Homework 2

Exercise 1 (3points)

- **Imagine a physical library.**
    - A real physical library has to be located in a building or part of the building. There are usually different sections for literature, science, newspapers etc.
    - Usually the sections are divided further into smaller domains like “English literature” or “Chemistry”. This helps the readers to find books they are interested in and helps librarians to better organize the book-shelves.
    - There are a number of books in the library, most of them having several copies. Usually one marked copy is never lent out. Instead it is kept to show what is available.
    - The bookshelves have codes on them to locate books.
    - Usually a book has a code by which it can be located in the library.

- **Find three actors involved in the checkout system. Explain their relevance.**
    - Librarian, Student, Library book database

Student is the actor who the system is build to serve. Librarian is the link between the Student and the books and the Library book database. Library book database is build to make the librarians life easier and actions less erroneous. The library book database is used to track if books are in the library , if they are loaned out and for how long they are loaned out. The library book database could also be used to serve the Students through a web portal.

- **One use case is checking out a book. Take the perspective of a client and find another two use-cases at a comparable level of abstraction.**

Create the use-case descriptions for each use-case.

Use Case:	Checking out a book
Summary:	Student has found a book she wants to loan and she checks it out.
Actors:	Student, Librarian, Library book database
Preconditions:	Book is in the book shelves.
Description:	Student goes to the library and finds her book from the book shelves. She takes the book to the librarian, who checks from the library book database that no one has reserved the book. The book is not reserved to anyone so the librarian can loan the book for the student. The librarian informs the library book database that the book will be loaned to the student till 2 weeks from the current date. Database informs that the loan has been recorded and the librarian can give the book for the student to take outside the library building.
Exception:	Student goes to the library and finds her book from the book shelves. She takes the book to the librarian who checks the book database and finds out that the book is reserved to someone but not the student. The book cannot be loaned out to the student.
Postconditions:	Book is not in the library.

Use Case:	Reserving a book that is already loaned to someone else.
Summary:	The student interacts with the librarian, who consults the Library book database, in order to reserve a title that is currently on loan to another student.
Actors:	Librarian, Student, Library book database.
Preconditions:	The student has not reserved the title they wished for.
Description:	The student searches the library and finds that the title they wish for is on loan to somebody else. The student approaches the librarian and asks to reserve the title. The librarian uses the Library book database to obtain the information regarding when the book is due back. The librarian uses the Library book database to reserve the book for the student for the day after the date the book is due back in. The librarian informs the student they may come and collect he desired title on that date. The librarian tells the student that he will get an email when the book is returned and also tell the approximate date when the book will be returned.
Exception:	The student is unable to reserve the book as the student who currently has the book on loan has reported to the librarian two days ago that they have lost the book. The librarian then entered the lost book information into the Library book database so when the student wanting the book requests it, an error message “Book unavailable – permanently lost” is displayed. The student has not reserved the title they wished for.
Postconditions:	The student has reserved the title they wished for.

Use Case:	Returning a book
Summary:	A student returns a book to the library and gives it to the librarian. The librarian takes the returned book and marks it returned in the book database.
Actors:	Librarian, Student, Library book database.
Preconditions:	A student has taken out a book from the library.
Description:	A student goes to the library to return a book that was checked out. He goes to the librarian and gives her the book that he wants to return. The librarian takes the book and reads the book's barcode with a barcode reader. The information about the book is automatically displayed to the librarian through an interface that interacts with the book database. The librarian sees that the return date has not passed and presses a button in the interface to confirm that the return was correct. The librarian notifies the student that the book has been returned and the student leaves.
Exceptions:	A student goes to the library to retrun a book that was checked out and gives the book to the librarian. The librarian tries to read the book's barcode but the book database's interface tells that the barcode can't be read. The librarian tries to read the code below the barcode but is not able to read all of the characters. The librarian asks the library card from the student and marks manually that the book has been returned. or A student goes to the library to retrun a book that was checked out and gives the book to the librarian. The librarian tries to read the barcode of the book but the book database interaface crashes and the librarian is not able to interact with the book database. The librarian asks the student to come back later.
Postconditions:	The book is back in the library and is set to be available in the book database. Student does not have the book checked out.

