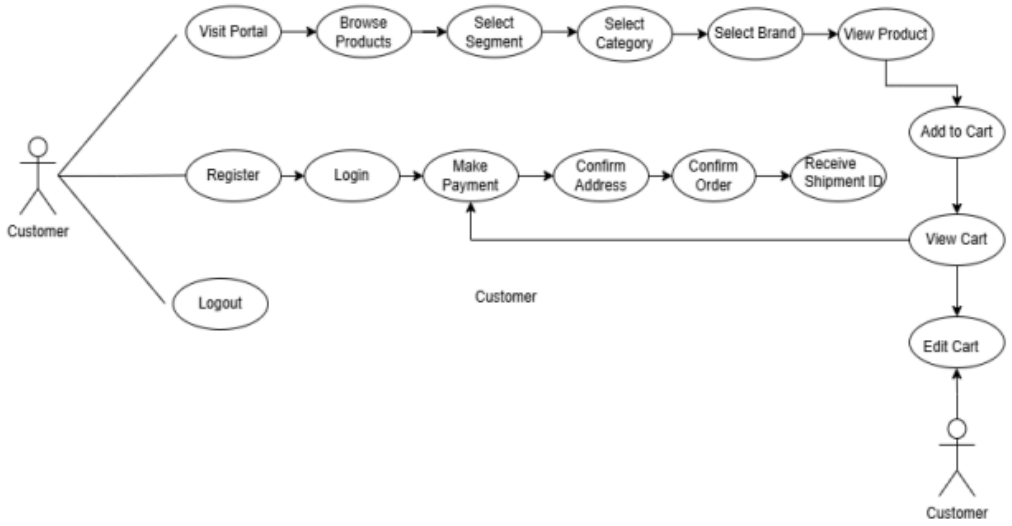
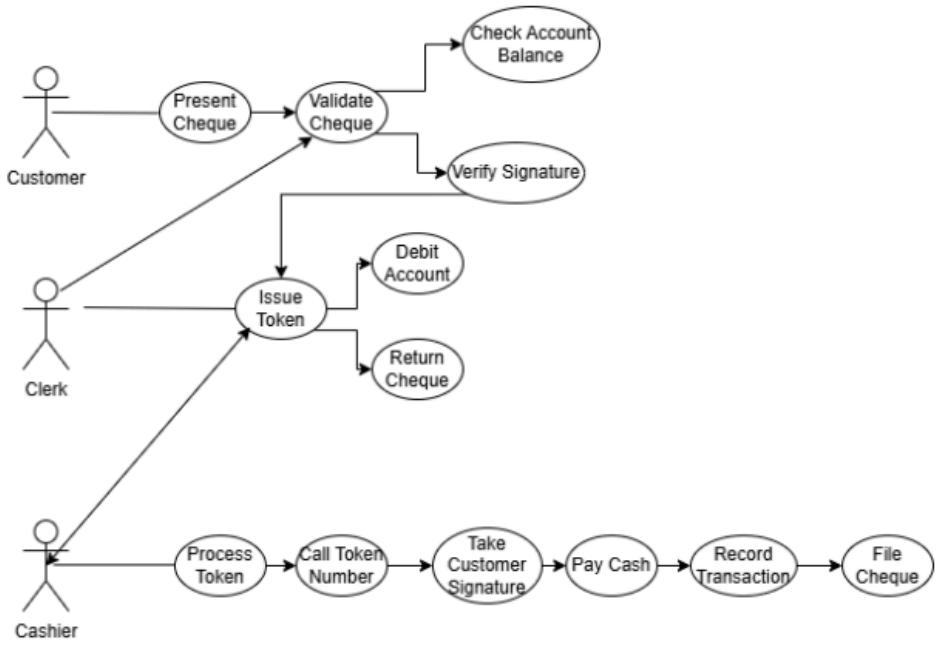
1) A customer visits an online shopping portal. A customer may either buy an item or simply visit the page and log out. The customer can choose a segment, followed by a category and brand, to explore different products within the desired range. The customer can select products for purchase, repeating the process for multiple items. Once product selection is complete, the cart can be viewed. If needed, the final cart can be edited.For payment, the customer must log in to the portal. If visiting for the first time, registration is required; otherwise, the customer can proceed via the login page. The final cart is submitted for payment, and the customer must confirm card details and address information. After confirmation, the customer receives a shipment ID, and the goods are delivered within 15 days.

Answer: Online Shopping Portal



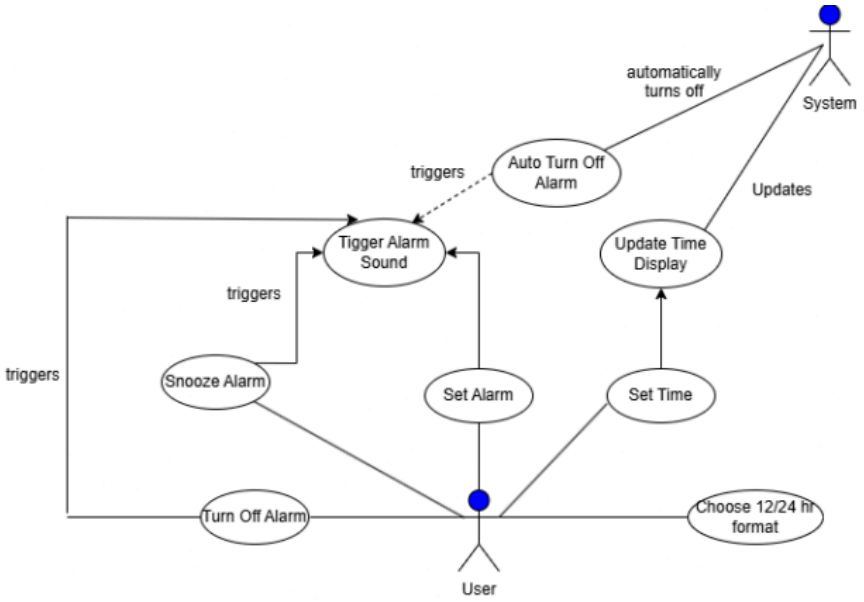
2) A customer presents a cheque to a clerk. The clerk verifies the ledger to check if the account number is valid, if there is enough balance, and if the signature is authentic. After verification, the clerk issues a token and debits the specified amount from the customer's account. If there is an error in the cheque, it is returned. The token number is written on the cheque and passed to the cashier. The cashier calls out the token number, takes the customer's signature, hands over the cash, records the transaction in the day book, and files the cheque.

