Practice Problems on UML Diagrams

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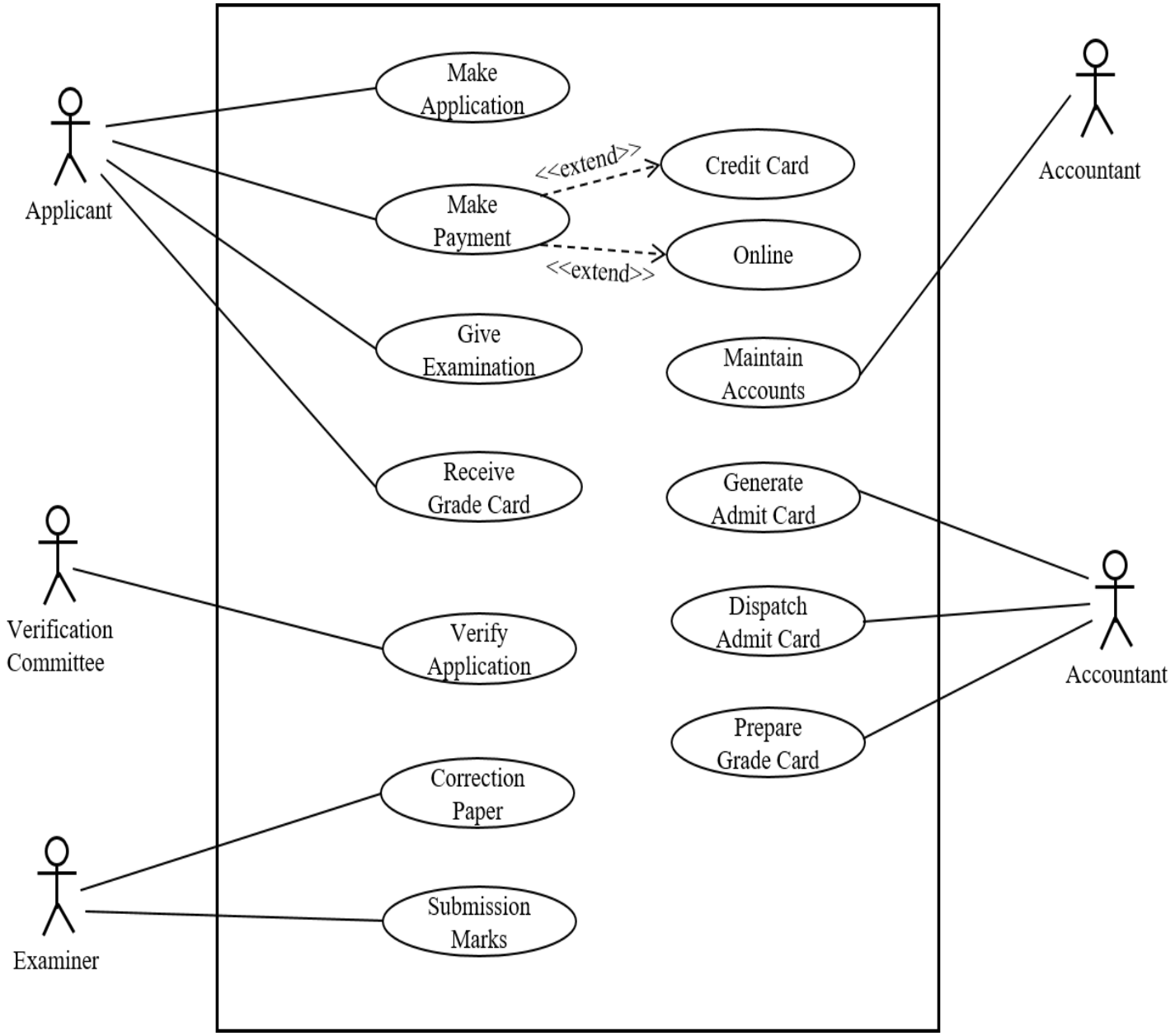
Use Case Diagram

You are required to design an entrance examination system. In this system, an applicant has to make the application by entering all the details and paying the fees for the application. The mode of payment is through credit/debit card or online. On the other hand, verification committee is responsible to verify each of the applications. The system has an enrollment office which takes care of generating and dispatching the admit cards. On receiving the admit card, an applicant is typically allowed to sit for the examination. The examiner checks the answer sheets and submits the marks to the system. Based on the marks given by the examiner, the enrollment office produces the grade card and dispatches those to the applicants.