- **Prepare a normal scenario for each use-case. (3 scenarios)**

Scenario 1:
Checking out a book.
Susan, a final year Philosophy student, needs to quote Plato for an essay she is writing. Much to her surprise she discovers she has lent her copy of 'Republic' to her classmate Anna so she decides to walk to the library. Susan enters the Philosophy faculty library and browses the shelves until she finds a copy of 'Republic'. Susan locates the librarian and the checking out desk and takes the copy of Republic to the checking out desk. The librarian asks for the copy of Republic and the scanner reads the book's barcode. The window on the librarian's computer displays the information about the book, including the date when the book will need to be returned (two weeks time). The librarian informs Susan that she can have the book for two weeks and that she will incur a penalty of 10 Kroons per day if the book is returned late. Susan indicates to the librarian that she is comfortable with the period of the loan and the subsequent fines if the period is exceeded. The librarian asks Susan for her library card and the scanner reads the bar code from Susan's card. The book database on the librarian's computer opens and automatically displays Susan's profile. The librarian notices that Susan has no outstanding books on loan and so is happy to check the book out to Susan. The librarian clicks 'check out' and the book is registered automatically as checked out by the Library book database. The librarian reminds Susan that the system will send her an email two days before the return date to remind her that the book is due back soon. Susan says thanks to the librarian and leaves.

Scenario 2:
Reserving a book that is already loaned to someone else.
Bob is a first year informatics bachelors student and is interested in algorithms. He takes a course named Algorithms and Data Structures and wants to read more about the subject. The lecturer advices him to read a book named Algorithms and Data Structures. He goes to the library of the Mathematics and Computer Science faculty and asks the librarian if the book named Algorithms and Data Structures is available. The librarian has a computer with a book database interface open. The librarian clicks on a search field and enters the book title Algorithms and Data Structures to the search form. She clicks search and the interface displays that the book is already loaned to someone. The librarian asks Bob if he wants to reserve the book and Bob insists. The librarian asks Bob's library card and reads the barcode from Bob's card. The book database interface automatically displays Bob's profile. Then the librarian clicks on a button - reserve a book - on the interface and a new window pops up. The popup window includes a form to search a book title. The librarian clicks on the form, types Algorithms and Data Structures and presses enter. The window displays the information about the book, including the date when the book must be returned. The librarian clicks reserve in the popup window and the program reserves the book for Bob. The reservation is automatically written into the book database. The librarian informs Bob of the reservation and tells him when the book should be available. She also tells him that Bob will get an email when the book is returned to the library and that Bob has three days to check out the book after the previous loaner has returned the book.Bob says thanks to the librarian and leaves.

Scenario 3:
Returning a book.
Jack, a first year theology student, has borrowed books “Theology and Early Modern Philosophy”, “Empirical theology in texts and tables: the statistics”, “A semiotic theory of theology and philosophy” for writing an essay about empirical theology. He has finished the essay today and noticed that the deadline for returning books is tomorrow. He takes the books to the library and walks to a librarian to return the books. The librarian uses her scanner to get the barcodes from the books. Each barcode shows up in the computer screen and is automatically linked to Jack and time the book was loaned: Sep 16, 2010. This way the librarian can identify Jack’s account and mark the books “available” in the book database, deleting the books from Jack’s account. Computer automatically leaves a log in the database about the loaned books storing the dates and times the books were loaned and returned. After the procedure, the librarian prints out a receipt about the returned books containing the book names given above and the date and time they were returned and gives it to Jack.

- **Prepare an exception scenario for each use-case. (3scenarios)**

Scenario 1:
Exception scenario for checking out a book .
Susan, a Philosophy student in Tartu University, has to write an essay about ancient philosophy. She does not like to use the computer for reading and therefore she goes to the university library to find a book about the philosophy in acient Greek. She enters the library building and begins to search for the book. Finally she finds a book - Ancient Greek And Roman Philosophy, which is complex enough. She wants to check out this book and goes to the librarian with it. She hands the book to the librarian and tells that she would like to loan it. The librarian asks her library card and Susan gives it to the librarian. The librarian reads the barcode of Susan's card and the computer automatically displays Susan's profile. The librarian clicks on a button “Add books”. After that the librarian reads the bookcode of Greek And Roman Philosophy, which was given to her by Susan and the system prompts an error message: “This book cannot be checked out because the book is reserved for three days”. The librarian tells Susan that she is sorry but the book cannot be checked out due to the reservation. She also tells Susan that the book should not have been available on the bookshelf and that she has to keep the book in order to give it to the person who reserved it. Susan says that she is a bit dissapointed but agrees to search for a similar book. Susan says goodbye to the librarian and goes to find another book about ancient greek philosophy.

