Assignment 1 UML Design

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Scenario description

Due to the development of the economy and the increasing degree of the city connection, the desire of crossing city communication is booming. Trains cross cities are one of the best ways to satisfy such needs. Based on that, booking tickets is a necessary step in accessing trains. In China, the official platform to do so is called "12306". In this assignment, you are required to design a similar simplified system like "12306". In particular, your system should meet the following requirements:

Let's declare some nouns first:

train_num 车次号

train_route 火车线路

ticket 车票

passenger 乘车人

order 订单

- Users can book a train `ticket` by inputting depart_city, arrival_city, and date into the system, then the system will return the potential `train_num`s. After that, the user can select a specific `train_num`, and then choose at least one `passenger` to take the train. After confirming `ticket` information and `passenger`s, the user can submit the `order`. After that, an unpaid `order` will be created successfully. At this moment, the system can prompt the user to finish the payment process.
- To simplify our requirements, the `order` only contains those four statuses: `unpaid`, `canceled`, `refundable`, `not_refundable`. When submitting an `order`, the status is `unpaid`. If the user hasn't finished the payment process within 30 minutes, the status of the `order` would become `canceled`. If the status of the `order` is `refundable`, the user can refund the `ticket`s, and once the train leaves the departure station he/she cannot refund the `ticket`. In addition, the user can search all `order`s booked by himself/herself, and he/she can select to refund one of them if the status of the `order` is `refundable`, and can select to pay for one of them if the status of the `order` is `unpaid`.
- User serves as an account being used to login to the system when registering an account. The user needs to provide his/her ID card, username, password, email and phone number.
- Users can also add, modify, or remove `passenger`s in the system by providing `passenger` name, `passenger` ID card, and phone number. Besides, the `passenger` is different from the user because no matter whether a `passenger` has an account, he/she can be booked a `ticket` as long as he/she provides his/her necessary information to a user.

Question 1: Draw a use case diagram according to the scenario above. (30 points)

Question 2: Class diagram: Finding out all entity class according to your design, and draw the class diagram. (40 points)

In this section, you need to indicate the class name, relevant attributes.

Question 3： Draw a sequence diagram to represent the payment process (30 points).

Payment Scenario

After the user book an order successfully, the payment scenario would be started because the user needs to finish paying the order in 30 minutes, otherwise the order would be canceled.

On the page, the user can click the payment button to start the payment process, and then the system will prompt the user to choose one of the supported payment methods. After selection, the system will redirect to the third-party payment system. Within the limited payment time (30 minutes), if the payment process succeeds, the third-party payment system will return the payment result to the system and change the status of the order to refundable; otherwise, an error message would be returned to the page.

If the payment time exceeds, failure information would be sent to the page, and the status of the order would be canceled. Other than that, the resources occupied by the tickets in the current order would be released back to the system.

What to submit

Complete all the questions and combine the UML diagrams into a single PDF file. If necessary, given several explanations about your diagrams.