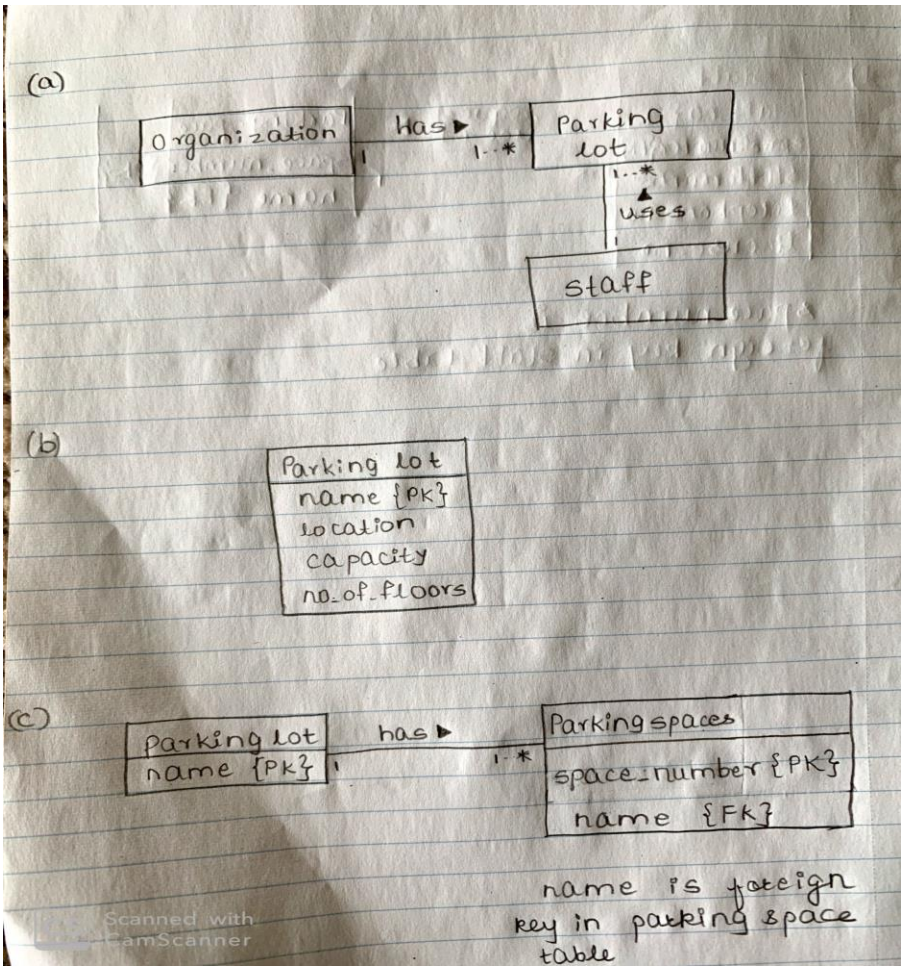
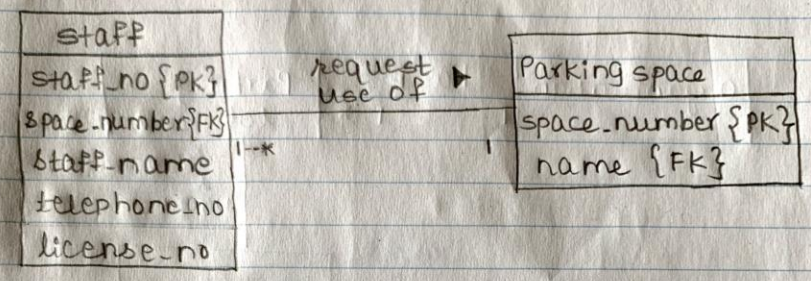
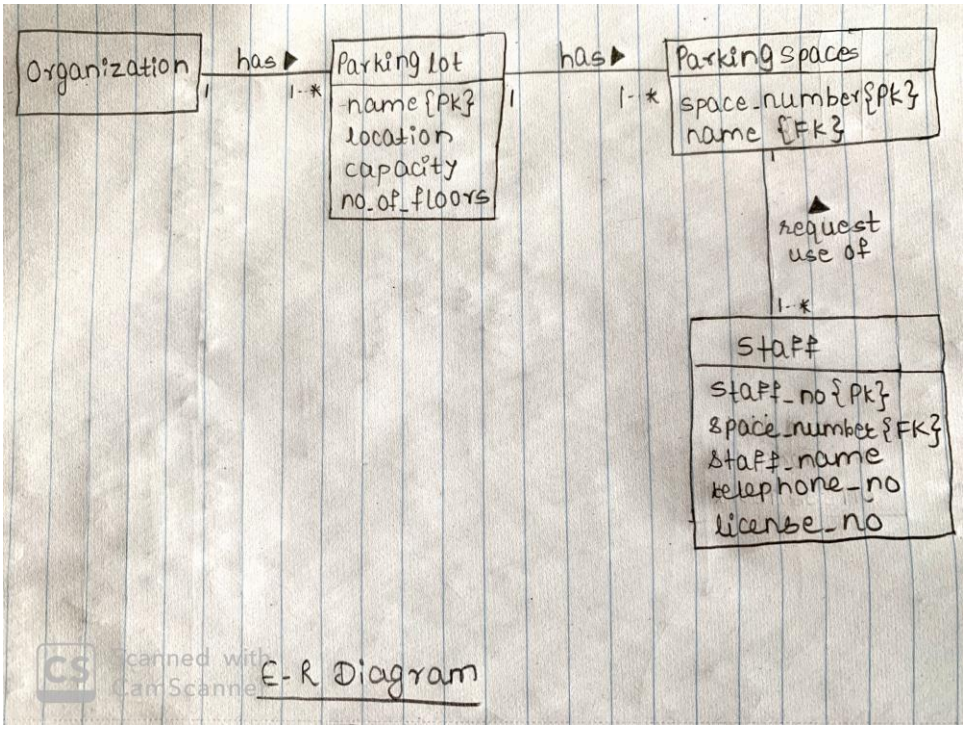