Scenario 2:

Exception scenario for reserving a book that is already loaned to someone else.

Bob has had a need for reading the Dostojevski Crime and Punishment for many years but has not been motivated enough until now. He decides to use the Tartu University library. It's Monday so the library is open already at 10am and he goes to the library.

After searching for the book from the book shelves for some twenty minutes, he goes to ask Wendy, the librarian. Wendy checks the library book database to see where the book is. The library book database informs that the book is loaned till Tuesday to someone else. The librarian tells Bob about this. Bob asks if he can reserve the book for loaning. Wendy marks Bobs reservation to the library book database. The library book database informs the librarian with an error message "Book unavailable – permanently lost". Unfortunately the previous owner had just informed that the book was lost. Wendy tells this news to Bob and tells that Bob will not been able to reserve the book.

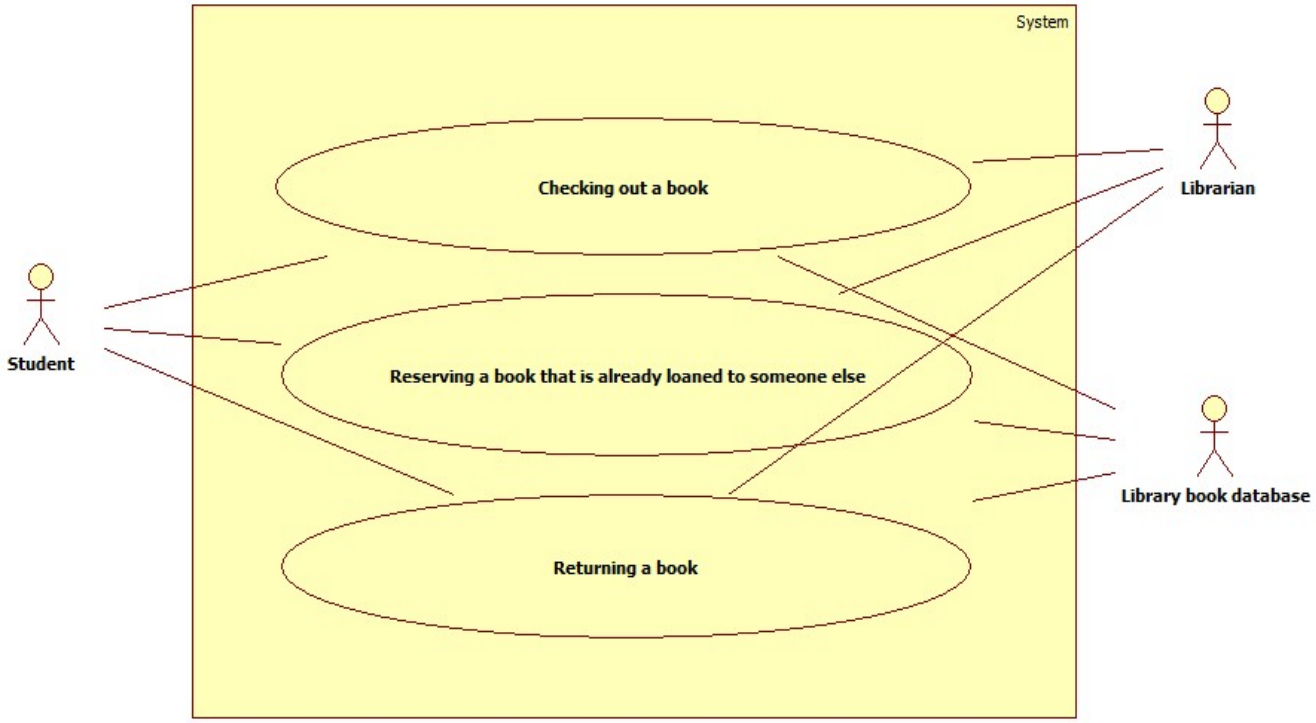
Disappointed from the bad luck with his book reservation, Bob decides that he will not read the book for now and loans the Sofi Oksanen - Purge instead. He goes back to his apartment to read the book.