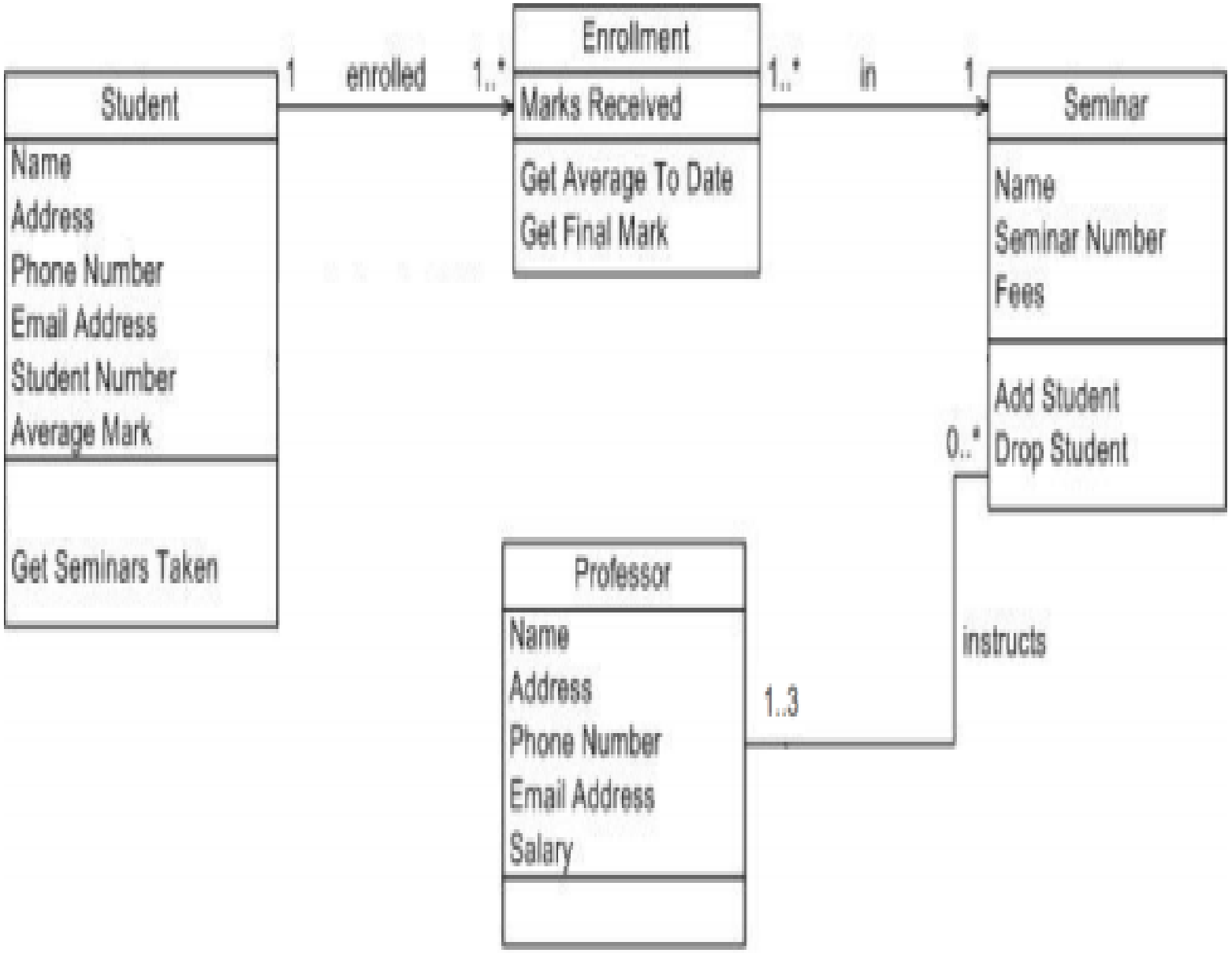
Based on the details of the above scenario, draw an use case diagram for the entrance examination system.