Answer: Bank Cheque Processing System



3) Suppose you want to develop software for an alarm clock. The clock shows the time of day. Using buttons, the user can set the hours and minutes fields individually and choose between 12 and 24-hour display. It is possible to set one or two alarms. When an alarm fires, it will sound some noise. The user can turn it off or choose to snooze. If the user does not respond at all, the alarm turns off itself after 2 minutes. Snoozing means to turn off the sound, but the alarm will fire again after some minutes of delay. This snoozing time is pre-adjusted. Draw a use case for this system.

Answer:Alarm Clock System



4) Design a class diagram for a class named Books, which has the following attributes and operations:

Attributes: name, author name, ISSN number, price

Operations: to input values for the above data, to search for a book by its ISSN, and to display the details of a book.

Answer: Books Class

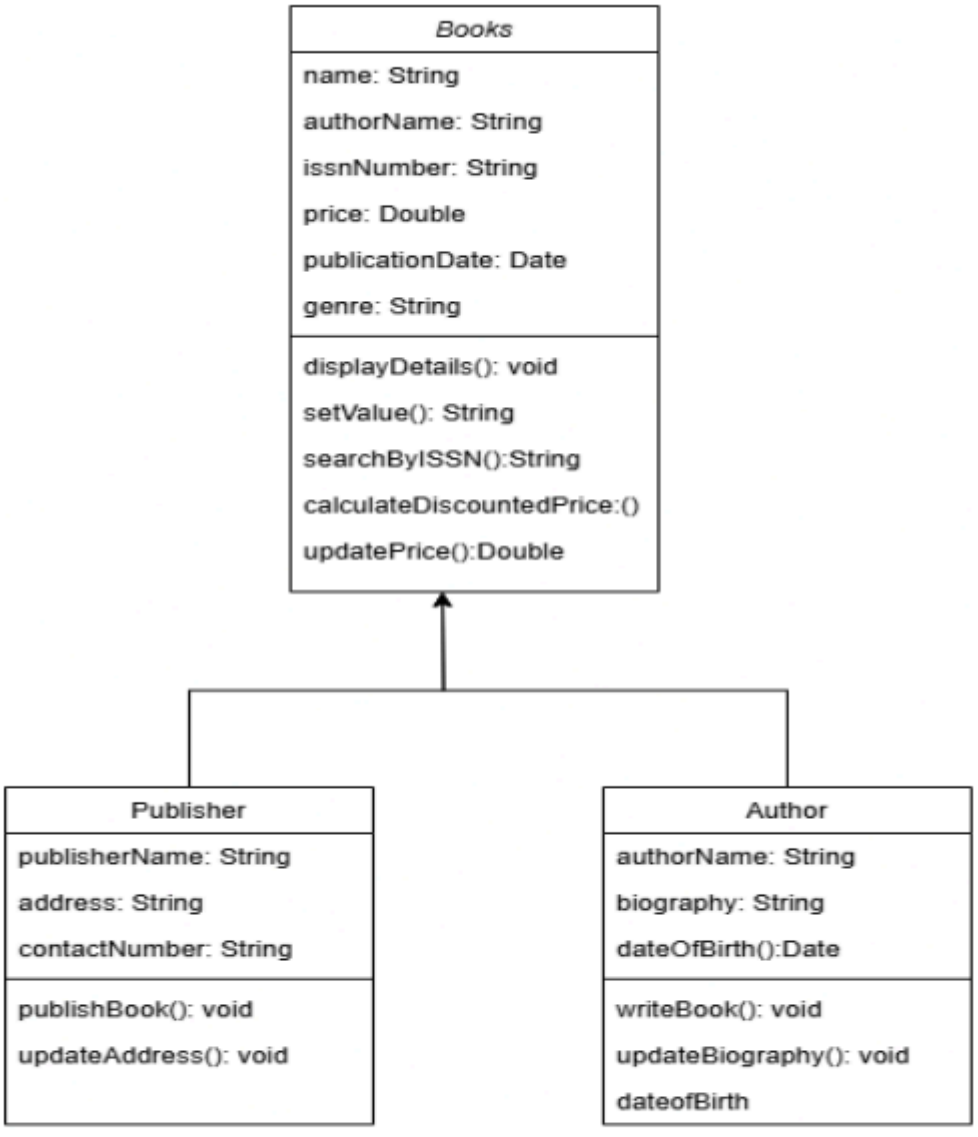
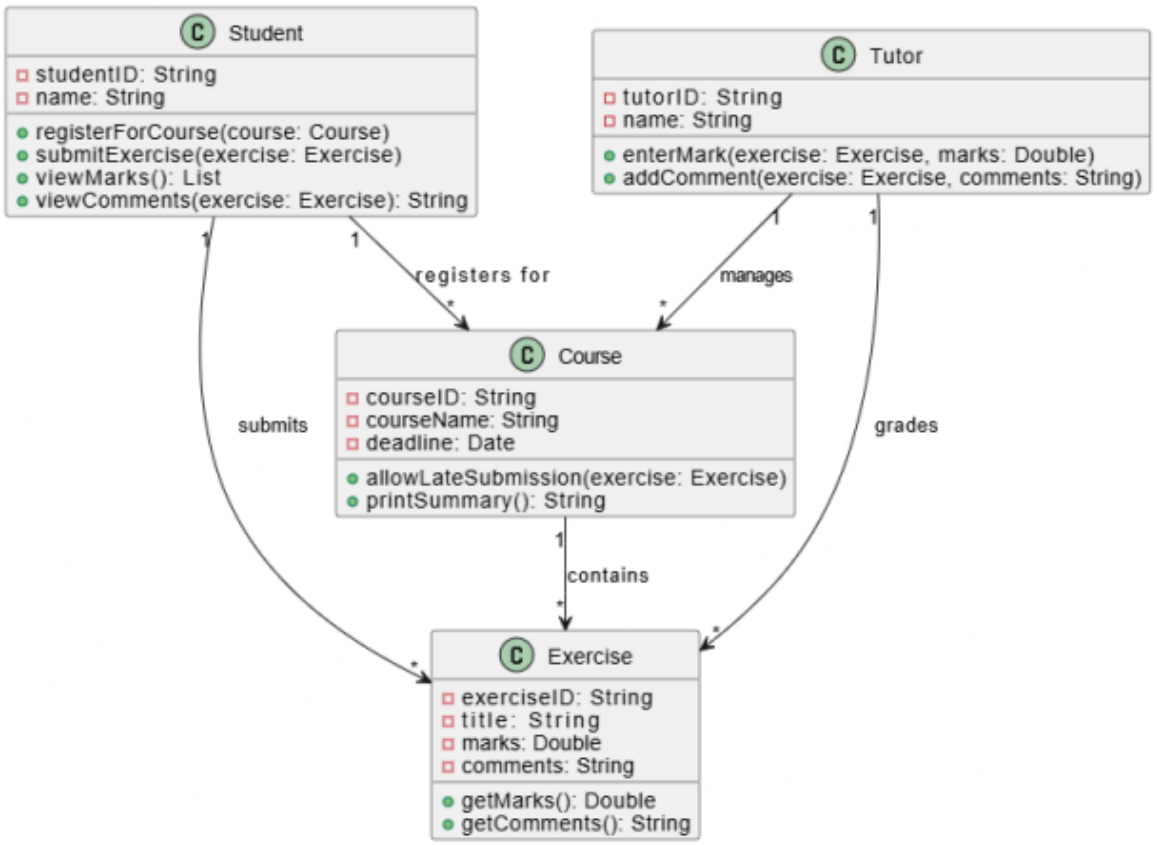


