

ITCS 6112/8112

CCI

MIDTERM EXAM

Department: Computer Science

Name: AKHIL IMMADI

(Please underline last name)

Student Number: 801390652

NOTE: There's no reason you can't create a well-written exam that I'll be able to easily understand.

PART I : (1 pt each to total 57 pts)

**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- b 1. A prototype has which of the following characteristics?
- a. Includes work procedures, both extensive and throwaway
  - b. Is operative and executable, is focused on a specific objective, is quickly built
  - c. Has good look and feel, is executable, and is complete
  - d. Is quickly built, has mock-up, and is complete
- a 2. The type of prototype used during the analysis phase is the \_\_\_\_ prototype.
- a. discovery
  - b. evolving
  - c. interface
  - d. functioning
- c 3. \_\_\_\_ prototypes are not built with the intent of being fully functional, but to check the feasibility of certain approaches to the business need.
- a. Functional
  - b. Discovery
  - c. Workflow
  - d. Logical
- a 4. A(n) \_\_\_\_ describes the various user (or system) activities, the person who does each activity, and the sequential flow of these activities.

- a. activity diagram
- b. synchronization bar

- c. mock-up
- d. swim lane

b 5. A(n) \_\_\_\_\_ is an initial working model of a larger, more complex entity.

- a. activity diagram
- b. prototype

- c. activity diagram
- d. workflow

b 6. \_\_\_\_\_ can prove that the technology will do what it is supposed to do.

- a. Activity diagrams
- b. Prototypes

- c. Workflows
- d. Swimlanes

b 7. \_\_\_\_\_ requirements are sometimes considered a subset of performance requirements.

- a. Technical
- b. Reliability

- c. Usability
- d. Security

b 8. \_\_\_\_\_ requirements may apply to areas such as network communications and storage.

- a. Technical
- b. Security

- c. Usability
- d. Reliability

d 9. The term "\_\_\_\_\_" refers to all the people who have an interest in the successful implementation of the system.

- a. users
- b. clients

- c. middle managers
- d. stakeholders

a 10. \_\_\_\_\_ requirements describe operational characteristics related to users.

- a. Usability
- b. Technical

- c. Reliability
- d. Performance

b 11. \_\_\_\_\_ requirements are most often documented in graphical and textual models.

- a. Security
- b. Nonfunctional

- c. Technical
- d. Functional

b 12. Diagrams and schematic representations of some aspect of a system are examples of a \_\_\_\_\_ model.

- a. logical
- b. graphical

- c. mathematical
- d. descriptive

a 13. Structured English or pseudocode is an example of a \_\_\_\_\_ model.

- a. concrete
- b. descriptive

- c. mathematical
- d. graphical

d 14. A series of formulas that describe technical aspects of a system is a(n) \_\_\_\_\_ model.

- a. concrete
- b. descriptive

- c. graphical
- d. mathematical

a 15. Narrative memos, reports, or lists that describe some aspect of a system represent a(n) \_\_\_\_\_ model.

- a. descriptive
- b. concrete

- c. mathematical
- d. graphical

b 16. An occurrence at a specific time and place, which can be described and is worth remembering, is called a(n) \_\_\_\_\_.

- a. external agent
- b. event

- c. temporary effect
- d. state of requirement

- b 17. An event that occurs outside the system, usually initiated by an external agent or actor, is called a(n) \_\_\_\_ event.
- a. logical
  - b. external
  - c. temporal
  - d. state
- a 18. An event that occurs as a result of reaching a point in time is called a(n) \_\_\_\_ event.
- a. temporal
  - b. logical
  - c. external
  - d. state
- a 19. The \_\_\_\_ states that events should be included during analysis only if the system would be required to respond under perfect conditions.
- a. perfect technology assumption
  - b. risk control assumption
  - c. system control
  - d. technology control
- d 20. \_\_\_\_ refers to a signal that tells the system that an event has occurred, either the arrival of data needing processing or a point in time.
- a. Source
  - b. Activity
  - c. Response
  - d. Trigger
- b 21. A synonym for cardinality (used with UML class diagrams) is \_\_\_\_.
- a. relationship
  - b. multiplicity
  - c. unary relationship
  - d. inheritance
- d 22. The term \_\_\_\_ is used to describe the relationship among three different types of things.
- a. unary relationship
  - b. binary relationship
  - c. multiplicity
  - d. ternary relationship
- b 23. An attribute that uniquely identifies a thing is called a(n) \_\_\_\_.
- a. class
  - b. key
  - c. compound attribute
  - d. attribute
- c 24. An attribute that contains a collection of related attributes is called a(n) \_\_\_\_.
- a. class
  - b. key
  - c. compound attribute
  - d. attribute
- d 25. \_\_\_\_ is based on the idea that people classify things in terms of similarities and differences.
- a. Aggregation
  - b. Encapsulation
  - c. Multiplicity
  - d. Generalization/specialization hierarchy
- d 26. A concept that allows subclasses to share the characteristics of their superclasses is called \_\_\_\_.
- a. aggregation
  - b. encapsulation
  - c. multiplicity
  - d. inheritance
- a 27. \_\_\_\_ describes a whole-part relationship between an object and its parts.
- a. Aggregation
  - b. Encapsulation
  - c. Associative entity
  - d. Inheritance
- c 28. \_\_\_\_ is an analysis technique that focuses on identifying the events to which a system must respond and then determining how the system must respond.
- a. User goals technique
  - b. List nouns technique
  - c. Event decomposition
  - d. CRUD
- b 29. The domain model class diagram is used to \_\_\_\_.
- a. show the software classes in the problem domain layer of the system



