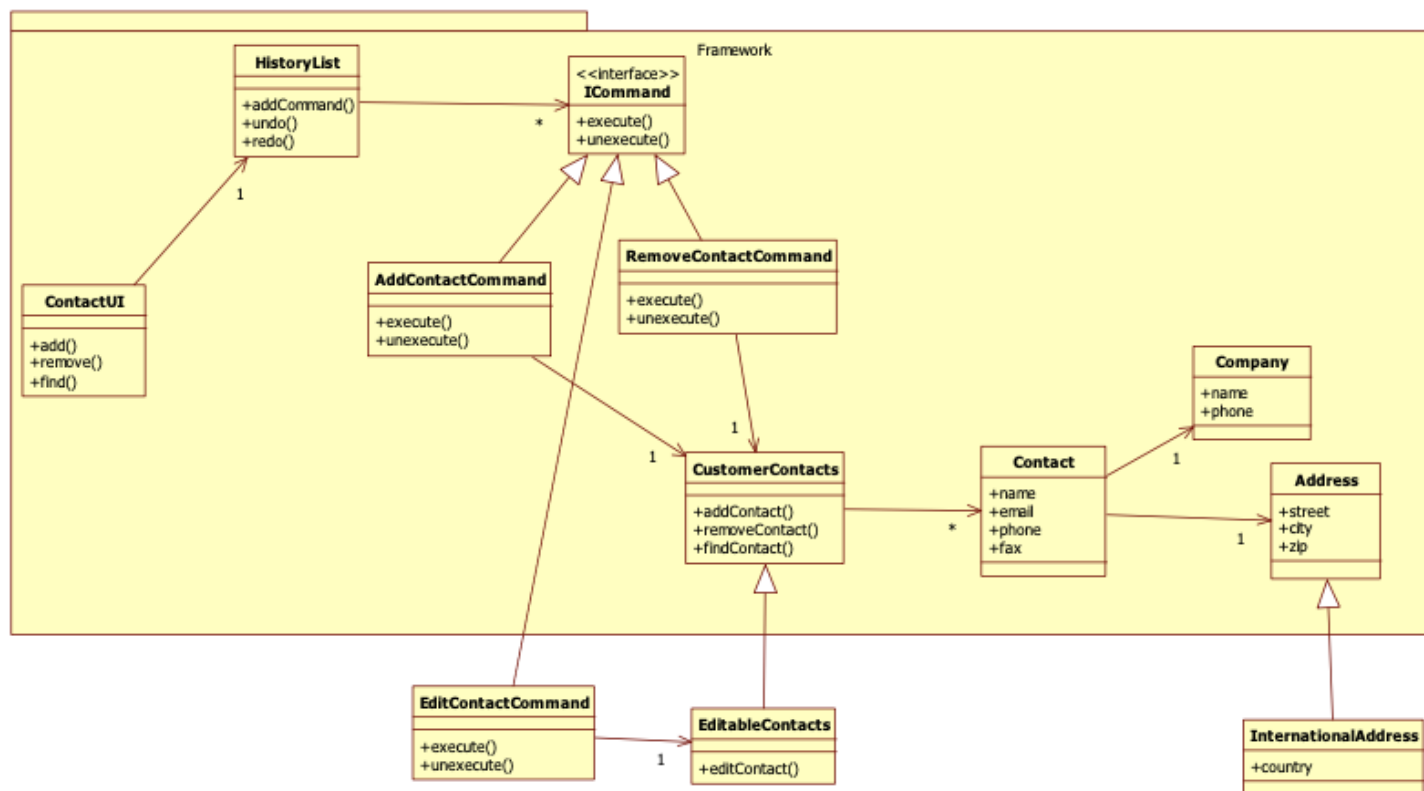


Question 1

We need to design a contact framework which we can use to write contact applications that allow us to manage our contacts. The framework has the following requirements:

