

SE2012 – Object Oriented Analysis and Design

Lecture 05 - Worksheet Noun Verb Analysis



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Question A

a) Identify all the Nouns which can be potential classes.

- Online bookshop
- things
- books
- magazines
- CDs
- products
- information
- price
- title
- author
- number of pages
- artists
- type
- customers
- orders
- shipments
- store
- personal customers
- business customers
- payments
- delivery
- invoice
- credit card
- contact information
- personal information
- authentication
- invoicing
- system
- reports

b) Identify the set of potential classes, show clearly how the nouns were rejected using the 5 rules.

- Product (with Book, Magazine, CD as subclasses)
- Customer (with Personal Customer and Business Customer as subclasses)
- Order
- Shipment
- Invoice
- Payment
- Report

Rejected Nouns and Justification:

- **Online bookshop, store, system: Rejected (Rule 1 - Redundant/Rule 2 - Irrelevant).** These nouns describe the entire system or are synonyms for it, not a specific class within the system.
- **things, information: Rejected (Rule 3 - Vague).** These nouns are too general and lack specific meaning in this context.
- **books, magazines, CDs:** These are kept as subclasses of a more general Product class to handle common properties like price and title.
- **price, title, author, number of pages, artists, type: Rejected (Rule 4 - Attribute).** These are all properties of the Product class or its subclasses.
- **personal customers, business customers:** These are kept as specialized types (subclasses) of the Customer class.
- **delivery: Rejected (Rule 5 - Operation).** Delivery is an action or process performed on an order, likely a method associated with the Order or Shipment class.
- **credit card, contact information, personal information: Rejected (Rule 4 - Attribute).** These are properties of the Customer or Payment classes.
- **authentication, invoicing: Rejected (Rule 5 - Operation).** These are actions or processes within the system. Authentication is a method related to Customer, and invoicing is a process that generates an Invoice.

Question B

a) Identify the Objects in the above Picture.

- Librarian at a desk
- A person returning a book
- A person browsing a book stand
- Two people reading at a table
- A person getting a book from a high shelf
- A person reading on the floor
- A child reaching for a book
- A woman reading to a child
- Bookshelves
- Books
- Tables
- Chairs
- Computer
- Scanner
- Globe
- Wall clock
- Ladder
- Windows
- Desk lamp
- Plants

b) Group these Objects into Classes.

- **Person: (Subclasses: Librarian, LibraryMember/Patron, Child)**
 - Objects: All the people in the library.
- **Book:**
 - Objects: All the individual books on shelves, tables, and in people's hands.
- **Furniture: (Subclasses: Table, Chair, Bookshelf, Desk)**
 - Objects: The tables, chairs, shelves, and the librarian's desk.
- **LibraryEquipment: (Subclasses: Computer, Scanner, Ladder, Clock)**
 - Objects: The computer, barcode scanner, ladder, and wall clock.
- **DecorativeItem: (Subclasses: Globe, Plant)**
 - Objects: The globe and indoor plants.

Section 2: Class Relationships

1. **HotelRoom, Booking, Guest:** This is primarily an **Association**. A Guest makes a Booking, and a Booking is for a HotelRoom. The Booking class acts as an association class that links a Guest to a HotelRoom for a specific period.
2. **AcademicStaff, Lecturer, Professor, Student:** This represents **Inheritance** (also known as Generalization/Specialization). Lecturer and Professor are types of AcademicStaff, so they would inherit from the AcademicStaff class. Student is a separate class that would likely have an **Association** with AcademicStaff (e.g., a student is taught by academic staff).
3. **Exhibition, ArtWork, OilPainting, WaterColourPainting, Sculpture, Photograph:** This shows both **Inheritance** and **Aggregation/Composition**. OilPainting, WaterColourPainting, Sculpture, and Photograph are all specific types of ArtWork (Inheritance). An Exhibition is made up of many ArtWork pieces (Aggregation, as the artworks can exist outside the exhibition).
4. **Prescription, Patient, Doctor, Appointment:** This demonstrates **Association**. A Doctor and a Patient are linked through an Appointment. A Doctor writes a Prescription which is for a Patient. All these classes are associated with each other to model the scenario.
5. **Cinema Complex, Film Hall, Seat, Booking, Filmgoer:** This shows **Composition** and **Association**. A Cinema Complex is composed of Film Halls. A Film Hall is composed of Seats (Composition, as halls and seats don't exist independently). A Filmgoer (a type of person) makes a Booking to reserve a Seat. Booking is an association class that links a Filmgoer to a Seat for a specific film showing.

Section 3: Class Diagrams

Question A: VTV Cable TV Company

1. Customer

- **Properties:**
 - customerID (unique)
 - name
 - address
 - email
 - creditCardDetails
- **Methods:**
 - register()
 - login()
 - updateDetails()
 - requestSchedule()
 - payBill()

2. Channel

- **Properties:**
 - channelID
 - channelName
 - tvSchedule
- **Methods:**
 - getSchedule()

3. Subscription

- **Properties:**
 - subscriptionID
 - customerID
 - listOfChannels
 - scheduleRequest (boolean)
- **Methods:**
 - addChannel()
 - removeChannel()

4. Bill

- **Properties:**
 - billID
 - customerID
 - amount
 - billingDate
 - isPaid (boolean)
- **Methods:**
 - generateBill()

5. Payment

- **Properties:**
 - paymentID
 - billID
 - amountPaid
 - paymentDate
- **Methods:**
 - processPayment()

Relationships:

- **Customer and Subscription:** One Customer has one Subscription. (One-to-One Association)
- **Subscription and Channel:** One Subscription consists of many Channels. (One-to-Many Association)
- **Customer and Bill:** One Customer can have many Bills. (One-to-Many Association)
- **Customer and Payment:** A Customer makes a Payment to pay a Bill. (Association)
- The Bill is generated based on the Subscription details.

Question B: Food Delight Restaurant

Potential Classes:

- Customer
- Order
- FoodItem
- Menu
- Manager
- HeadChef
- JuniorChef
- DeliveryTeam
- Payment

Class Details and Relationships:

- **Customer:**
 - Properties: customerName, deliveryAddress, contactDetails.
 - Methods: viewMenu(), placeOrder(), makePayment().
- **Order:**
 - Properties: orderID, listOfFoodItems, totalAmount, orderStatus (e.g., placed, preparing, delayed, out for delivery).
 - Methods: calculateTotal(), updateStatus().
- **FoodItem:**
 - Properties: itemID, name, price, ingredientsRequired.
- **Menu:**
 - Properties: listOfFoodItems.
 - Methods: addItem(), removeItem().
- **Manager:** (is a type of Staff)
 - Methods: viewOrder(), forwardOrderToChef(), contactCustomer().
- **HeadChef:** (is a type of Staff)
 - Methods: checkIngredients(), assignOrderToJunior(), reorderIngredients(), informManagerOfCompletion().

- **JuniorChef:** (is a type of Staff)
 - Methods: prepareOrder().
- **DeliveryTeam:** (is a type of Staff)
 - Methods: printOrderDetails(), deliverOrder().
- **Payment:**
 - Properties: paymentID, orderID, amount, cardDetails.
 - Methods: processTransaction().

Relationships:

- A Customer places one or more Orders.
- An Order contains one or more FoodItems.
- FoodItems are part of the Menu.
- A Manager views and manages an Order.
- A HeadChef receives an Order from the Manager and assigns it to a JuniorChef.
- The DeliveryTeam delivers the completed Order.
- A Customer makes a Payment for an Order.