- b. show the things involved in the user's work that are important to the system
- c. show the data entities in the traditional approach
- d. show the use cases in the OO approach

d 30. The procedure for identifying domain classes or data entities is to list all of the \_\_\_\_ found when discussing system requirements with users.

- a. events
- b. verbs
- c. actors
- d. nouns

d 31. Which of the following models is NOT considered an object-oriented model?

- a. Use case diagram
- b. Activity diagram
- c. State machine diagram
- d. Context diagram

d 32. The basic objective of requirements definition is \_\_\_\_.

- a. messaging
- b. interaction
- c. analysis
- d. understanding

a 33. \_\_\_\_ diagrams are used in conjunction with detailed descriptions or with activity diagrams.

- a. Context
- b. System sequence
- c. Class
- d. Entity-relationship

b 34. The objective of \_\_\_\_ analysis is to identify and define all of the business processes that the system must support.

- a. statechart
- b. use case
- c. context
- d. class

d 35. Which of the following compares the identified use cases with the domain model class diagram?

- a. Systems analysis
- b. Unified Modeling Language (UML)
- c. Object-oriented modeling (OOM)
- d. CRUD analysis

b 36. Which of the following documents information about classes that are part of the problem domain of the user?

- a. Activity diagram
- b. State machine diagram
- c. Use case diagram
- d. System sequence diagram (SSD)

b 37. On a systems sequence diagram, \_\_\_\_ indicate(s) a true/false condition.

- a. ( )
- b. [ ]
- c. { }
- d. \*

c 38. The term "\_\_\_\_" is used to describe the communication between objects within a use case.

- a. object line
- b. lifeline
- c. message
- d. parameter

a 39. The purpose of the use case diagram is to identify the \_\_\_\_.

- a. users of the system
- b. system boundary
- c. messages in the system
- d. uses of the system

c 40. A use case diagram can be derived from a(n) \_\_\_\_.

- a. class diagram
- b. sequence diagram
- c. event table
- d. context diagram

b 41. An actor is a(n) \_\_\_\_.

- a. fictitious person
- b. role played by someone using the system

- c. person defining a system use
- d. external file that communicates with the system

b 42. The "includes" relationship represents the idea of \_\_\_\_.

- a. embedding classes within other classes
- b. one use case being used by another
- c. classes included within use cases
- d. embedding states within other states

d 43. One way to begin the development of a use case diagram is to identify the \_\_\_\_.

- a. system boundary
- b. flows of information
- c. classes
- d. actors

d 44. The dashed lines in a system sequence diagram represent \_\_\_\_.

- a. object lifelines
- b. object transitions
- c. transition activities
- d. messages

d 45. Which of the following refers to the business processes that a new system must respond to?

- a. Things
- b. Objects
- c. States
- d. Events

a 46. Which of the following describes the inputs and outputs that occur within a use case?

- a. System sequence diagrams (SSDs)
- b. Data flow definitions
- c. Context diagrams
- d. DFD fragments

a 47. Which of the following can be used to describe processes that include manual and automated system activities?

- a. DFD fragments
- b. Context diagrams
- c. Entity-relationship diagrams (ERDs)
- d. Activity diagrams

a 48. A(n) \_\_\_\_ diagram is a diagram showing the sequence of messages between an external actor and the system during a use case or scenario.

- a. system sequence
- b. statechart
- c. class
- d. activity

d 49. A(n) \_\_\_\_ diagram identifies status conditions and specifies the processes allowed.

- a. system sequence
- b. state machine
- c. class
- d. activity

b 50. A(n) \_\_\_\_ provides an overview of all the use cases for a system.

