Home Work 3 – Domain Analysis

Referring to the Library description from Homework 2 (repeated here) and the two use cases provided below, complete the following:

Problem 1: (20 pts) Create a candidate class list (class names only). Limit the elements to those necessary to the supplied scenarios.

Candidate Class List:

- Patron
- Librarian
- Library System
- Account
- Resource

Problem 2: (40 pts) Using copies of the supplied card image, complete CRC cards for each element in your list.

Class: **Patron**	Collaborators
Responsibilities - Request to pay late fees - Request to check out a resource - Make a payment of late fees - Finding a resource to check out - Returning a resource that has been checked out - Provide their ID information	 - Librarian - Account - Resource
Grasp Pattern: (if any)	

Class: **Librarian**	Collaborators
Responsibilities - Receive patron ID information - Look up account of patron - Find fee balance of patron account - Share balance information with patron - Prompt the patron for payment information - Receive payment from patron - Record payment information on library system - Enter resource identification info on library system	 - Patron - Account - Library System
Grasp Pattern: Controller	

Class: **Library System**	Collaborators
Responsibilities - Provide librarian with patron id information - Provide librarian with resource information - Provide patron account information - Provide patron fee balance to librarian - Process and keep record of payments - Adjust patron's fee balance in their account - Determine if a patron is allowed to take out a loan - Records loans and computes due dates	 - Librarian - Library System - Account - Resource
Grasp Pattern: Information Expert	

Class: **Account**	Collaborators
Responsibilities	
- Documents patron's fee balance - Store patron's ID information - Manage patron funds	- Patron - Librarian - Library System
Grasp Pattern: (if any)	

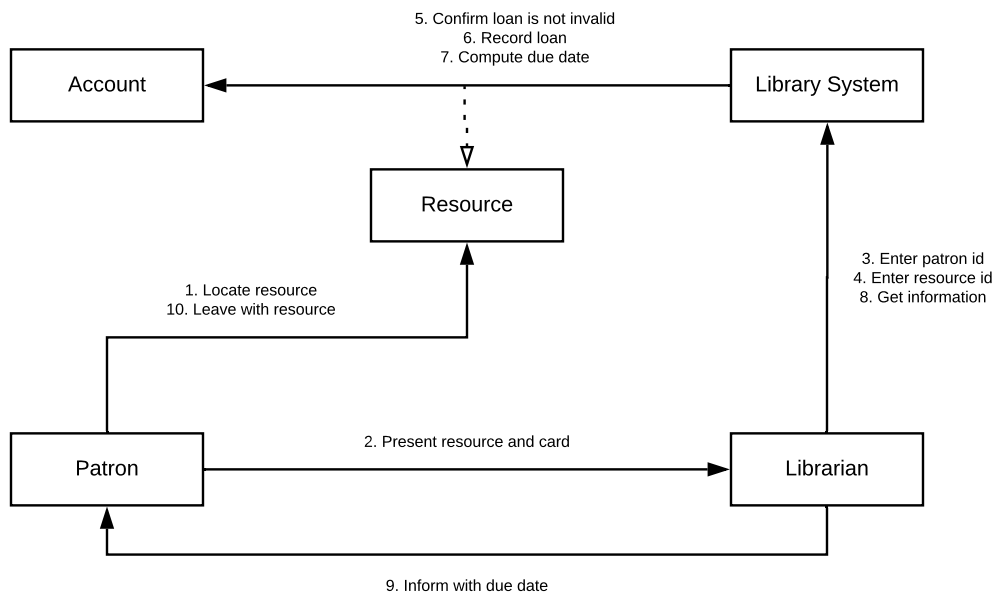| Class: **Resource**	Collaborators
Responsibilities	
- Provides use to patrons and librarians - Gets checked in and out of library	- Patron - Librarian - Library System
Grasp Pattern: Polymorphism	

Problem 3: (20 pts each) Complete two communication diagrams, one for each of the supplied scenarios.

