**Problem 1)**

A patient record and scheduling system in a doctor’s office is used by the receptionists, nurses, and doctors. The receptionists use the system to enter new patient information when first-time patients visit the doctor. They also schedule all appointments. The nurses use the system to keep track of the results of each visit including diagnosis and medications. For each visit, free form text fields are used that captures information on diagnosis and treatment. Multiple medications may be prescribed during each visit. The nurses can also access the information to print out a history of patient visits. The doctors primarily use the system to view patient history. The doctors may enter some patient treatment information and prescriptions occasionally, but most frequently they let the nurses enter this information. Each patient is assigned to a family. The head of the family is responsible for the person with the primary medical coverage. Information about doctors is maintained since a family has a primary care physician, but different doctors may be the ones seeing the patient during the visit.

Develop a Use Case Diagram for the above-mentioned Scenario.

**Problem 2)**

Video-Rental Ltd. (VRL) is a small video rental store. The store lends videos to customers for a fee, and purchases videos from a local supplier. They need a computerized system that helps them run their daily business. Description of their daily business is as follows:

Only a registered customer can borrow videos from the store. New customers register by filling out a form with their personal details and credit card details. The credit card details are used to pay subscription fee, video borrowing fees, and overdue fines. On successful payment of subscription fee, the customer is issued a membership card by VRL. The membership card has a unique membership id which is later used when borrowing videos. Each new customer's form is also added to the customer file. A customer can request a video by providing video title, his/her membership id, and payment – payment is always with the credit card used to open the customer account. If the payment is successful, the customer is handed over the video by VRL. The customer then returns the video to the store after watching it. If a loaned video is overdue by a day the customer's credit card is charged, and a reminder letter is sent to the customer. Each day after that a further transaction on card is made, and each week a reminder letter is sent. This continues until either the customer returns the video, or the charges are equal to the cost of replacing the video. The local video supplier sends a list of available titles to VRL, who decides whether to send the supplier an order and payment. If an order is sent, then the supplier sends the requested videos to the store. For each new video a new stock form is completed and placed in the stock file.

Draw the use-case diagram for the above scenario. (Note: Use "include" and "extend" where required.)

**Problem 3)**

The C5DC system is to be built for a large chain of cinemas called Cinema 3D. It is a loyalty system to encourage customers to return to one of the cinemas within the chain to see movies because if they see 9 movies then they can get the 10th movie for free. Regular movie goers are shown advertisements before the movie to encourage them to enroll in the system. The customers then go to www.c5dc.com.au to sign up for the system. To sign up they must provide their first name, last name, street address, suburb, postcode, state (it is only for Australian residents), email address, password, and date of birth. Once the customer registers, they are sent MMS about movie specials or snacks vouchers. The system each day will print plastic membership cards. Staff in the head office then place the cards in envelopes and mail them to the members. The member is notified by TXT that the card is being sent. Once they have their membership card, each time they go to any Cinema5D venue they hand over their membership card when they buy a ticket. The staff at the cash register in the cinema will use a bar code scanner to scan the membership number on the card. The system will then display the person's name and points balance, which if it is over 90 points, the sales staff can offer them to go into the movie for free. If they select to use the free ticket, then their points balance must be reduced by 90. The counter staff cannot see the address or the history of the movies the member has seen. At any time, the member can login online to the system and see their basic details, their points balance and the history of which movies they have seen. If there has been a mistake and a movie purchase was not recorded against them, or they forgot their card when they went to the movies, then they can email the head office or telephone the head office and by giving their membership number, the name of the movie and the unique ticket number printed on the ticket - the head office staff can check whether it is a genuine ticket for that movie and add the details into the member's list of movies they have seen.

Draw a domain class diagram to model the basic classes in the domain for the C5DC Case study application, containing attributes and associations with multiplicity.

**Problem 4)**

Draw a UML Class Diagram for the following case study: Presume that a hockey league can be made up of at least three hockey teams. It is known that a hockey team may have six to twelve players and out of them, one is the captains of the team. Each team is assigned a name and has its own record. Each player has a number and plays on a defined position. For the matches, Hockey teams play against each other so that each game can have a score and a location. The teams may have a coach, who can have a certain level of accreditation and a number of years of experience. A coach can train multiple teams. define attributes and relationships for all the classes.

**Problem 5)**

Draw a UML Class Diagram for the following case study:

The account management system is an application for maintaining a personal account in a bank. A bank account is a financial account between a bank customer and a financial institution. The financial transactions which have occurred within a given time on a bank account are reported to the customer on a bank statement and the balance of the account at any point in time is the financial position of the customer with the institution. Almost all banks have multiple branches expanded over the multiple cities. Every branch has its unique identification number and a branch name. In each zone, one branch is designated as the zonal head office that supervises the other branches in that zone. Customers can access the banks' system to view their account details and perform the transactions on their accounts according to their requirements. Every customer has their unique account number, and the bank will identify customers by only that account number. The account number will be the same for all the branches for that bank. The system manages three types of accounts such as Savings Account, Current Account, and Checking account. The saving account usually remains active for 6 months with no transaction after that it needs to be reactivated. A customer may open both a savings account and a current account. However, a customer must not have more than one savings account or current account. The system provides the access to the customer to create an account, deposit/withdraw the cash from his account, and apply for a loan, etc. This banking system also provides 24 hours services and enable customers to perform all routine transactions, such as bill payment, print out a statement, fund transfer, balance inquiries, stop-payment requests, view recent transaction, and credit card payments. Customers can transfer funds between two accounts by providing an account number of other account holder who they wish to transfer. If the account information is correct, the customer then provides the desired amount to be transferred. The system will require the customer to identify themselves once again for the transfer to be processed. Employees are the backbone of any bank. All the employees will get their unique employee id similar through all branches of the bank. Bank managers are responsible to add new customer account, delete the account, and modify existing customer account information. Accountants, on the other hand, manages customer deposits, debit, and credit, etc. Using this system, employees can search for any individual account in a few seconds. The bank statement showing credit and debit information of the corresponding account is generated for the customer. The customer can also get a loan from the bank by submitting a loan application along with the following documents: ID, owned assets, and source of income. All loan applications are examined by the bank as per policy and eligible applications are further processed. The system will inform the customer if he or she pre-qualifies for the requested amount and will generate a prequalification letter. The customer then must submit a declaration of agreeing to all terms and conditions of the loan. The bank deducts a loan processing fee after the approval of a loan.