Scenario 3:

Exception scenario for returning a book.

Jack, a first year theology student, has borrowed books "Theology and Early Modern Philosophy", "Empirical theology in texts and tables: the statistics", "A semiotic theory of theology and philosophy" for writing an essay about empirical theology. He has not yet finished the essay, but received an e-mail from the library noting that the deadline is today. Jack finishes his essay in three days and then goes to the library to return the books. He walks to the librarian. The librarian uses her scanner to get the barcodes from the books. Each barcode shows up in the computer screen and is automatically linked to the Jack and time the book was loaned: Sep 15 2010. This way the librarian can identify Jack's account and mark the books "available" in the book database, deleting the books from Jack's account. As Jack was late returning the books, the computer automatically calculates the fee 16 EEK he must pay to compensate for being late. Computer automatically leaves a log in the database about the loaned books storing the dates and times the books were loaned and returned. Also, computer adds the fee to Jack's account. After the procedure, the librarian prints out a receipt about the returned books, assigned fee and gives it to Jack.

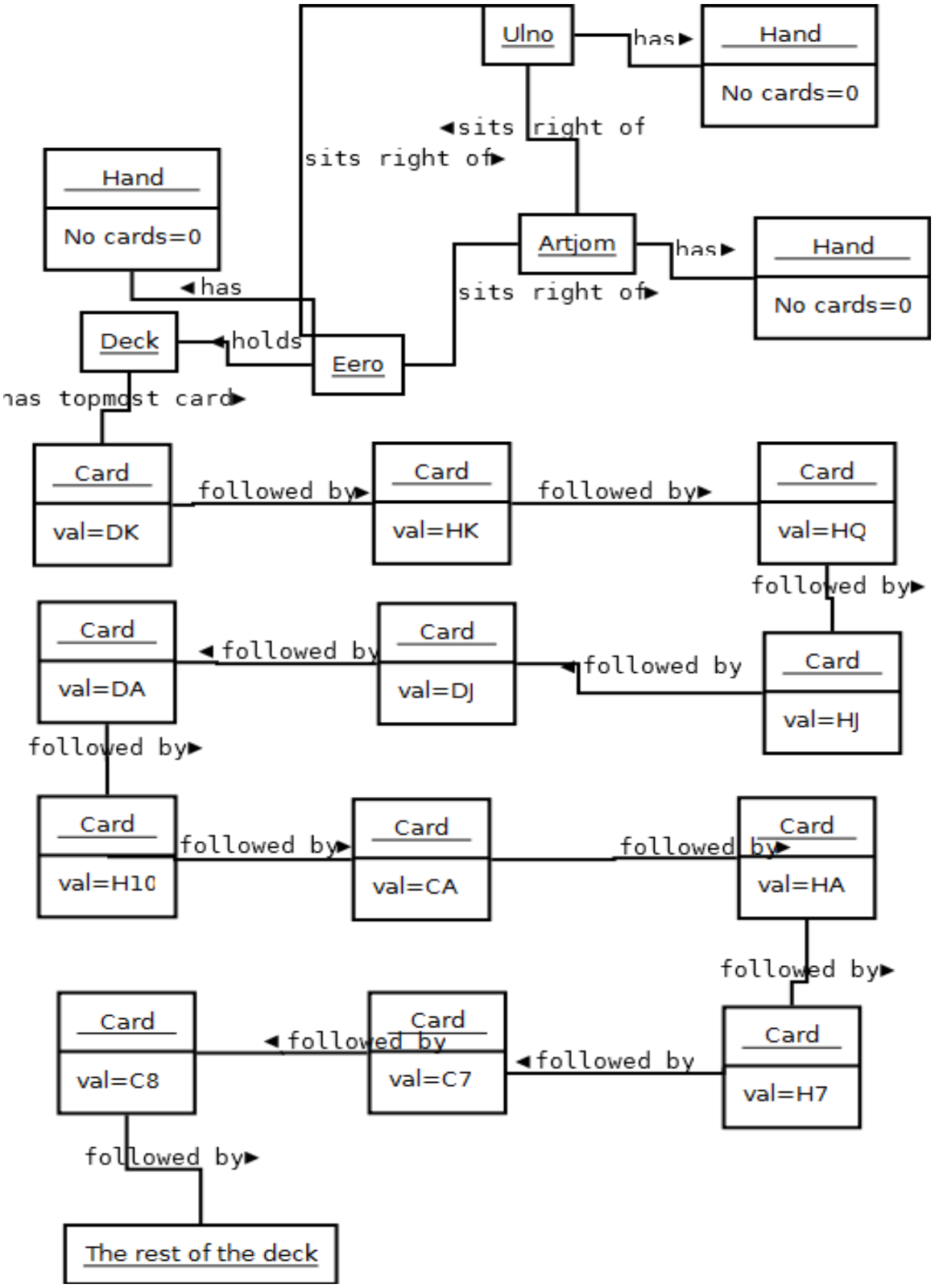
- **Create a use case-diagram for this library case (try to include also other use-cases and actors).**