Fig: Books Class

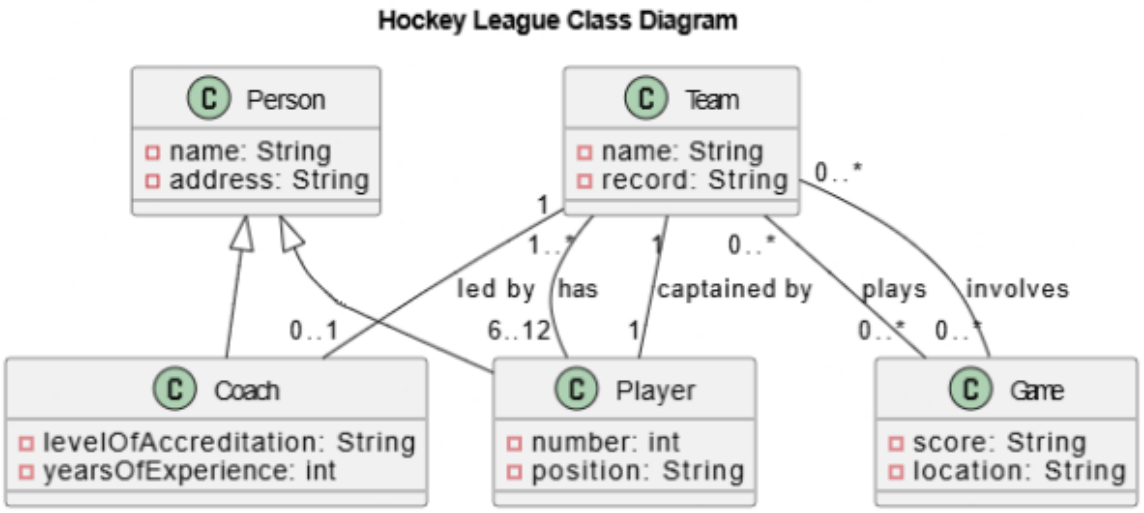
5) A simple system is to be developed to manage exercises completed by students taking a course. Students first meet with the course tutor to register for a course, and then submit a number of exercises during the course. Every course has a deadline assigned by the tutor. Tutors can allow exercises to be submitted late. At any point, a student can check the marks they have received for completed exercises and view any comments made by the tutor on specific exercises. The course tutor can enter marks for an exercise and print a summary of marks for all students in the course. Identify classes and draw a class diagram to model an efficient solution for the problem.

Answer: Student Exercise Management System



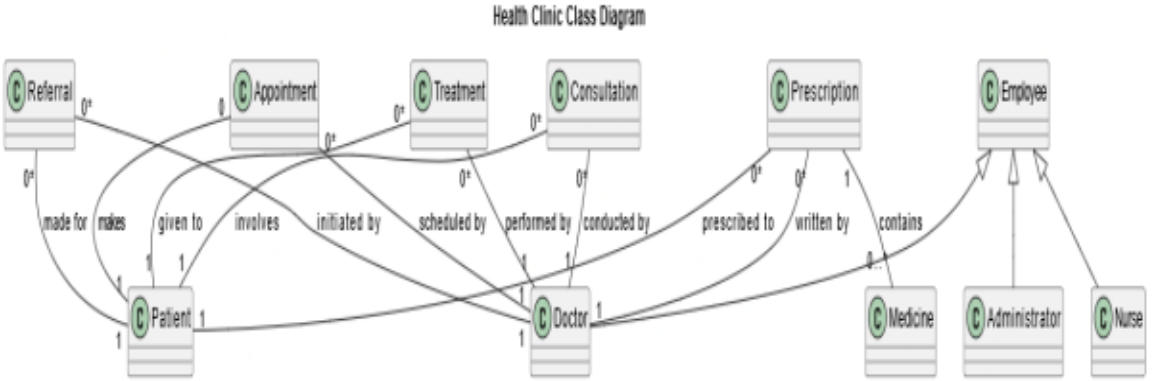
6) Draw a UML class diagram representing the following elements for a hockey league. A **hockey league** consists of at least four **hockey teams**. Each **hockey team** is made up of 6 to 12 **players**, with one player serving as the team captain. A **team** has a name and a record. **Players** have a number and a position. **Teams** play **games** against each other, with each **game** having a score and a location. **Teams** can be led by a **coach**, who has a level of accreditation and years of experience. A **coach** may coach multiple teams. Both **coaches** and **players** are types of **people**, who share common attributes like names and addresses. The diagram should include appropriate multiplicities for all associations.