Make Application
Make Payment
Give Examination
Receive Grade Card
Verify Application
Correction Paper
Submission Marks
<<extend>>
Credit Card
<<extend>>
Online
Maintain Accounts
Generate Admit Card
Dispatch Admit Card
Prepare Grade Card
Applicant
Verification Committee
Examiner
Accountant
Accountant

Class Diagram

A professors has a name, address, phone number, email ID, and salary. A student has a name, address, phone number, email ID, and roll number. A student also has an average mark of the final marks of his or her seminars. A seminar has a name and a unique number. When a student is enrolled in a seminar, the marks for this enrollment are recorded. The current average and the final mark can be obtained from the enrollment. From a student one can obtain the list of seminars he or she is enrolled in. Professors teach seminars. Each seminar has at least one and at most three teachers. There are two types of seminar: bachelor and master. Students can withdraw from a master seminar but not from a bachelor seminar.

Based on the details of the above scenario, draw a class diagram for this university.

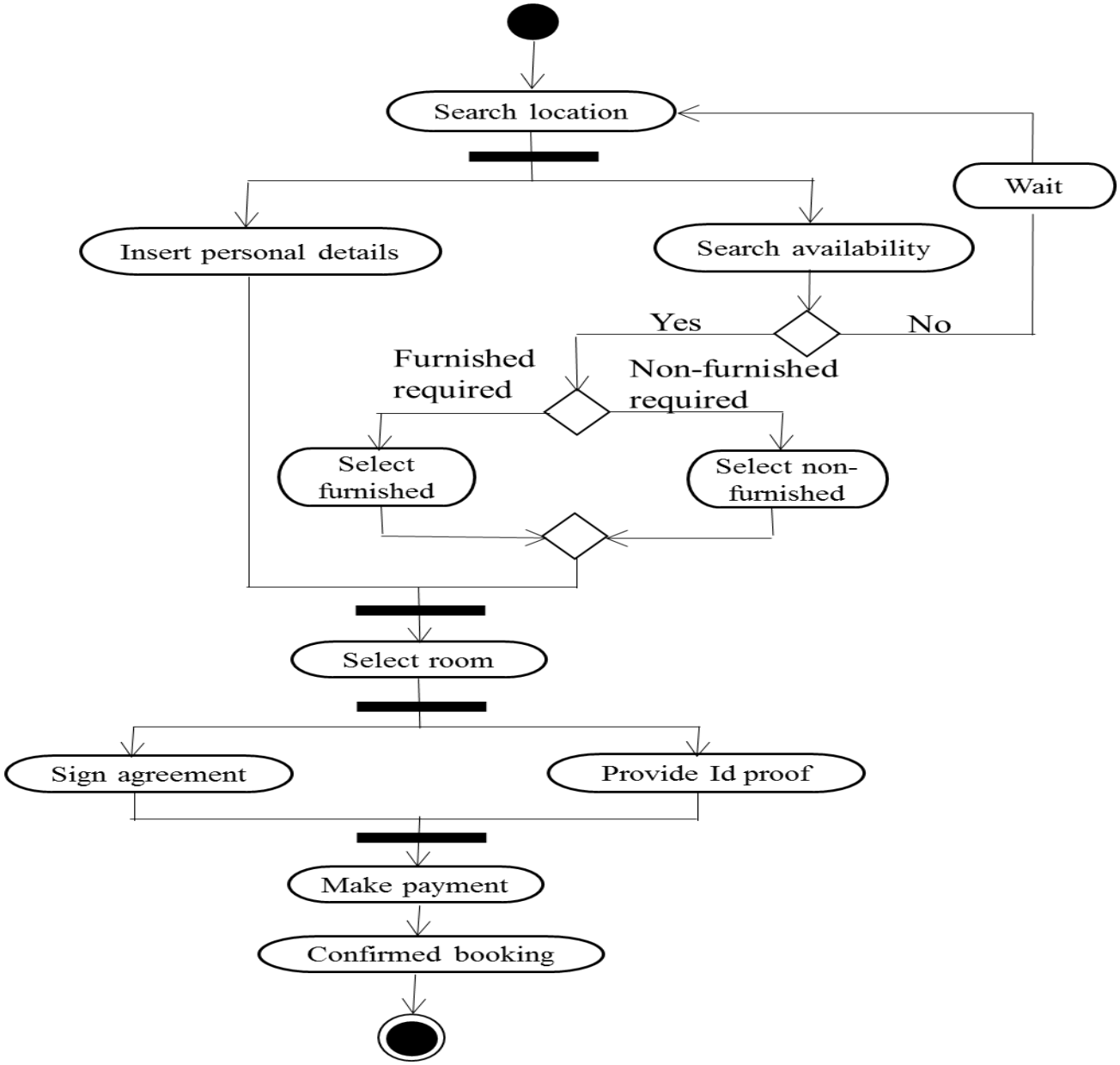

Enrollment
Student
1
enrolled
1..*
Marks Received
1..*
in
1
Seminar
Name
Address
Phone Number
Email Address
Student Number
Average Mark
Get Average To Date
Get Final Mark
Name
Seminar Number
Fees
Add Student
Drop Student
0..*
Get Seminars Taken
Professor
Name
Address
Phone Number
Email Address
Salary
instructs
1..3

Activity Diagram

You have applied for higher studies in abroad and got selected. During the higher studies in abroad, you need a room based on rent. You decide to book the room through an online portal, Room Renting System (RRS). In RRS, vacant room will be searched according to your preferred location. During this process, you need to provide your personal information and check the availability of room. If no room is available, you have to wait for a certain duration and resume searching again. After acquiring the list of available vacant rooms, you need to select

the type of room such as furnished or non-furnished. Based on this selection, the list will be filtered and a sub-list will be generated from which you have to select a room. For authenticity, you need to provide ID proof and sign an agreement for the final booking. Finally, you have to make payment.