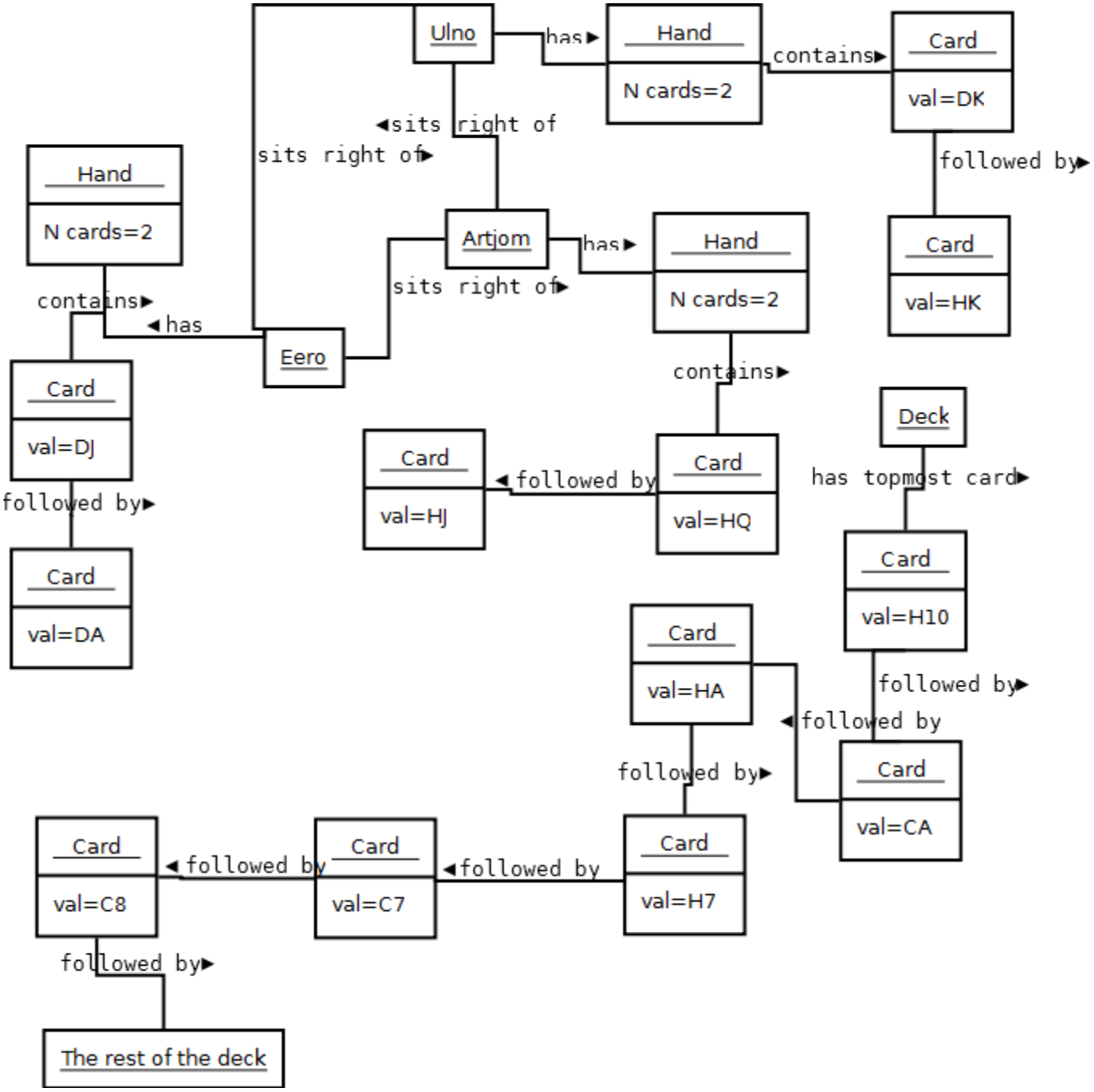
Exercise 2 (2 points)

Object diagrams for pre and post condition of "Eero deals one round..."