Answer: Fig:Hockey League Diagram



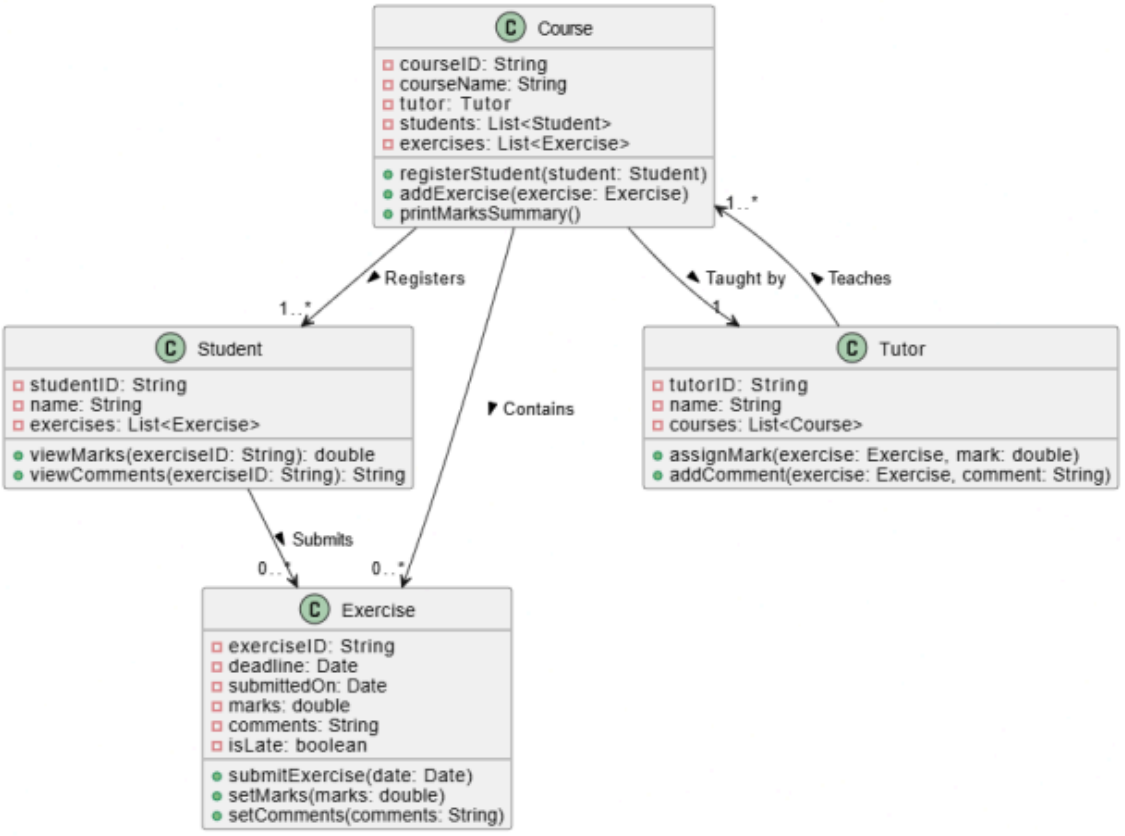
7) A health clinic provides medical services to patients in a small town. The clinic employs five doctors and three nurses who consult with patients, prescribe medicines, and carry out minor treatments. Patients with more serious conditions are referred to specialists at the local hospital. A medical information system is being designed for use in the clinic, which will manage data about employees (doctors, nurses, and administrators), patients and their contact details, appointments, consultations, medicines, prescriptions, treatments, and referrals.Produce a UML class diagram to represent this system, using an object-oriented programming language. The diagram should include all applicable classes and relationships, but there is no need to specify the attributes and operations for each class.

Answer: Fig:Heath Clinic Class Diagram



8) A simple system needs to be developed to manage exercises completed by students in a course. Students initially meet with the course tutor to register for a course. During the course, they submit various exercises. Each course has a deadline assigned by the tutor, and tutors can permit late submissions. At any time, a student can check the marks they've received for completed exercises and view any comments made by the tutor. The course tutor can enter marks for exercises and generate a summary of marks for all students in the course. Identify the classes involved and create a class diagram to efficiently model the solution for this problem.