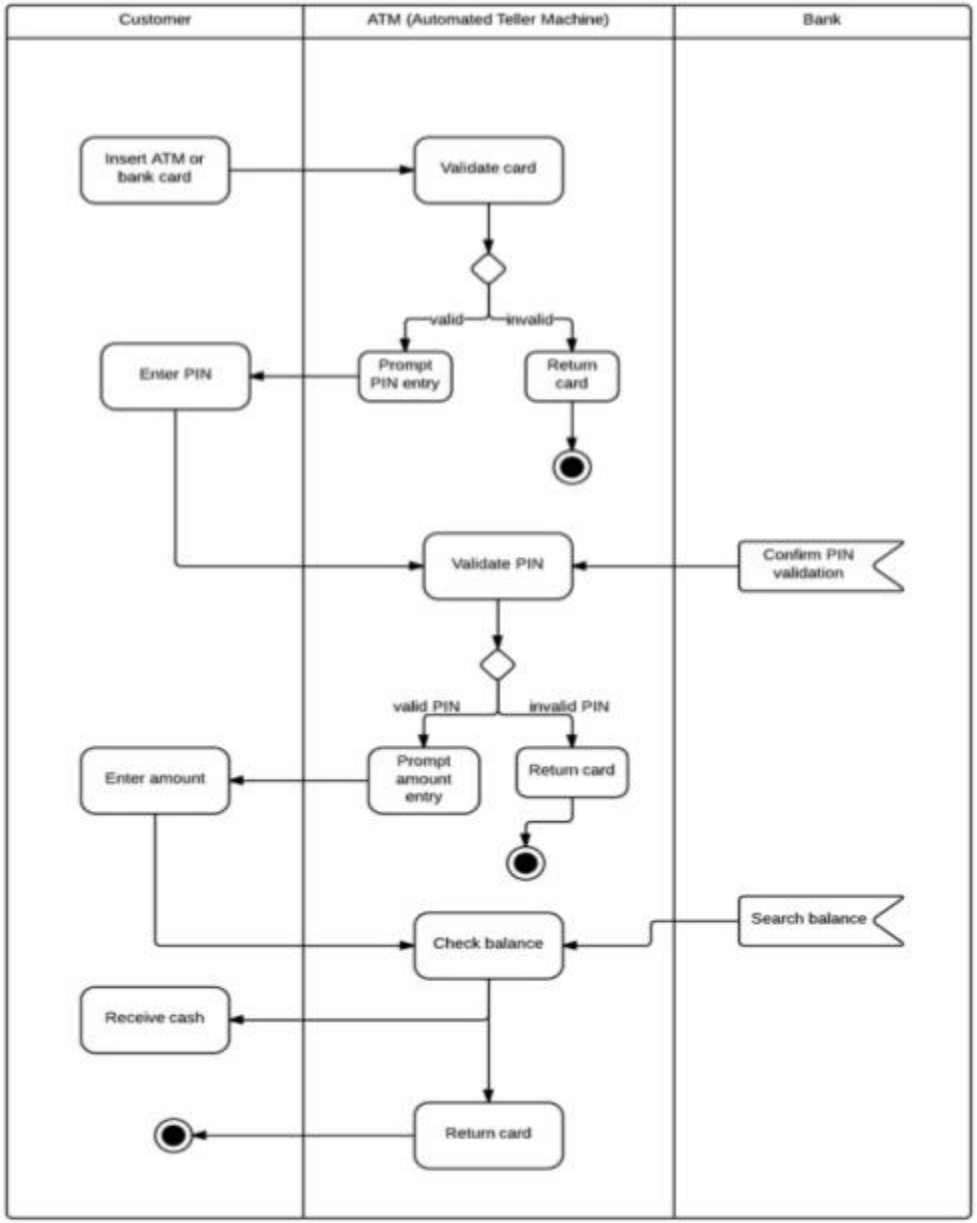
Based on the details of the above scenario, draw an activity diagram for RRS.


Search location
Wait
Insert personal details
Search availability
Yes
No
Furnished required
Non-furnished required
Select furnished
Select non-furnished
Select room
Sign agreement
Provide Id proof
Make payment
Confirmed booking

Swimlane Diagram

ATM System: The customer inserts the ATM card and enters the pin number. The Bank system then validates the pin. If the pin is invalid, the ATM machine ejects the card, the customer takes the card, and the scenario ends. Assuming the card pin was valid, the customer enters an amount to withdraw. The bank checks the account balance. If the balance is less than the amount to withdraw, the ATM shows the balance, and then ejects the card. Once ejected the customer then takes the card and the scenario ends. Assuming the amount is available, the customer takes money from the slot and at the same time the bank debits the account. Once the customer has taken money and the account debit is complete, the ATM machine shows the balance. The ATM machine then ejects the card, the customer takes the card and the scenario ends.