Scenario 1:

```
  ┌──────────┐   9. Record payment and adjust    ┌────────────────┐
  │ Account  │◄──────── fee balance ─────────────│ Library System │
  └──────────┘                                   └────────────────┘
                                                         ▲
                                                         │
                                              3. Get patron id info
                                           4. Get patron account info
                                              5. Record payment info
                                                         │
                 1. Approach Librarian                   │
                 2. Request to pay fees                   │
  ┌──────────┐   7. Tender desired payment    ┌────────────────┐
  │ Process  │───────────────────────────────►│   Librarian    │
  └──────────┘                                └────────────────┘
       ▲                                              │
       └──────────────────────────────────────────────┘

                 5. Share balance info
              6. Prompt patron for payment
                 8. Receive payment
```
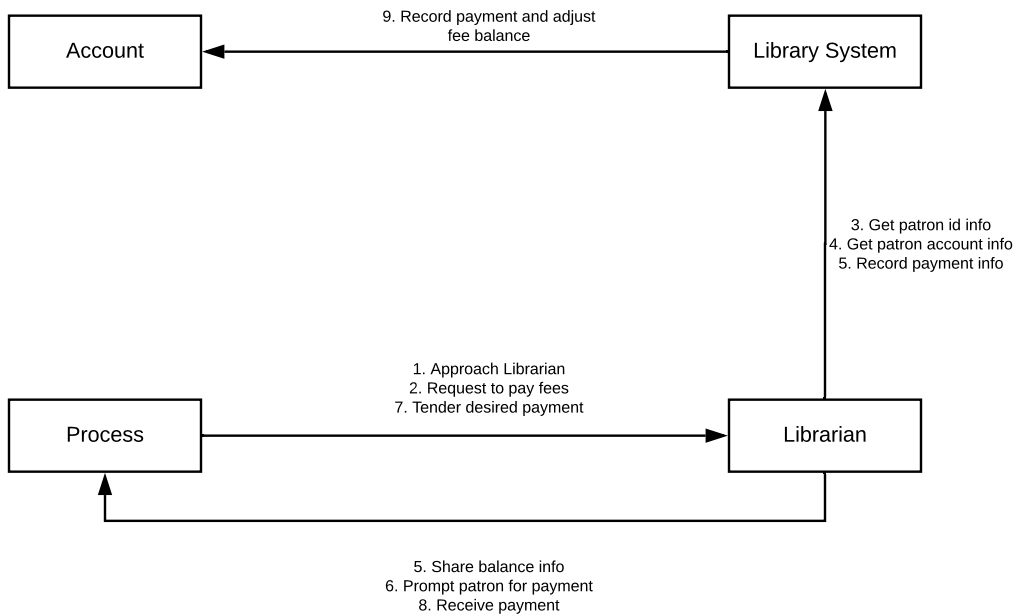
Note: The box that says "process" is supposed to say "Patron"; typo…

Scenario 2:

Account   5. Confirm loan is not invalid   Library System
                 6. Record loan
                 7. Compute due date

                       Resource

                                                         3. Enter patron id
1. Locate resource   4. Enter resource id
10. Leave with resource   8. Get information

Patron   2. Present resource and card   Librarian

                 9. Inform with due date

Scenario 1

Use Case Name: Pay Late Fees

Primary Actor: Patron

Triggering Event: Patron visits library to pay fees.

Stakeholders and Interests:

- Patron: Wishes to reduce their current late fee balance.
- Library: Wishes to keep receivables current.

Preconditions: Patron is registered as a library user and has their library card.

Success Guarantee: Patron makes payment and their account balance is reduced appropriately.

Main Success Scenario:

1. Patron approaches an available librarian.
2. Patron requests to pay late their late fees.
3. Librarian obtains the patron's id information.
4. Librarian looks up patron's account to find fee balance.
5. Librarian shares balance information with patron.
6. Librarian asks patron how much they want to pay.
7. Patron tenders desired payment.
8. Librarian receives payment.
9. Librarian records payment information in the system.
10. System records payment and adjusts patron's fee balance.

Scenario 2

Use Case Name: Check out a Resource

Primary Actor: Patron

Triggering Event: Patron decides to borrow a particular resource.

Stakeholders and Interests:

- Patron: Wants to use the resource outside of the library.
- Librarian: Wants to assure patron is satisfied and that loans are properly tracked.

Preconditions

- Librarian is authorized to check out the resource.
- Patron is an authorized library user (has a valid library card).
- Patron's borrowing privileges are not restricted (especially, patron does not owe excess late fees.)
- The resource is available and eligible for loan.

Success Guarantee

- Patron leaves with the loaned resource and the loan is properly recorded in the system.

Main Success Scenario

1. Patron locates the resource (see sub scenario).
2. Patron goes to the front desk.
3. Patron presents the resource and their library card to an available librarian.
4. Patron advises librarian they wish to check out the resource.
5. Librarian enters patron's identification information from the card.
6. Librarian enters resource identification information.
7. System confirms the loan is not prevented by restrictions on either the patron's borrowing privileges or on the resource.
8. System records the loan and computes a due date.
9. Librarian informs Patron of the due date and returns the resource.
10. Patron leaves with the loaned resource.

CRC Template

Class:	Collaborators
Responsibilities	
Grasp Pattern: (if any)	

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Responsibilities	
Grasp Pattern: (if any)	