

CSE 400 Midterm

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The following explanation is for Questions 1 and 2:

Consider an online (i. e. web based) ticket reservation and sale system for an airline company. Main functions of the system include searching for a flight, choosing a flight (to make a reservation or to make a purchase), making a reservation (option for purchasing a ticket within a certain time limit), cancelling a reservation, purchasing a ticket, online check in (reserving a seat and declaring number of luggage pieces), searching for promotions (i. e. tickets with lower prices), and system administration (e. g. database administration). User confirmation (i. e. obtaining user confirmation when and where appropriate), data input checking (i. e. checking user input such as date, flight no, etc. for correctness and validity), error reporting (i. e. displaying an error message if user makes an error or inputs incorrect data), and online help (providing online help to user) are some features of the system. Only credit card payment is accepted by the system.

I. QUESTION (18 POINTS)

Draw a high level use case diagram for this system. State any assumptions you make.

II. QUESTION (18 POINTS)

Assume that make payment is a use case which is engaged in an include relationship with purchase ticket use case, i. e. purchase ticket use case includes make payment use case. Draw a sequence diagram for make payment use case. State any assumptions you make.

III. QUESTION (18 POINTS)

Consider a traffic light system at a four-way crossroads (two roads intersecting at right angles). Assume the simplest algorithm for cycling through the lights (e.g., all traffic on one road is allowed to go through the crossroad, while the other traffic is stopped). Identify the states of this system and draw a statechart describing them. Remember that each individual traffic light has three states (green, yellow, and red).

IV. QUESTION (22 POINTS)

- Specify which of these statements are functional requirements and which are nonfunctional requirements:
 - The TicketDistributor must enable a traveler to buy weekly passes.
 - The TicketDistributor must be written in Java.
 - The TicketDistributor must be easy to use.
 - The TicketDistributor must always be available.
 - The TicketDistributor must provide a phone number to call when it fails.
- Specify which of these decisions were made during requirements or system design:
 - The TicketDistributor is composed of a user interface subsystem, a subsystem for computing the tariff, and a network subsystem for managing the communication with the central computer.
 - The TicketDistributor hardware uses PowerPC processor chips.
 - The TicketDistributor provides the traveler with on-line help.
- Specify which of these requirements are verifiable or not.
 - The system must be usable.
 - The system must provide visual feedback to the user within one second of issuing a command.
 - The availability of the system must be above 95 percent.

V. QUESTION (24 POINTS)

- a) Draw a class diagram representing a book defined by the following statement: “A book is composed of a number of parts, which in turn are composed of a number of chapters. Chapters are composed of sections. A book includes a publisher, publication date, and an ISBN. A part includes a title and a number. A chapter includes a title, a number, and an abstract. A section includes a title and a number”.
- b) In Part a), note that the Part, Chapter, and Section classes all include title and number attributes. Add an abstract class and inheritance relationship to factor out these two attributes into the abstract class.
- c) Draw a class diagram representing the relationship between parents and children. Take into account that a person can have both a parent and a child. Annotate associations with roles and multiplicities.