**Assignment#3**

**Question#1**

**Case Study: Jinnah Book Exchange**

Jinnah Book Exchange is a type of e-business exchange that does business entirely on the Internet. The company acts as a clearing exchange for both buyers and sellers of used books.

For a person to offer books for sale, he/she must register with Jinnah. The person must provide a current physical address and telephone number as well as a current e-mail address. The system will then maintain an open account for this person. Access to the system as a seller is through a secure, authenticated portal.

A seller can list books on the system through a special Internet form. Information required includes all of the pertinent information about the book, its category, its general condition, and the asking price. A seller may list as many books as desired. The system maintains an index of all books in the system so that buyers can use the search engine to search for books. The search engine allows searches by title, author, category, and keyword.

People wanting to buy books come to the site and search for the books they want. When they decide to buy, they must open an account with a credit card to pay for the books. The system maintains all of this information on secure servers.

When a request to purchase is made, along with the payment, Jinnah Book Exchange sends an e-mail notice to the seller of the book that was chosen. It also marks the book as sold. The system maintains this as an open order until it receives notice that the books have been shipped. After the seller receives notice that a listed book has been sold, he/she must notify the buyer via e-mail within 48 hours that the purchase is noted.

Shipment of the order must be made within 24 hours after the seller sends the notification e-mail. The seller sends a notification to both the buyer and Jinnah Book Exchange when the shipment is made.

After receiving notice of shipment, Jinnah Book Exchange maintains the order in a shipped status. At the end of each month, a check is mailed to each seller for the book orders that have been in a shipped status for 30 days. The 30-day waiting period is to allow the buyer to notify Jinnah Book Exchange if the shipment does not arrive for some reason, or if the book is not in the same condition as advertised.

The buyers can, if they want, enter a service code for the seller. The service code is an indication of how well the seller is servicing book purchases. Some sellers are very active and use Jinnah Book Exchange as a major outlet for selling books. So, a service code is an important indicator to potential buyers.

For this case Study, develop **a use case diagram**.

**Question#2**

**Case Study:**

The blood bank testing unit (BBTU) is responsible for receiving, testing, storing, and supplying blood samples. After receiving a blood sample, BBTU tests for blood type (e.g. A +ve, O -ve, etc.). Then, it checks for the presence of diseases (e.g. Hepatitis, AIDS, etc.) in the blood sample. If a disease is detected, BBTU destroys the blood sample. If the blood sample does not contain any disease, BBTU assigns it a unique serial number and stores it in the refrigerator. The serial number and other information related to this blood sample - blood type, date received, amount (in ml) - are then forwarded to the Processing Office. Blood samples have a limited shelf-life. Samples exceeding their shelf-life expire and need to be destroyed. Every day, the BBTU receives a list of expired samples (identified by their serial numbers) from the Processing Office. These expired blood samples are destroyed by the BBTU and a confirmation (of destruction) is sent back to the Processing Office. A hospital in need of blood of a specific type sends a request to the BBTU specifying the type and amount of blood required. The BBTU checks whether this hospital is one of its members or not by looking at its membership file. If the hospital is not a member, the BBTU sends it a membership application form. If the hospital is a member, the BBTU checks the stock of blood samples in the refrigerator. If the required type and amount of blood is unavailable, the BBTU generates a notification of regret and sends it to the hospital. Otherwise, the required blood is donated to the hospital (after removing it from the refrigerator) and a stock update notification is sent to the Processing Office.

**Use ONLY the information provided above, to draw (on the next page i.e. page 2) levels 0 and 1 of a data flow diagram (DFD) modeling the BBTU.**

**Question#3**

One Parking is about to launch the first version of a parking garage/lot automation project, **Reserve ‐ Your Spot**. The parking garage currently operates without any computerized system. The management has concerns about inefficiencies of sub‐optimal usage of parking space. In addition, there are frequent instances of congestion inside the garage, caused by drivers searching for vacant spots. Currently, management monitors the available locations in the garage by having employees walk around the decks to inspect if the individual spots are occupied or vacant.

The purpose of Reserve ‐Your ‐Spot is to track and manage availability of parking slots in the garage and allow registered customers to find and reserve available parking places. The reservation can be made for single day as well as multiple days. The payment of reservation shall be online or on-site through credit card only. The users can view the parking garage visually on the mobile screen. The reserved spots will be shown red however the vacant spots will be shown green. The reservation can be made either through the visual layout of the garage or user can request for a reservation and the system itself would reserve a location and notify the user through message or e-mail.

**To do:**

1. Specify at least 10 functional requirements of Reserve your spot system. You may specify requirements that should be in the system and are not given in the problem statement
2. Specify at least 5 non-functional requirements of Reserve your spot system. You may specify requirements that should be in the system and are not given in the problem statement
3. Since it is a new system to be built and you can easily assess from the statement if the system is large, medium, or small. Given the information about the Reserve your spot system, which process model (s) is/are the most appropriate to develop this system? Justify your answer.

**Question#4**

Question: For each of the systems described below, sketch an appropriate software architecture and explain how you would assign key functionalities to the components:

1.       The system under consideration pertains to a network of automated banking machines (ABMs) designed to serve as decentralized kiosks, enabling bank customers to conduct cash deposits and withdrawals from their accounts. These ABMs are strategically distributed across various locations to provide convenient access to banking services for customers.

Operational functionalities of the ABM system include facilitating cash transactions such as deposits and withdrawals, wherein customers can interact with the machines to conduct financial transactions without the need for human intervention. This system caters to the core banking needs of customers

2.  Software for sea buoys support for navigation at sea: The buoys have air and water temperature, wind speed, and location data. Each buoy notifies current wind, temperature, and location information every 60 seconds to the users that expressed interest. It sends an SOS signal after a sailor engages the emergency switch; this signal takes priority over all other broadcasts and continues until reset by a passing vessel.

3. An e-mail system filters incoming e-mails with a whitelist (e-mails from senders on the whitelist are accepted), a blacklist (e-mails from senders on the blacklist are deleted), and the Spamassassin tool (e-mails that do not pass this check are marked as spam). The system will run on a single-core server machine, but may be moved to a multi-core server if the load gets too high.