- a. use case description
- b. use case diagram
- c. activity diagram
- d. system sequence

d 51. In a use case diagram, the use case is symbolized by a(n) \_\_\_\_.

- a. rectangle
- b. stick figure
- c. rounded rectangle
- d. oval

d 52. Use cases can be organized by \_\_\_\_.

- a. subsystem
- b. grouping all cases that involve a specific actor
- c. the needs of the project team
- d. All of the above

a 53. In a state machine diagram, a state is represented by a(n) \_\_\_\_.

- a. oval
- b. black dot
- c. square
- d. dashed arrow

c 54. Which of the following is NOT a step in the development of a state machine diagram?

- a. List all the status conditions for an object
- b. Identify state exiting transitions
- c. Expand the name of each state to identify concurrent activities
- d. Sequence the state-transition combinations in the correct order

b 55. Which is NOT considered a valid object-oriented model?

- a. Class diagram
- b. Context diagram
- c. State machine diagram
- d. System sequence diagram

a 56. A state machine diagram is used to document the states and transitions of a(n) \_\_\_\_.

- a. Business process
- b. Use case
- c. Event message
- d. Object

b 57. An actor is a valid part of which model?

- a. State machine diagram
- b. System sequence diagram
- c. Activity diagram
- d. Fully developed use case description



## PART II : SHOW YOUR WORK FOR ALL OF THE QUESTIONS BELOW:

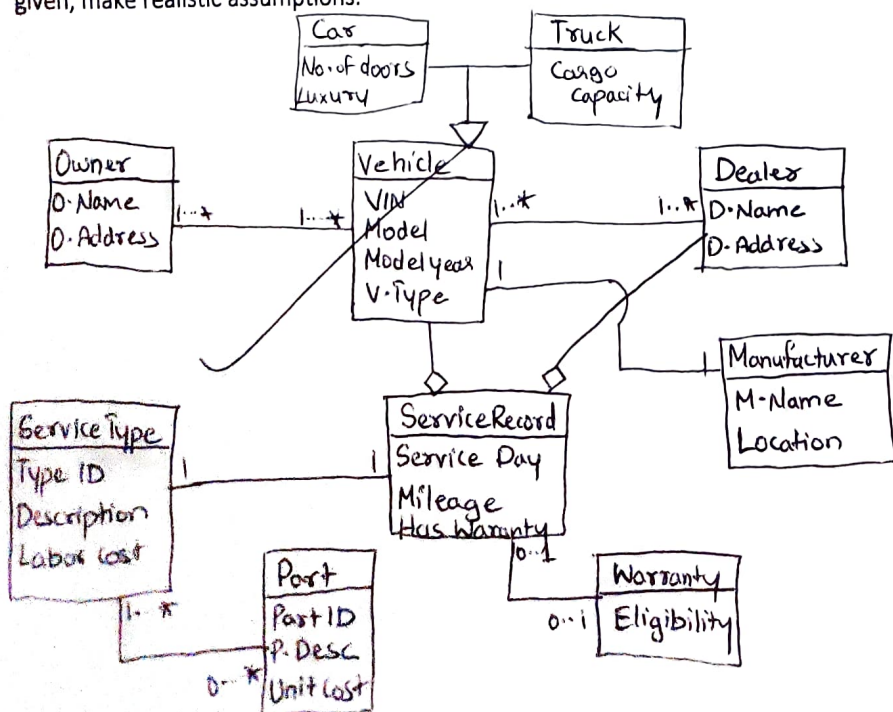
A service department in a local car dealership would like to create a system that keeps track of car service records. Business analyst provides information about the problem domain in the form of notes. The business analyst notes are as follows:

1. The owner class has the attributes name and address.
2. The vehicle class is an abstract class that has the attributes VIN, Model and model year.
3. There are two types of vehicles, cars and trucks
  - a. Car has additional attributes for the number of doors and luxury level.
  - b. Truck has an additional attribute of cargo capacity.
4. The manufacturer class has the attributes name and location.
5. The Dealer class has the attributes name and address.

A service record is an association class between each class vehicle and a dealer, with the attributes service day and current mileage. A warranty service record is a special type of service record with an additional attribute eligibility verification. Each service record is associated with a predefined service type; with the attributes type ID, description, and labor cost. Each service type is associated with zero or more parts, with attributes part ID, description, and unit cost. Parts are used with one or more service types.

An owner can own many vehicles, and many owners can own a vehicle. An owner and a vehicle are entered into the system only when a dealer first services an owned vehicle. Vehicles are serviced many times at various dealers, which service many vehicles.