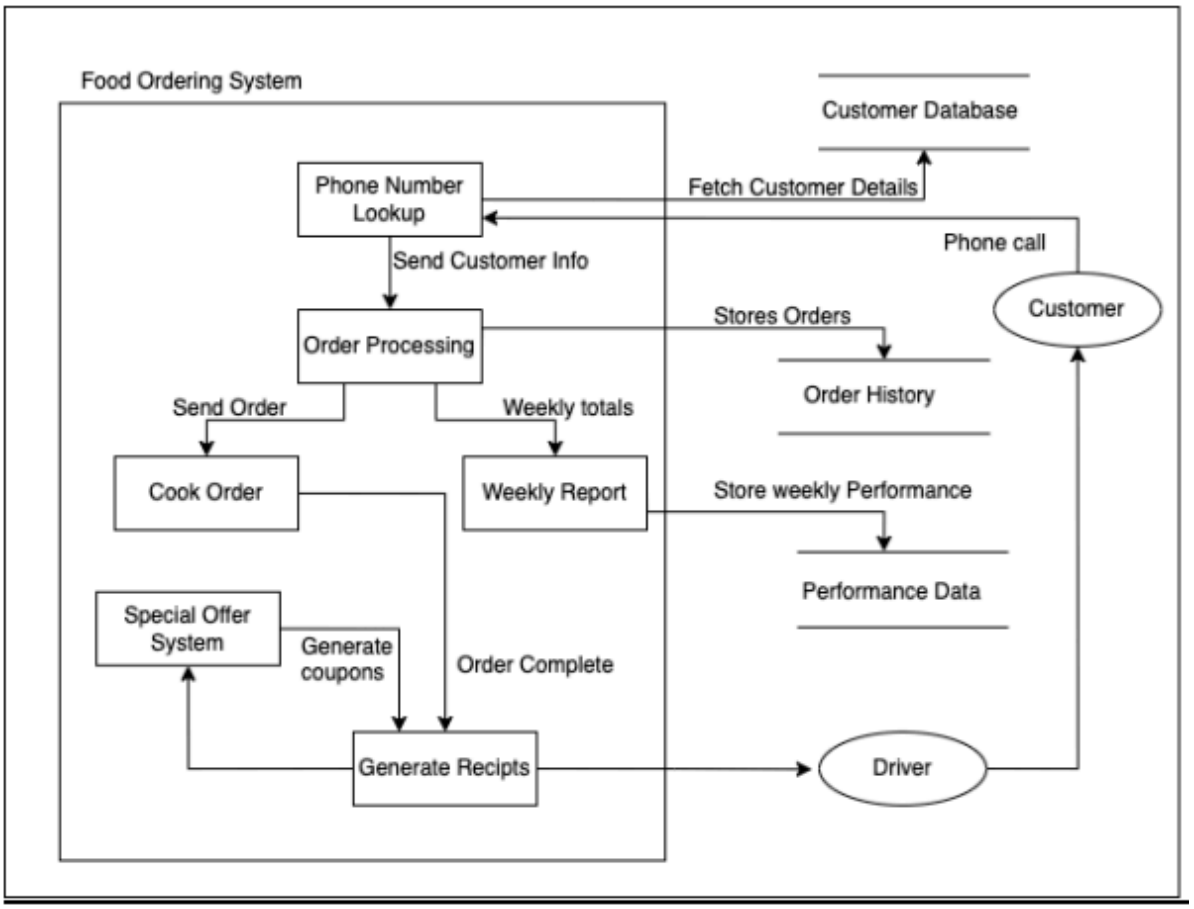
Answer: Exercise Management System



9) Prepare level 1 DFD for the following Food Ordering System. [2020 fall] KFC pizza wants to install a system to record orders for pizza and burger. When regular customer call KFC pizza on the phone, their phone number goes automatically into pizza system. The phone number invokes the name, address and last order date automatically on the screen. Once the order is taken, the total including tax and delivery is calculated. The order is given to the cook. A receipt is printed. Occasionally, special offers (coupons) is printed so the customer can get discount. Drivers who make deliveries gives customers a copy of the receipt and coupon (if any). Weekly totals are kept for comparison with last year's performance.

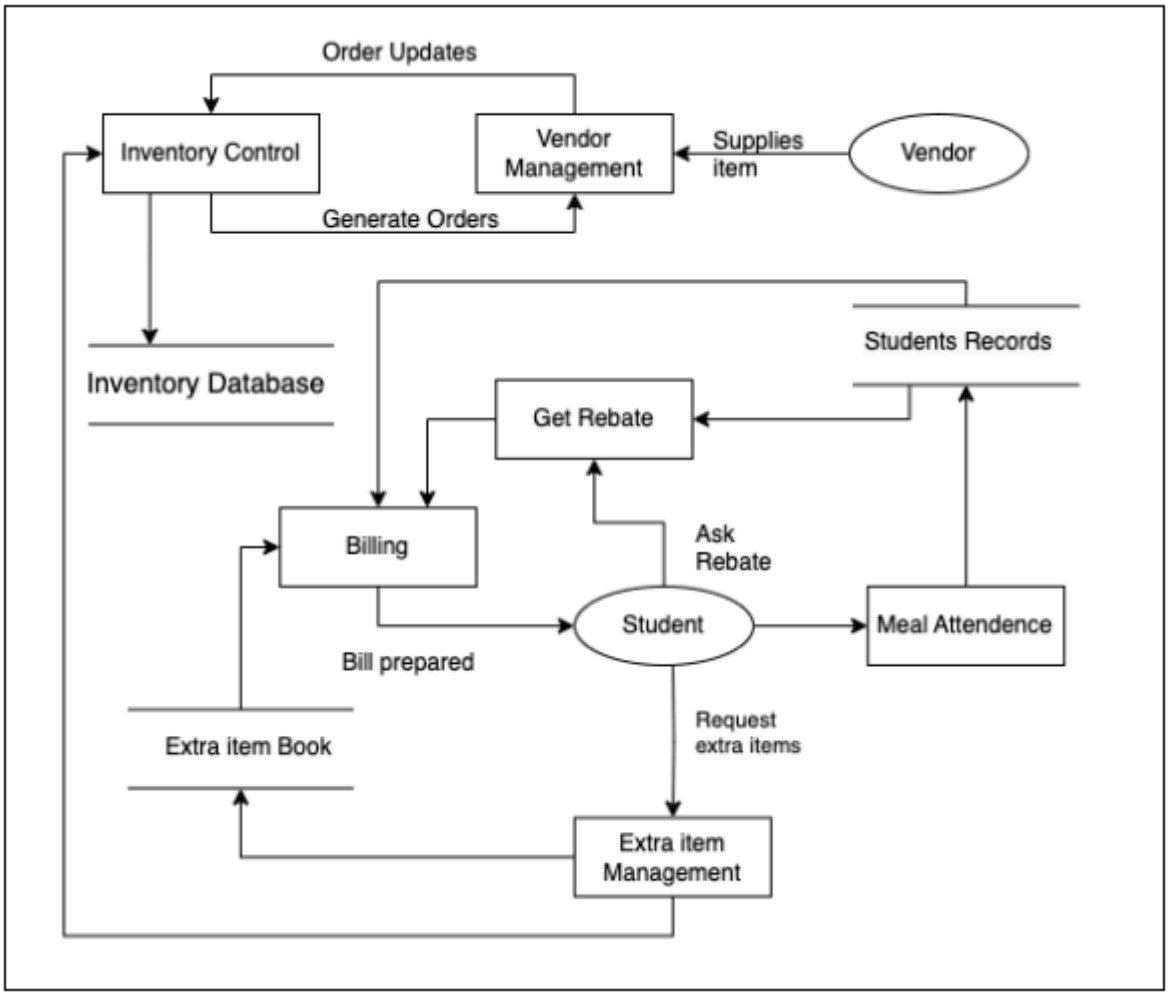
Answer:

