON
Documents autorisés : NON
Ordinateur autorisé : NON

RAPPEL :

- NOM et Prénom de l'élève doivent être portés sur toutes les copies rendues.
- Les copies doivent être numérotées.
- Tous les appareils électroniques (téléphones portables, PDA, ordinateurs, montre connectée, etc.) doivent être éteints et rangés.
- **Toute erreur constatée sur le sujet doit être signalée sur la copie. Le correcteur en tiendra compte lors de la correction du devoir.**
- Il est interdit de communiquer.
- Toute fraude, ou tentative de fraude, qu'elle soit passive ou active, fera l'objet d'un rapport de la part du surveillant et sera sanctionnée par la note zéro, assortie d'une convocation devant le Conseil de discipline. Aucune contestation ne sera possible. Tous les documents et supports utilisés frauduleusement, devront être remis au surveillant.
- Les élèves ne sont pas autorisés à quitter la salle où se déroule l'épreuve moins de 45 minutes après le début de l'épreuve. Au-delà de ces 45 premières minutes, toute sortie est définitive (sauf dans le cas d'une épreuve durant plus de deux heures).

Software Engineering with the UML (2017-2018)

- Duration 1h30 hours. 20 points.
- All documents, computers, and smartphones forbidden.
- Read all the questions before answering.
- International section students MUST reply in English.

Theory (4 points)

1. Illustrates using a concrete example how we can implement a test case using the JUnit framework. You can use a concrete example of your choice that illustrates the test of a single class.
2. Explain briefly the concept of software product lines.

3. Explains the principals of FeatureHouse, presented in the course and in the labwork, to implement software product lines in Java.

Exercise (4 points)

Figure 1 shows a portion of the class diagram of a simple banking application, while Figure 2 shows a sequence diagram of the **same application.**

Question: Provide the needed modifications to be added to the class diagram of Figure 1 to be coherent with the sequence diagram of Figure 2.

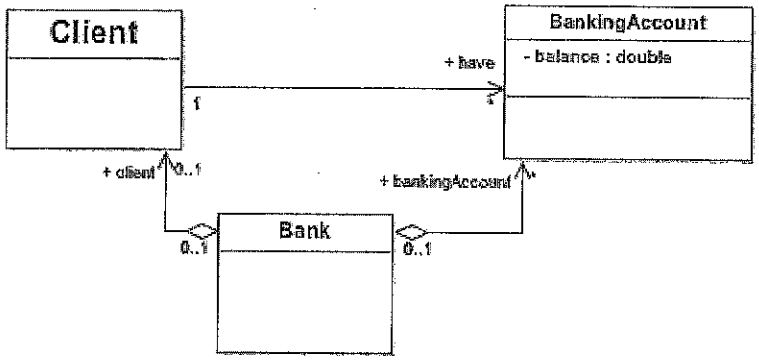

Figure 1. a class diagram of a banking system.

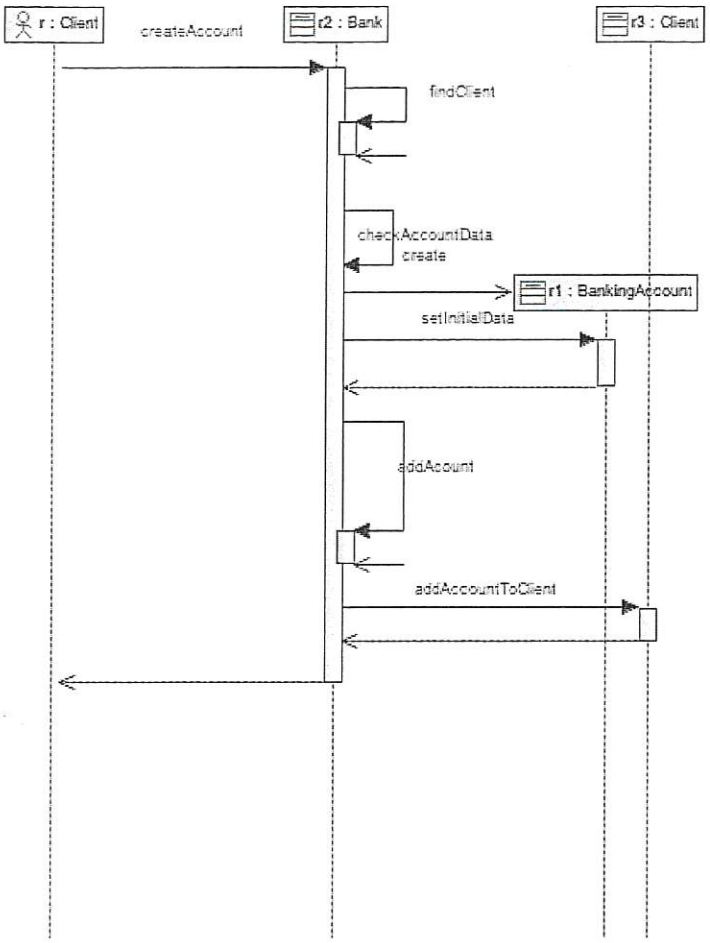

Figure 2. Un example of UML sequence diagram if the banking application.

Case study (12 points)

The real estate agency MONIMMO manages a group of properties (apartments or houses) for rent. This involves acquiring new properties for rent and finding customers to rent these properties. Only the director of the agency is authorized to add new properties to the lease. A good is described by its surface, its address and its number of pieces. If it's an apartment, the floor is mentioned. If it is a house, the presence of a garden is indicated as well as the number of floors.

The rental is as follows. A client declares his interest in a property to the real estate agent, who then reserves it for this client if the property is free (not rented and not reserved by another client). The property then becomes reserved. The client must confirm within 15 days his reservation. No extension is granted. The agent then establishes the lease, which includes the dates of validity (beginning and end of the lease) and the amount of the lease. The property is then rented. Without confirmation beyond 15 days, the system cancels the reservation and the property becomes free again. The agent can terminate the contract at any time of the lease (on his own or at the customer's request, whatever). The real estate then becomes free again.

Contract and customer information is permanently editable by the manager or agents.

Question 1: Provide a **use case diagram** for the MONIMMO system.

Question 2: Provide a **class diagram** for the MONIMMO system.

Question 3: Provide a **sequence diagram** specifying the following behavior:

- The client declares interest for a house. You consider the assumption that this house exists and already saved inside the application.
- The client confirms the reservation
- The agent establishes the lease and creates the contract.

You must show the needed modifications to the class diagram obtained from Question 2.

Question 4: Provide the **state machine** related to the class that represents the real estate.