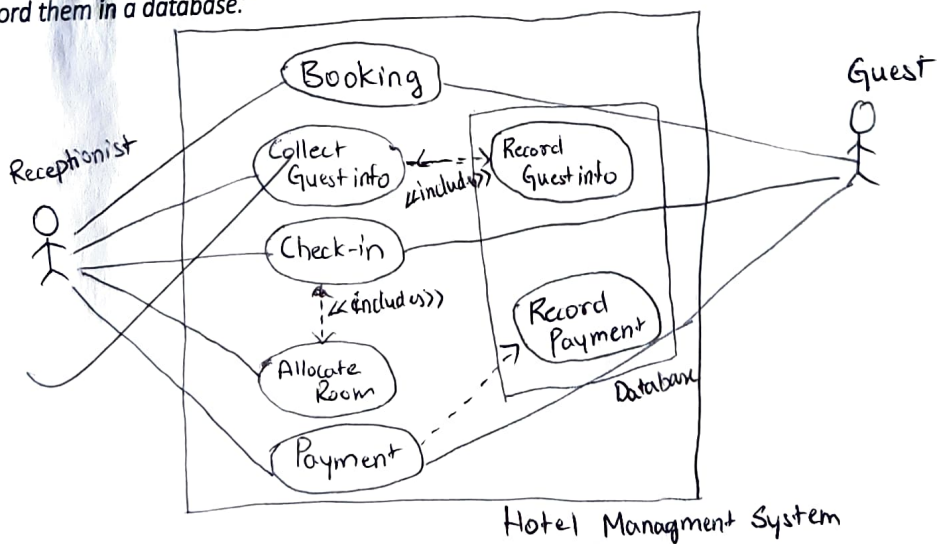
1. (20 pts) Draw a UML domain model class diagram for the system as described above. Be as specific and accurate as possible, given the information provided. If needed information is not given, make realistic assumptions.



2. (Each 1 pts) True or False to the following statements, which are based on the domain model.

- This domain model is for a single car dealer service department. *False*
- This domain model is for a single car manufacturer. *False*
- A vehicle can have service records with more than one dealer. *True*
- A dealer can service vehicles from more than one manufacturer. *True*
- Current mileage is recorded for service records and warranty service records. *True*
- An owner can have each of his or her cars serviced by a different dealer. *True*
- A warranty service for a car can include many parts. *True*
- A vehicle can be made by more than one manufacturer. *False*

3. (6 pts) Draw a use case diagram for the following scenario related to the Hotel Reception. It says about responsibilities of a Hotel receptionist. "Receptionist handles guest's bookings and stay at the hotel. When a guest arrives or calls for a booking, the Receptionist collects information of the guest and records it in a database. She checks in the guests and allocates a room/rooms to them and handovers the keys. Receptionists might also receive guest's payments, provide receipts and record them in a database."

