Assignment 1

1. Explain how encapsulation and Abstraction concepts works together in object orientation with suitable example.
2. An object has state, behavior and unique identity. Explain.
3. How are OOA, OOD and OOP related? Differentiate between OOA and OOD.
4. What is a CRC card? How it helps in the development of Object Oriented System?
5. Prepare a fully labelled use case for withdrawing cash from ATM.
6. A busy restaurant in Lalitpur consists of one chef, a customer, a reception and one waiter. The chef is responsible for order of all the food ingredients, preparation of the food and doing washing up. The waiter is responsible for taking the customer order and serving the customer. The customer browses the menu, orders the food, consumes the food, orders the bill and pays the bill. The reception is responding for forwarding the order that has been placed by their customers through online system and preparing the bill and taking the payment made by the customer. Draw the use case diagram for the restaurant showing the role of chef, waiter, reception and customer.

   Draw use case diagram for above scenario.

7. Draw a use case diagram for following problem.
   A school of business operates international business in 10 location throughout the globe. The school has its first 9000 graduates in 1998. The school keeps track of each student's name, country of birth, current address. In order to maintain strong ties to its alumni, the school holds various events around the world. Events have title, date, location and time. The school needs to keep track of which graduates have attended which events. For an attendance by a graduate at an event, a comment is recorded about information. School officials learns from that graduate at that events. As with the events, school records information learned from graduates. When an official knows that he or she will be meeting or talking to graduate, a report is produced showing the latest information about the graduate and the information learned during the past two years from that graduate from all contacts and events the graduate attended.

8. Identify actors, use cases and relationship for the following scenario and draw use case diagram.

   MathTrainer aids in perfecting the mental arithmetic of elementary school students. MathTrainer poses each student ten random arithmetical exercises, which should be solved as fast and correct as possible. From the responses, scores are collected which can be viewed by the users of MathTrainer.

   Teachers can define types of exercises by determining numerical ranges and allowed mathematical operations. They can also delete types which were defined by themselves. Students are assigned to their teacher and can request exercises for an exercise type of their teacher. New teachers and students are able to apply as new MathTrainer users themselves by specifying username and password – this is done in the context of the usual user identification. The password can be changed anytime. Teachers can delete the students which are assigned to them. During the realization of a test (ten exercises) the time needed for each exercise is stopped.

   However, the scores are based on the cumulative time.

9. Prepare a use case for making top-up payment via e-sewa.
10. For the case study given below identify all the actors, use cases and relationships. Also draw use case diagram.

    A Coffee Vending Machine dispenses coffee to Customers. Customers order coffee by selecting a recipe from a set of recipes. Customers pay for the coffee using coins. Change is given back if any to the customers. The service staff load ingredients (coffee powder, milk, sugar, water and chocolate) into the coffee machine. The service staff can also add a recipe by indicating the name of the coffee, the units of coffee powder, milk, sugar, water and chocolate to be added as well as the cost of the coffee.
11. Write short notes on:
    a. Extreme Programming
    b. Scrum
    c. Methods of requirements gathering
12. In OOAD, there are various types of models like conceptual, structural, behavioral etc. What is the significance of these many types of model? Explain with an illustrative example.
13. Consider a Library System. Each book in the library contains bibliography, each bibliography consists of a number of reference to other books. A book

will be referred to in many cases and therefore a reference can appear in more than one bibliography Use noun phrase identification strategies to find the conceptual classes of above cases. Also draw complete conceptual class diagram for above case.

14. Identify conceptual class and its supportive attributes for a Photocopier machine from the description given below and draw the conceptual class diagram for the same.

    Initially the machine is off. When the operator switches on the machine it first warms up during which it performs some internal tests. Once the tests are over machine is ready for making copies. When operator loads a page to be photocopied and press 'start' button, machine starts making copies according to the number of copies selected. When machine is making copies, machine may go out of paper. Once operator loads sufficient pages, it can start making copies again. During the photocopy process, if paper jam occurs in the machine, operator may need to clean the path by removing the jammed paper to make the machine ready.

15. For the specification given below, use non phrase analysis method to create a domain model.

    XYZ Restaurant in Kathmandu would like to automate its building service. A waiter takes an order for each table in the restaurant along with order details (item name and quantity). Customers are allowed to order more items after their first order. A bill is generated at the end for each customer having the following details; restaurant name, date, bill number, item, quantity, amount and total amount.

16. Sequence diagram aids the implementation of Reactive System. If you agree on the statement justify with reason and model diagram.
17. Prepare the sequence diagram for bus ticket reservation system.
18. Draw the sequence for login page. Use four scenario as following: User, User Interface, Login-Session (Active or Expire), system Validity. Show all scenarios with brief explanations.