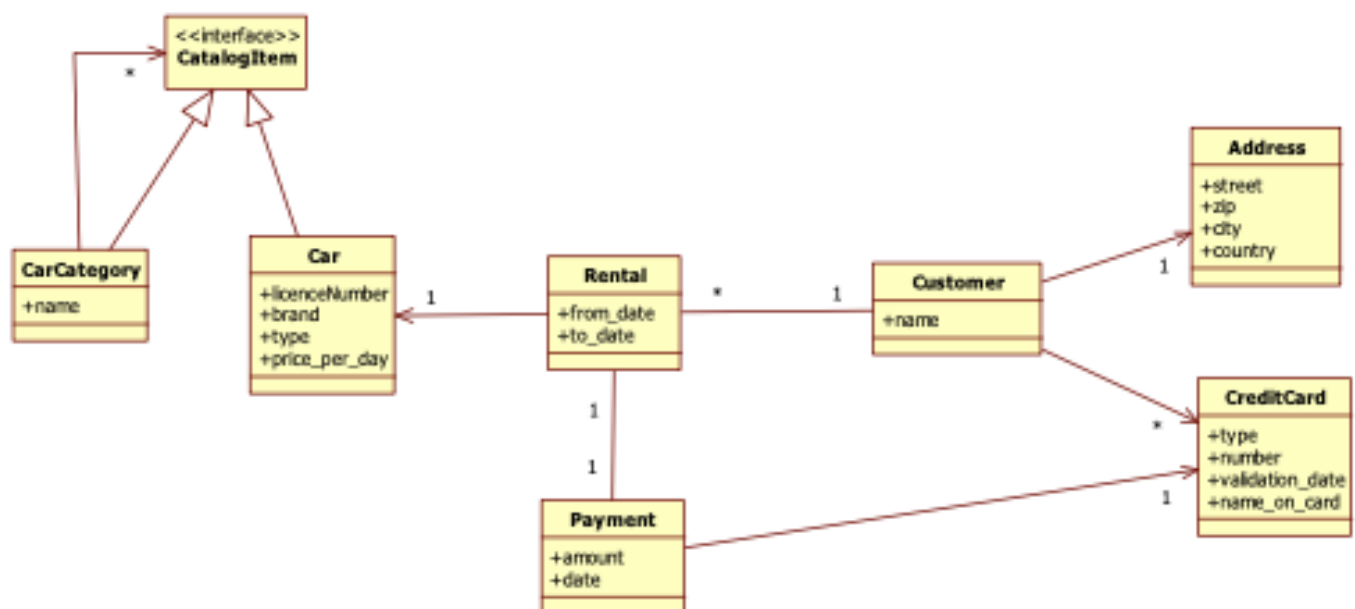
- We should be able to add new contact, delete contacts and search contacts.
- For every contact we need to store its name, phone, email, fax number, company name, company phone, street, city and zip code.
- The framework should also support the functionality to show the list of the last 10 executed actions (“add contact” actions and “delete contact” actions), and we should be able to select one of these actions and undo the selected action. Search actions are not shown in this list.