Title: Level 1 DFD food ordering system



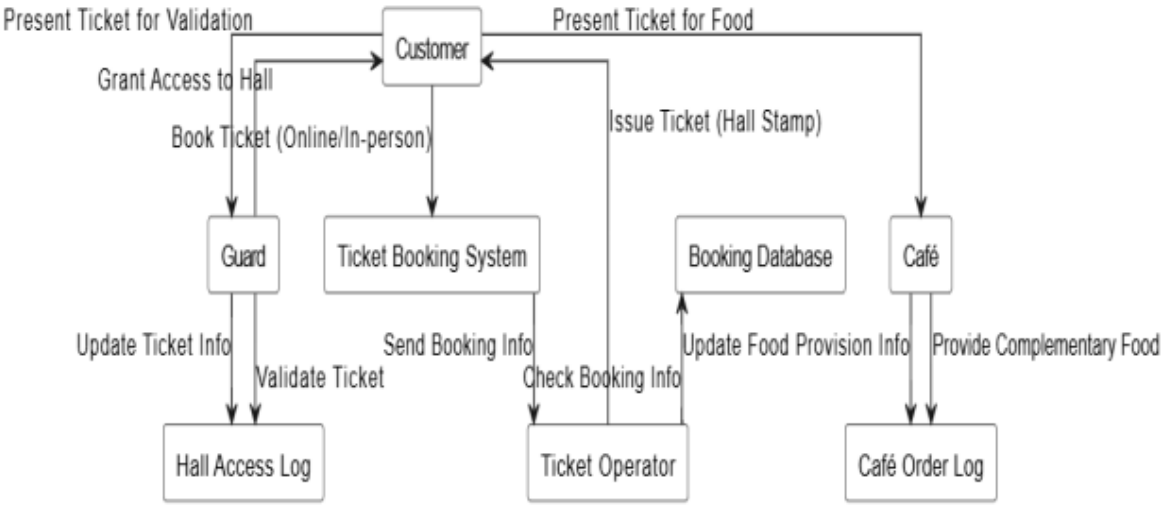
10) Obtain DFD for the following Mess management system: [2014 Spring] A hostel has 500 rooms and 4 messes. Currently, there are 1000 students in all in 2 seated rooms. They eat in any of the messes but can get rebate if they inform and do not eat for at least 4 consecutive days. Besides normal menu, extra items are also given to students when they ask for it. Such extras are entered in an extra book. At the end of the month, a bill is prepared based on the normal daily rate and extras and given to each student. System for stores issue and control is maintained for daily use of perishables and non-perishables items and order to vendor and suppliers are also maintained as well.

Answer:



11) Obtain 1-level DFD for Movie Management System: [2015 spring] A customer can book a ticket from the Internet or can directly buy the ticket in the Movie-hall itself. There can be multiple halls within one movie theatre. The ticket operator provides a ticket with hall's stamp after checking the booking information to the customer. The guard in each hall validates the ticket and provides access to the customer inside the hall. There is also provision of complementary food item which the café will provide in the break time of the movie.

Answer:



12) Obtain 1-level DFD for the following system of encashing cheque in a bank. A customer presents a cheque to a clerk. The clerk checks the ledger containing all account numbers and makes sure whether the account number in the cheque is valid, whether adequate balance is there in the account to pay the cheque, and whether the clerk also debits customer's account by the amount specified on the cheque. If cash cannot be paid due to an error in the cheque, the cheque is returned. The token number is written on the top of the cheque and it is passed on to the cashier. The cashier calls out the token number, takes the customer's signature, pays cash, enters cash paid in ledger called day book, and files the cheque.