Pre-condition



Post-condition



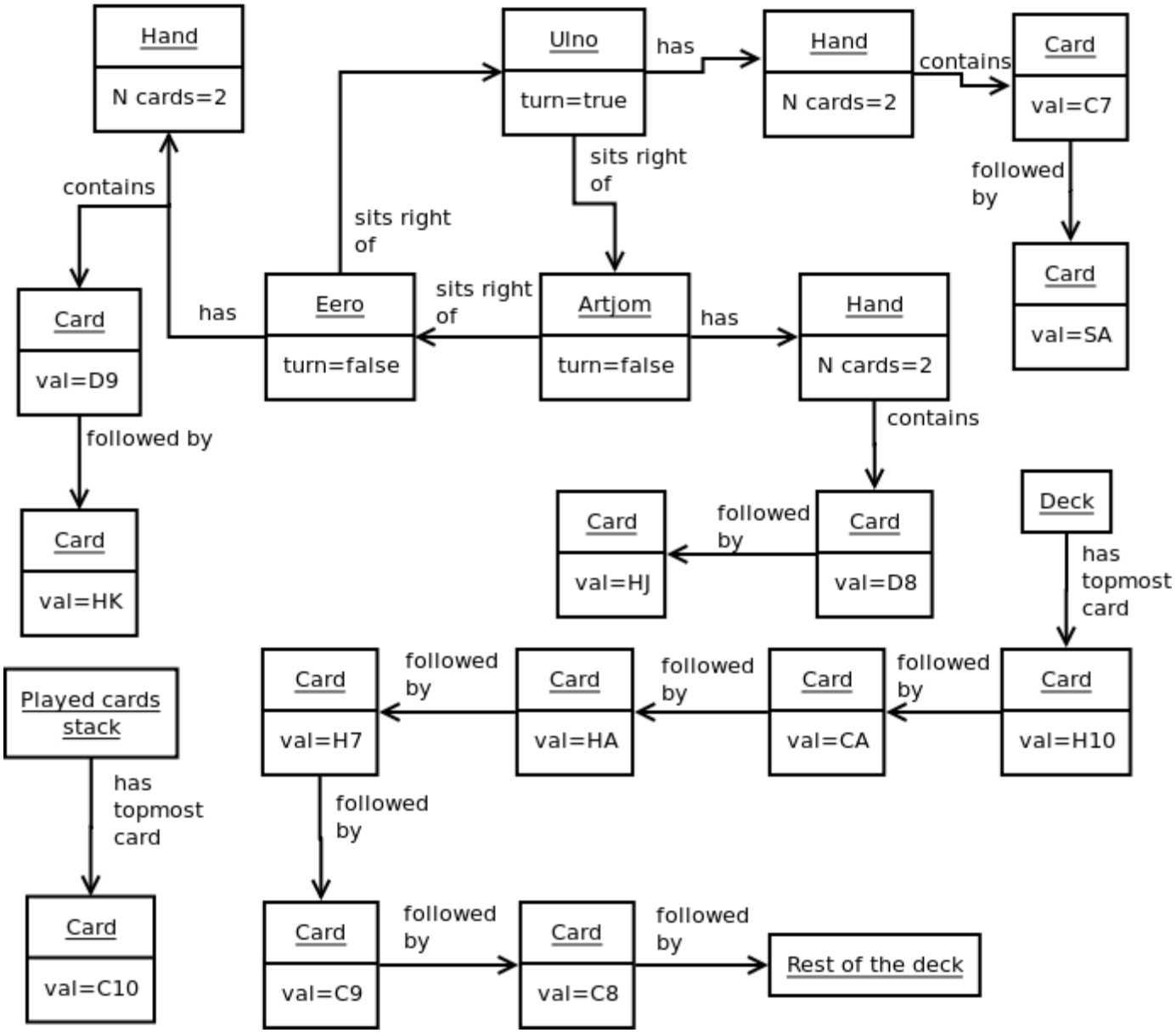
- **Write down user-story for "The game starts with Ulno playing a seven forcing Artjom to draw"**