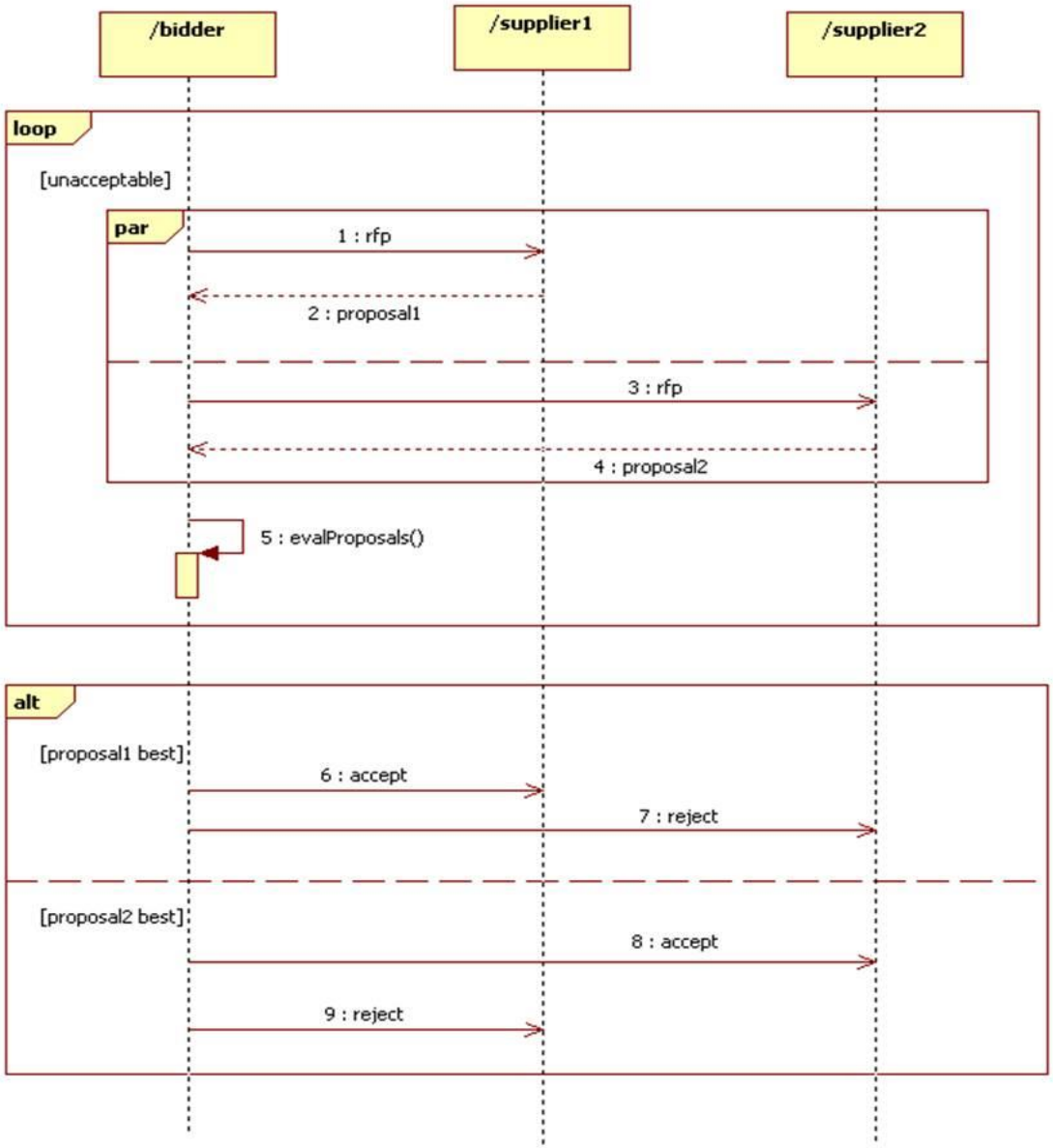
Based on the details of the above scenario, draw a swimlane diagram for money withdrawal from an ATM.


Customer
ATM (Automated Teller Machine)
Bank
Insert ATM or bank card
Validate card
valid
invalid
Enter PIN
Prompt PIN entry
Return card
Validate PIN
Confirm PIN validation
valid PIN
invalid PIN
Enter amount
Prompt amount entry
Return card
Search balance
Check balance
Receive cash
Return card

Sequence Diagram

Two suppliers are participating in a bidding process for a government project. The bidder sends the request for proposal (RFP) to both the suppliers concurrently. Each supplier submits a proposal to the bidder. The bidder evaluates the proposals. If any of the proposals is in unacceptable form, then the bidder resends the RFPs and re-evaluates the latest proposals. Once both the proposals are in acceptable form, the bidder accepts the best proposal and rejects the other.

Based on the details of the above scenario, draw a sequence diagram for the bidding process.


/bidder
/supplier1
/supplier2
loop
[unacceptable]
par
1 : rfp
2 : proposal1
3 : rfp
4 : proposal2
5 : evalProposals()
alt
[proposal1 best]
6 : accept
7 : reject
[proposal2 best]
8 : accept
9 : reject

THANK YOU