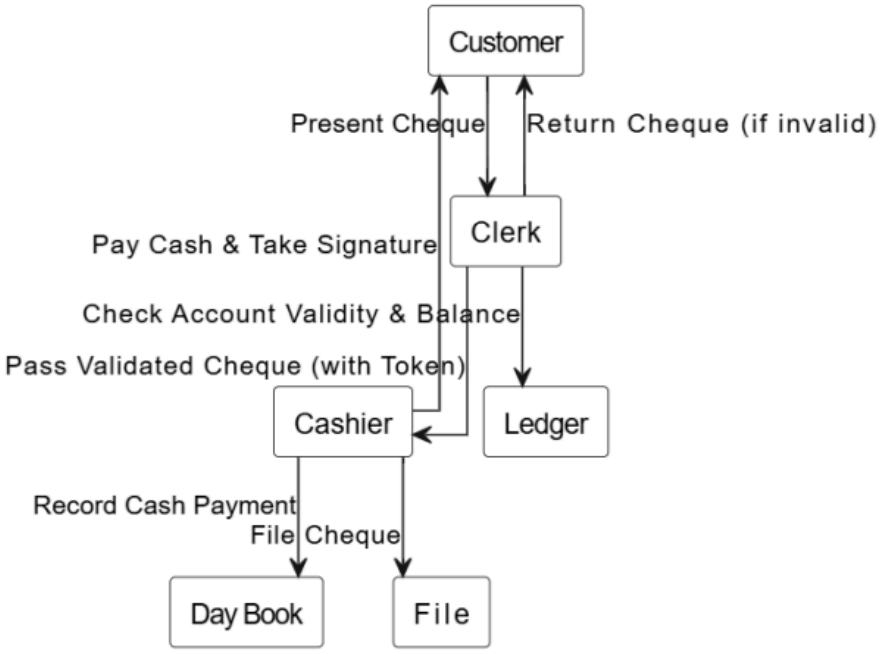
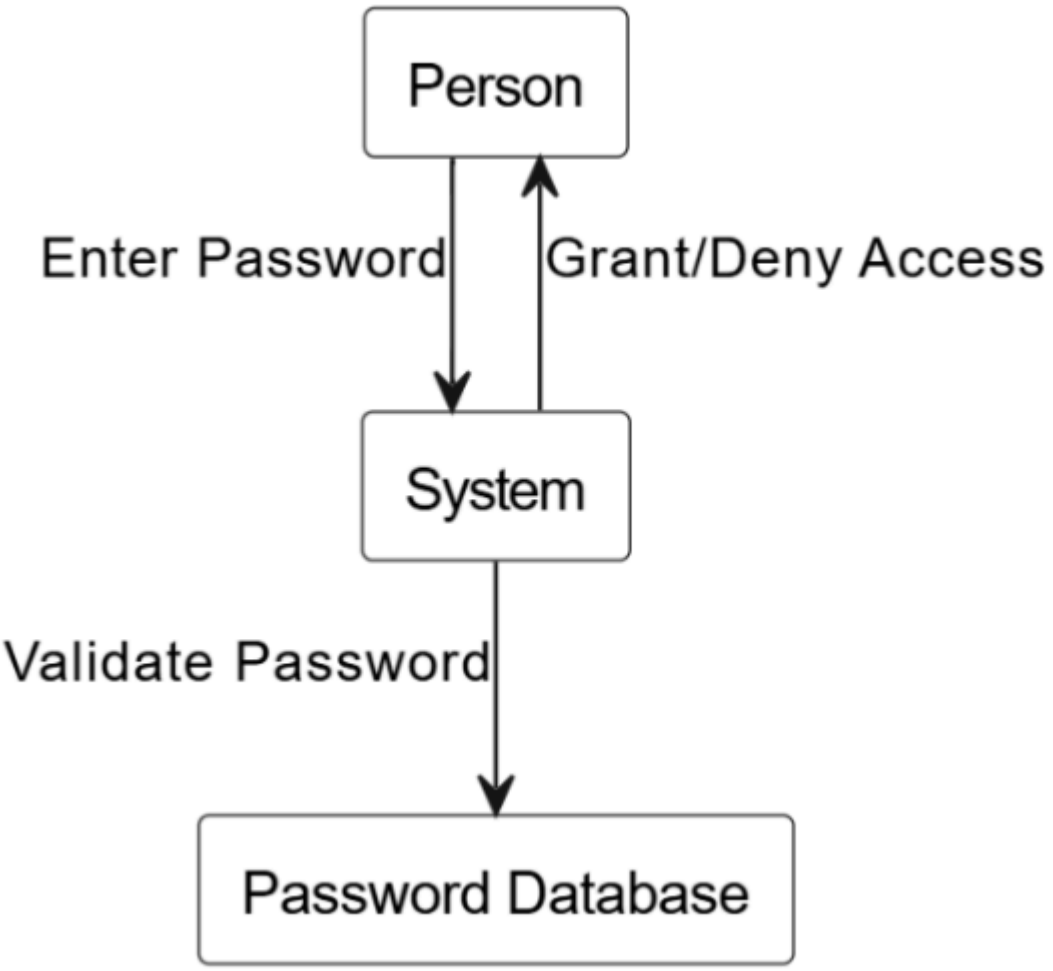


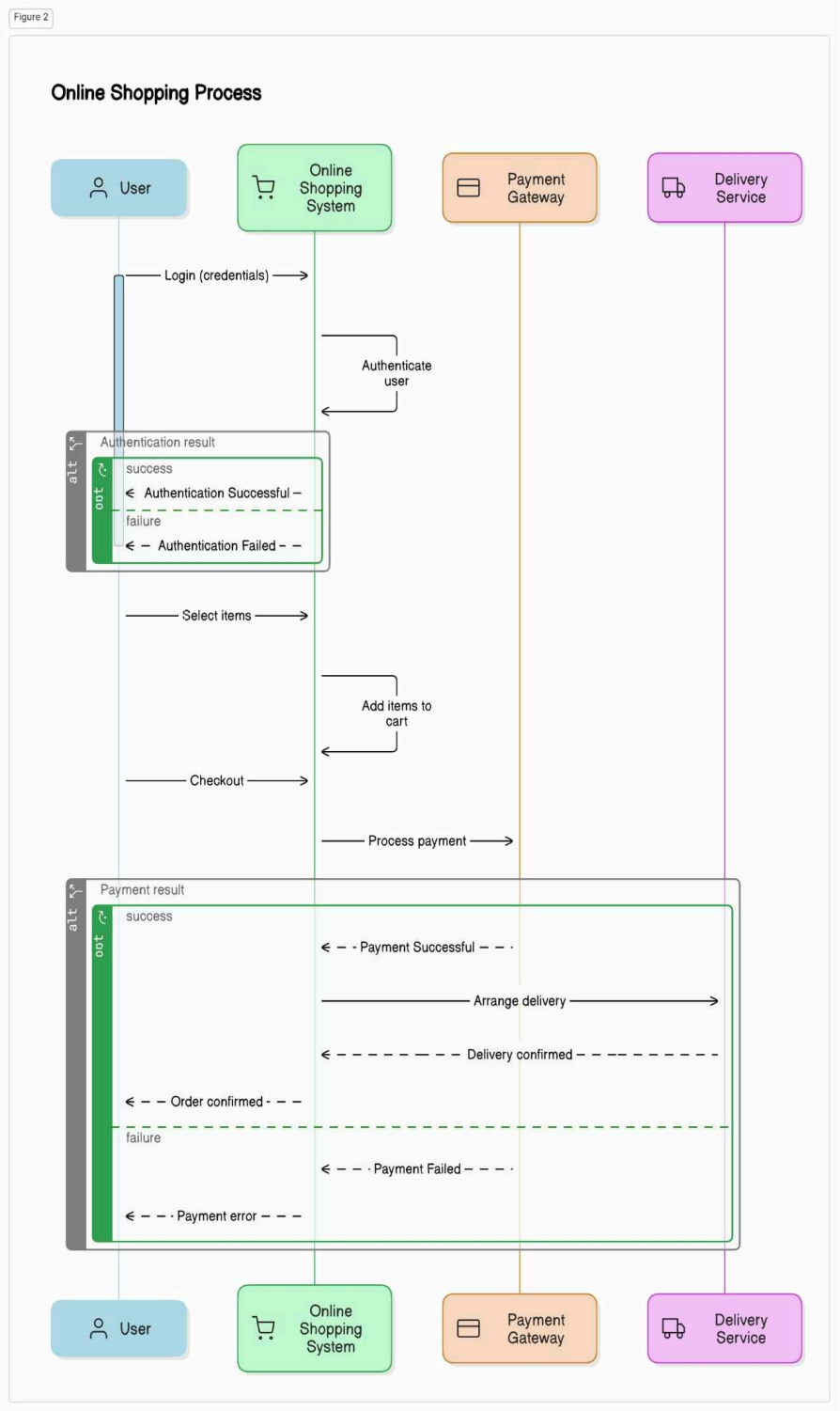
Fig: system of encashing cheque in a bank

13) Draw the different levels of DFD for Safe Home System where any person can enter to the home on matching his/her password at the entrance door.