  – Specify all hands!
  – refer to pre-pre-condition

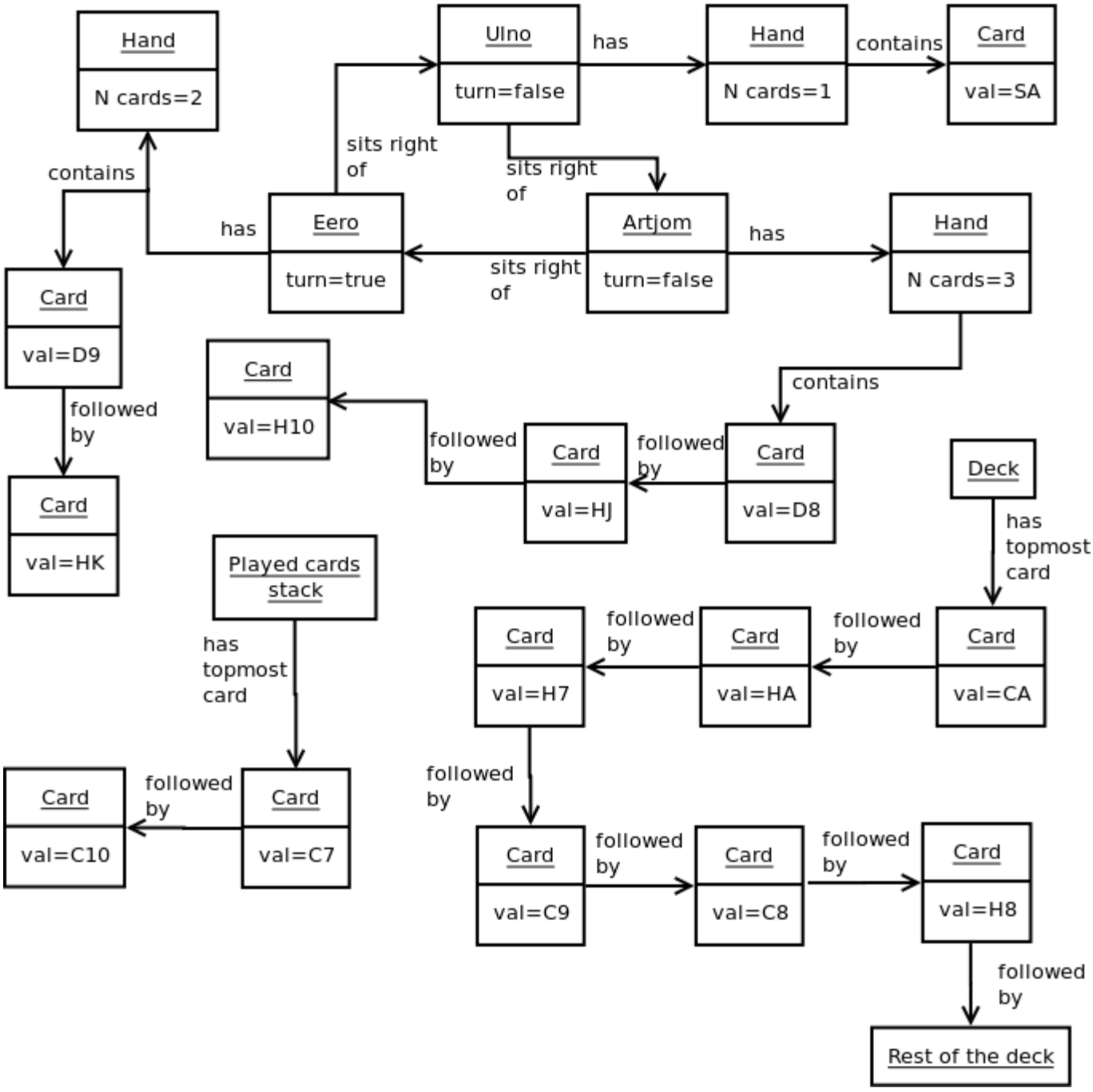
Assuming they are playing Mau Mau with two cards dealt at a time