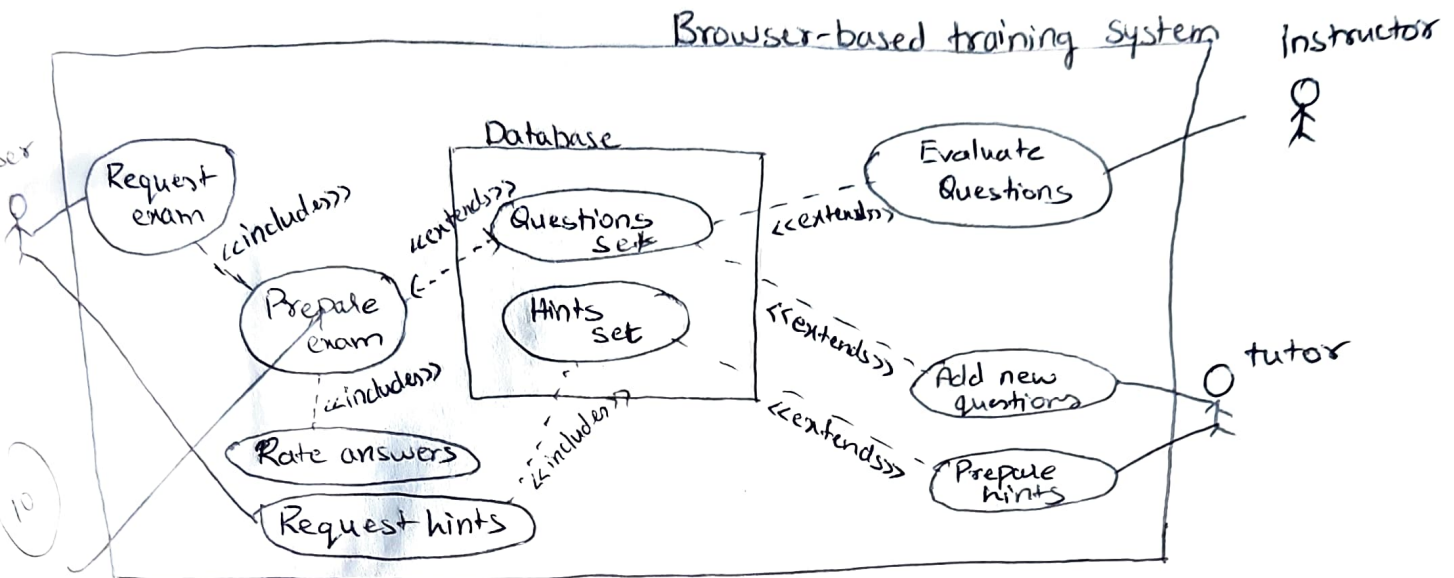


4. (10 pts) Draw a use case diagram for the following "Browser-based training system"

Let's imagine we will develop a browser-based training system to help people prepare for an online exam. A user can request a quiz for the system. The system picks a set of questions from its database, and compose them together to make a quiz. It rates the user's answers, and gives hints if the user requests it. In addition to users, we also have tutors who provide questions and

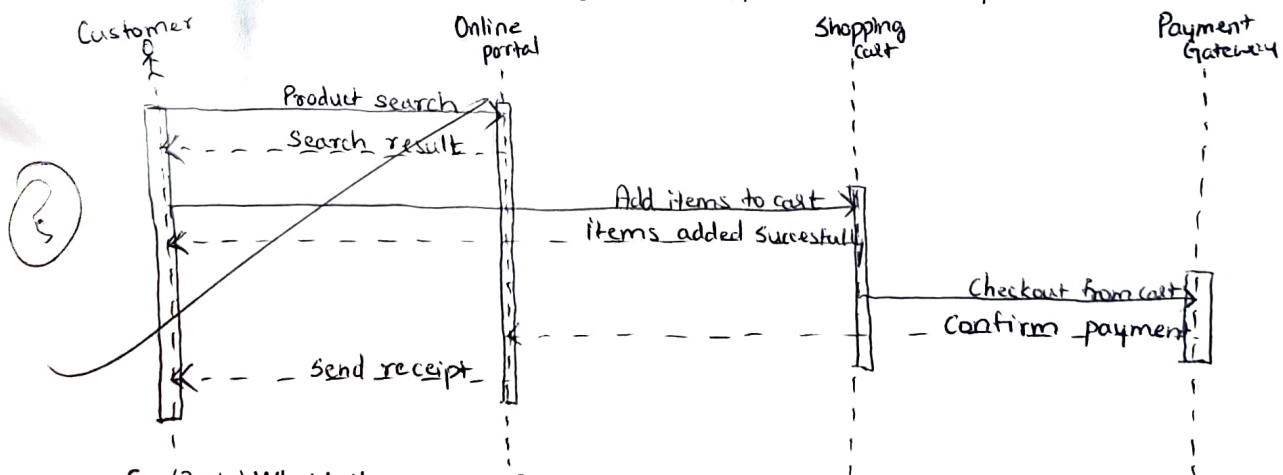


hints. And also, examiners who must certify questions to make sure they are not too trivial, and that they are sensible. Draw a use case diagram to model this system.



5. (5 pts) Draw a sequence diagram for the following scenario:

The customer searches the online portal for a product by name. The portal will return all products with that name. The customer checks the product details. The customer can add a product to the shopping cart. The customer can repeat this process as many times as desired. The customer can buy the items in the shopping cart by checking out and the portal sends a receipt.



6. (3 pts) What is the purpose of an SSD? What symbols are used in an SSD?

System Sequence Diagram (SSD) is used to provide a detailed overview of all the processes inside a particular use case with the external actor/user (on system).

Symbols used in SSD -

- \* Dotted lines - messages in the use case.
- \* Thick directed arrow - to indicate a process
- \* Dotted arrow - to indicate return message of a process

\* Human - To indicate user/external actor.

\* Rectangle - To indicate the domain of the message used.

7. (3 pts) Why are activity diagrams useful for understanding a use case?

Activity diagrams specifies which ~~use~~ process is handled by which actor/external system and provides a clear flow of the process from each step thus clarifying the flow of the usecase at each and every step of the usecase.

8. (3 pts) What is the difference between a relationship and an association?

A relationship between two classes is the no. of objects one class can relate with another class. But, association is not same as relationship. It is defining the parent class to be in relation with the child class where child class can independently be in system even without parent class.

9. (5 pts) Name three important agile techniques that were introduced in extreme programming?

?