14) Draw a sequence diagram of the following: A valid user can login to the online shopping system. The user can order the items and as well as pay the Credit card. The items will be delivered later. The items within 15 days will be reimbursed.

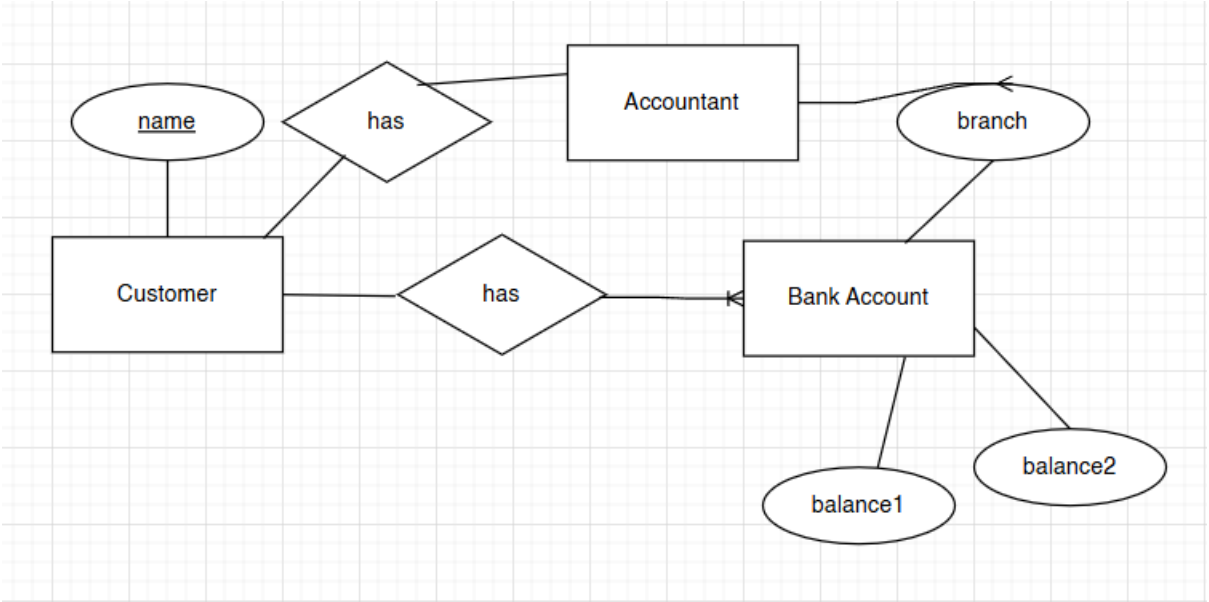
Answer:



15) Draw ERD for the following situation: [2014 Spring]

An accountant is a relationship between customer and bank. A customer has name. A bank has a branch. A customer may have several accountants of different types and balances.

Answer:



17. A restaurant uses an Information system that takes customer orders, send the order to the kitchen monitors: the goods sold and inventory and generates reports for management. List functional and Non-functional requirements for this Restaurant Information System. [2018 Fall]

Functional Requirements:

- Order Management: Customers place orders via UI, sent to the kitchen in real time.
- Inventory Monitoring: Tracks stock, updates after each order, and alerts when low.
- Sales Monitoring: Records goods sold, generates daily, weekly, and monthly reports.
- Customer Information: Stores customer details for quick reordering.
- Reporting: Provides sales trends, inventory, and financial reports.

Non-Functional Requirements:

- Performance: Handles peak-time orders efficiently, processes orders in <5 sec.
- Usability: Intuitive and accessible interface.
- Scalability: Supports growth, more users, and locations.
- Reliability: Ensures minimal downtime, with backup and recovery.
- Security: Encrypts customer data, implements role-based access.

18. Why User interface design is important in software development? Referencing a mobile application for smart agriculture, describe user interface design issues.

Importance of UI Design in Software Development:

- User Experience (UX): Ensures smooth, intuitive interaction.
- Usability: Simplifies navigation and task completion.
- Accessibility: Supports disabilities (e.g., screen readers).
- Efficiency: Reduces steps for faster operation.

- Branding: Reflects professionalism and trust.

UI Design Issues in a Smart Agriculture App:

- Simplicity: Easy navigation for non-tech users.
- Offline Access: Works without an internet connection.
- Real-Time Alerts: Sends critical notifications (e.g., pest alerts).
- Data Visualization: Displays complex data in graphs.
- Multi-Language Support: Supports regional languages.
- Device Compatibility: Runs on low-end and advanced smartphones.
- Battery Efficiency: Optimized to save power.

19. What is Class Responsibility Collaborator model? How do you develop CRC model? Explain with example. [2013 spring]

Class Responsibility Collaborator (CRC) Model:
A method in object-oriented design defining classes, their duties, and collaborations.

Components:

- Class: Represents an entity (e.g., Order, Customer).
- Responsibility: Defines tasks (e.g., Order processes customer requests).
- Collaborator: Other classes it interacts with (e.g., Inventory updates stock).

Developing a CRC Model:

1. Identify Classes: Example: Order, Customer, Inventory, Report.
2. Assign Responsibilities: Order takes requests, Inventory tracks stock.
3. Determine Collaborators: Order updates Inventory, Inventory collaborates with Report.

Example CRC Card:

- Class: Order
- Responsibilities: Take orders, send to kitchen, update stock.
- Collaborators: Customer (order details), Kitchen (process order), Inventory (stock updates).

CRC models help clarify system structure, interactions, and potential issues early in development.