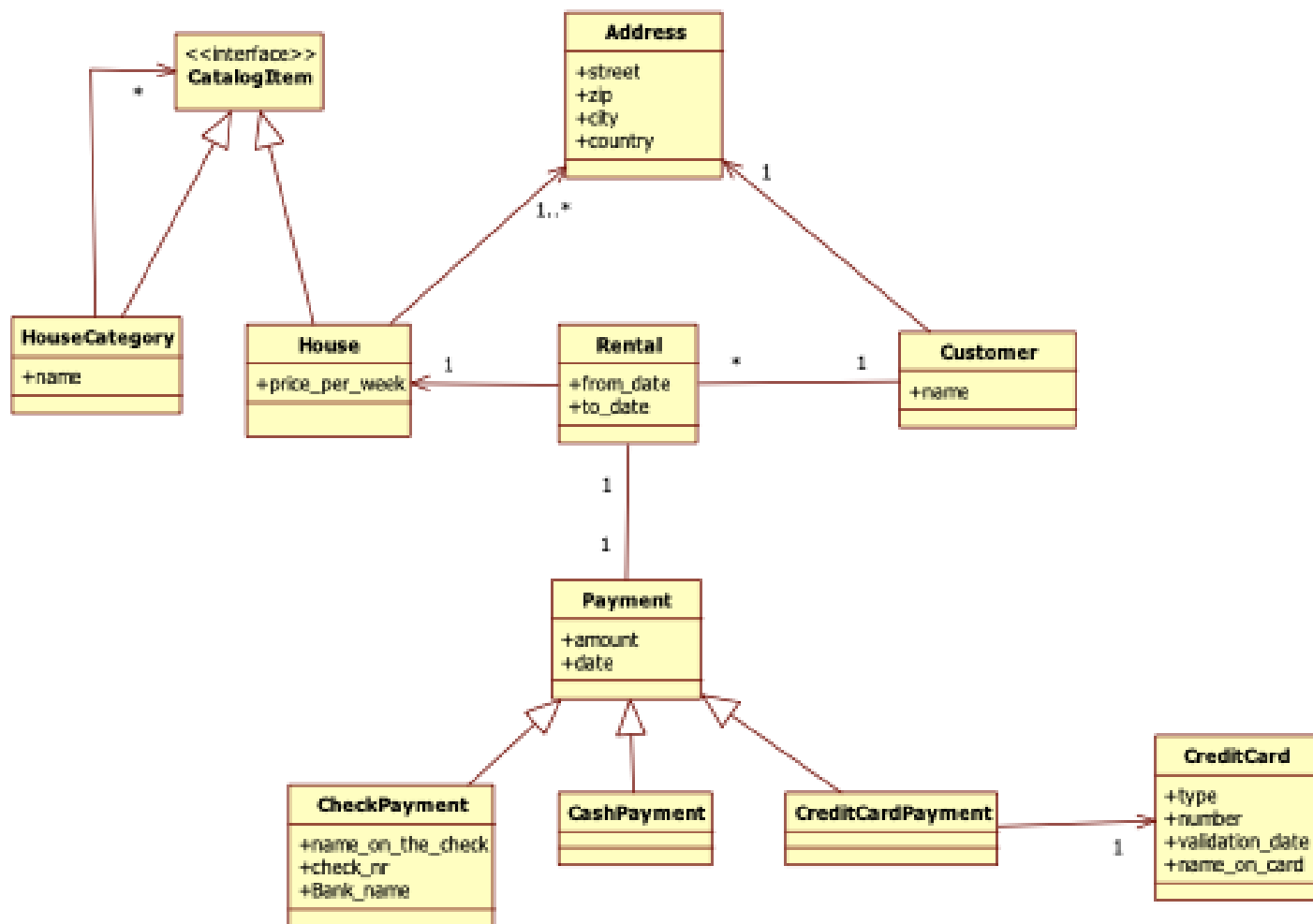
Question 2 [40 points] {50 minutes}

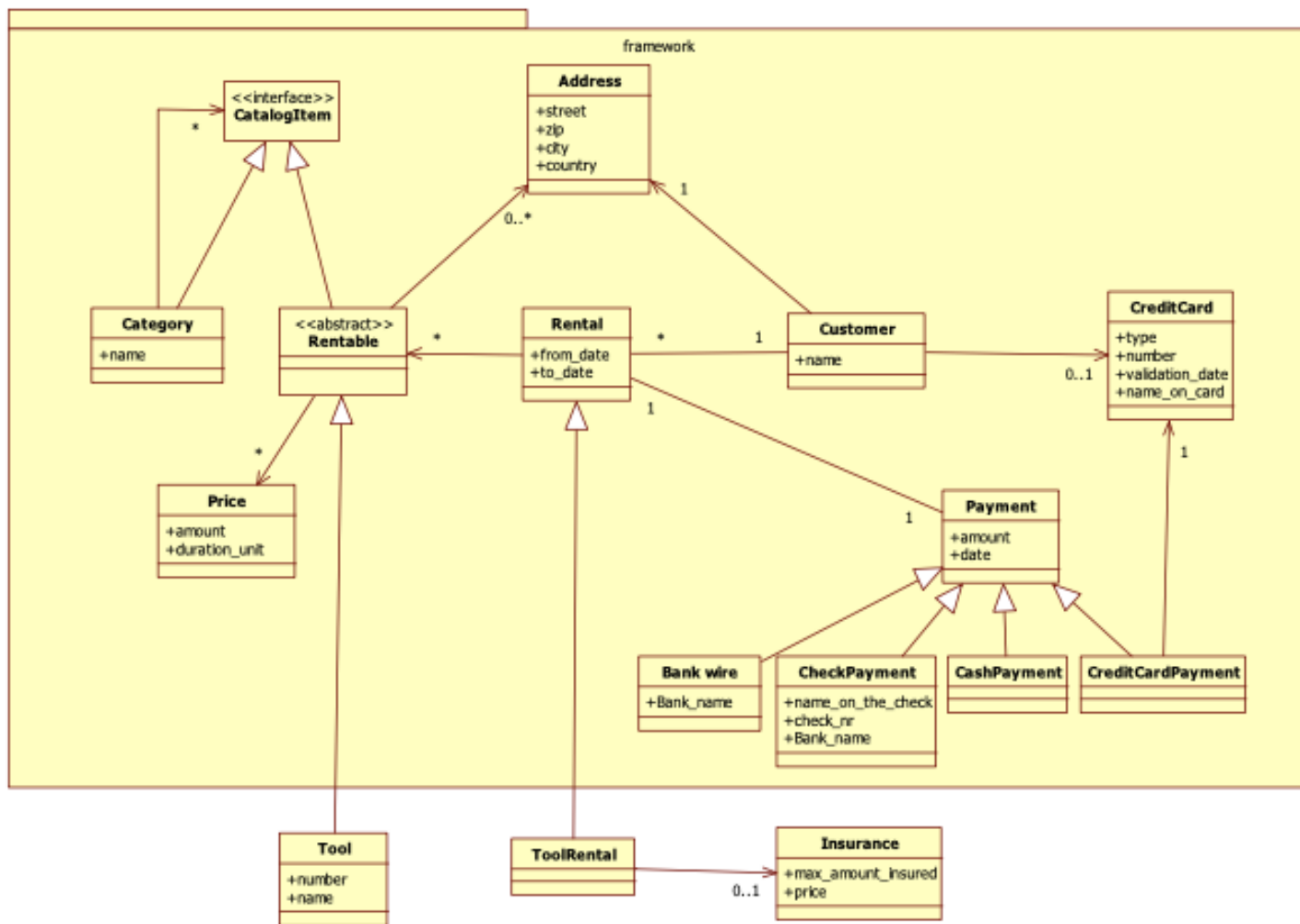
First we have to design a car rental application for one of our customers with the following requirements:

- The application keeps track of which customers (name, address) rents which car (licenceNumber, brand, type, price_per_day) on which days.
- The application keeps track of the list of credit cards that a customer may have
- The application keeps track of payments(amount, date)
- Car rentals can only be paid with credit card.
- Cars are categorized in categories (economy, business(standard, full size, specialty), minivan, suv, etc)

a. car rental application

b.





Question 3 [30 points] {30 minutes}

We want to design a points award framework that allows us to write applications that records the number of points in a points award program like frequent flyer miles programs or hotel reward programs. The framework should support the following requirements:

- Members should have a certain status, like bronze, silver and gold, and depending on the status you get a certain number of bonus points
- The possible statuses are application specific
- Every status knows its next status
- Customers can subscribe themselves to notifications on certain events, for example when their account state changes (from silver to gold for example) or when new points are added to their account. Customers can decide themselves how they want to be notified, for example by email or by SMS. The framework should support both notifications by email and notifications by SMS.
- It should be easy to add more notification options, for example by regular mail.
- The history of added points should be available. We should be able to see how many points are added at what date.