Title	The game starts with Ulno playing a seven forcing Artjom to draw
Precondition	There is a deck of 32 cards, consisting of 4 suits (diamond, heart, spade, clubs). In each suit we have 7, 8, 9, 10, Jack, Queen, King, Ace. There are three players: Eero, Ulno, and Artjom. Eero sits right of Ulno, Ulno right of Artjom, and Artjom right of Eero. The players are playing Mau Mau with two cards dealt at a time. Eero was the dealer and has dealt one round of two cards each for himself, Ulno and Artjom. Eero has D9 and HK. Ulno has C7 and SA. Artjom has D8 and HJ. The topmost card is the ten of clubs, C10. The top of the deck shows H10, CA, HA, H7, C9, C8.
Action	Ulno plays C7 onto the C10. Artjom has D8 and HJ so is unable to place a card on the stack, according to the rules of Mau Mau. Artjom draws the H10 from the deck.
Postcondition	The topmost card is the seven of clubs, C7. The top of the deck shows CA, HA, H7, C9, C8, H8. Eero has D9 and HK. Ulno has SA. Artjom has D8, HJ and H10. It is Eero's turn.

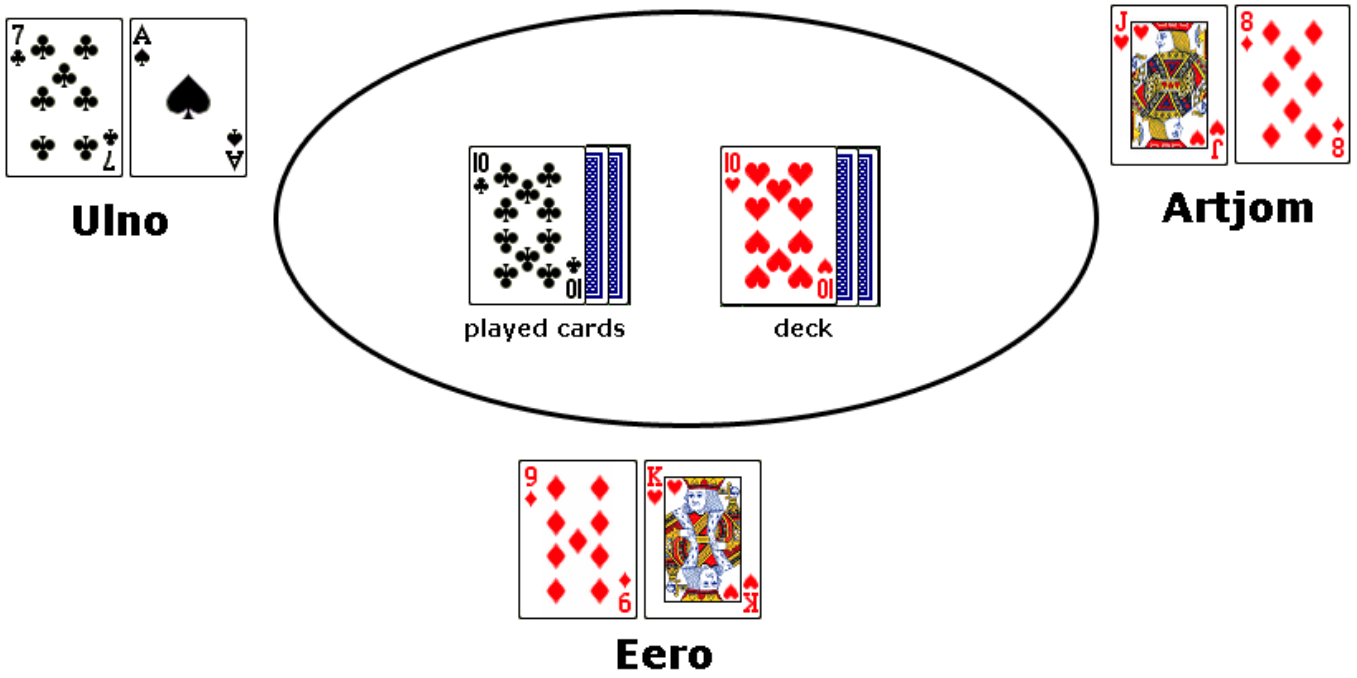
The precondition object diagram



The postcondition object diagram



The precondition and postcondition for this user story
Precondition



Postcondition