1. Parking lot ER Diagram



d)



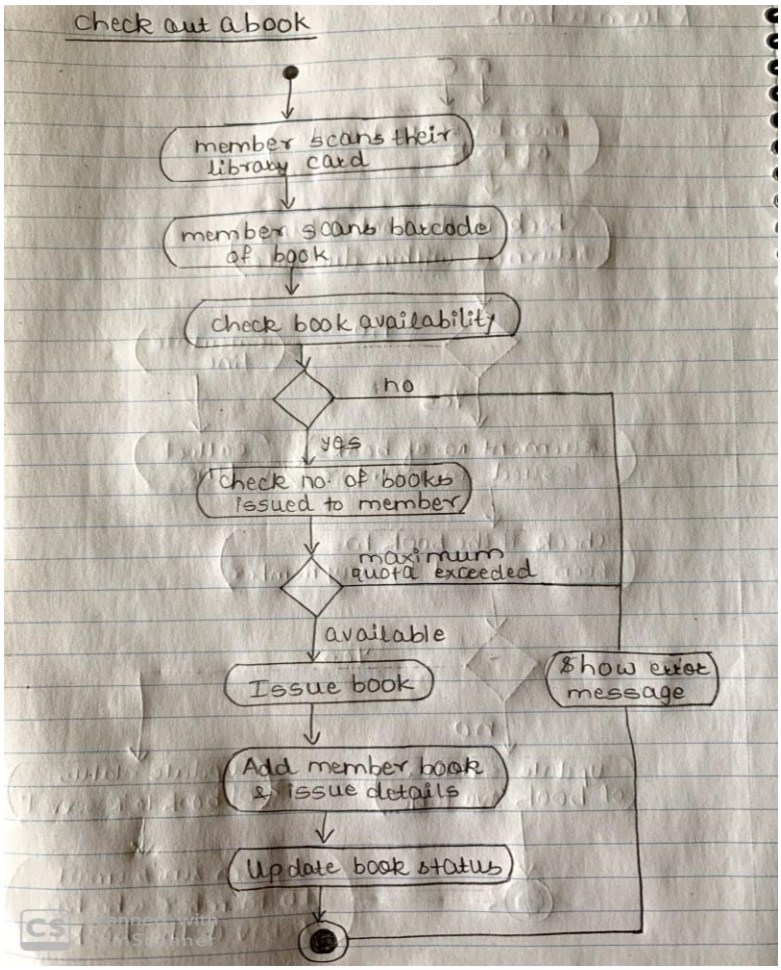
space_number is foreign key in staff table



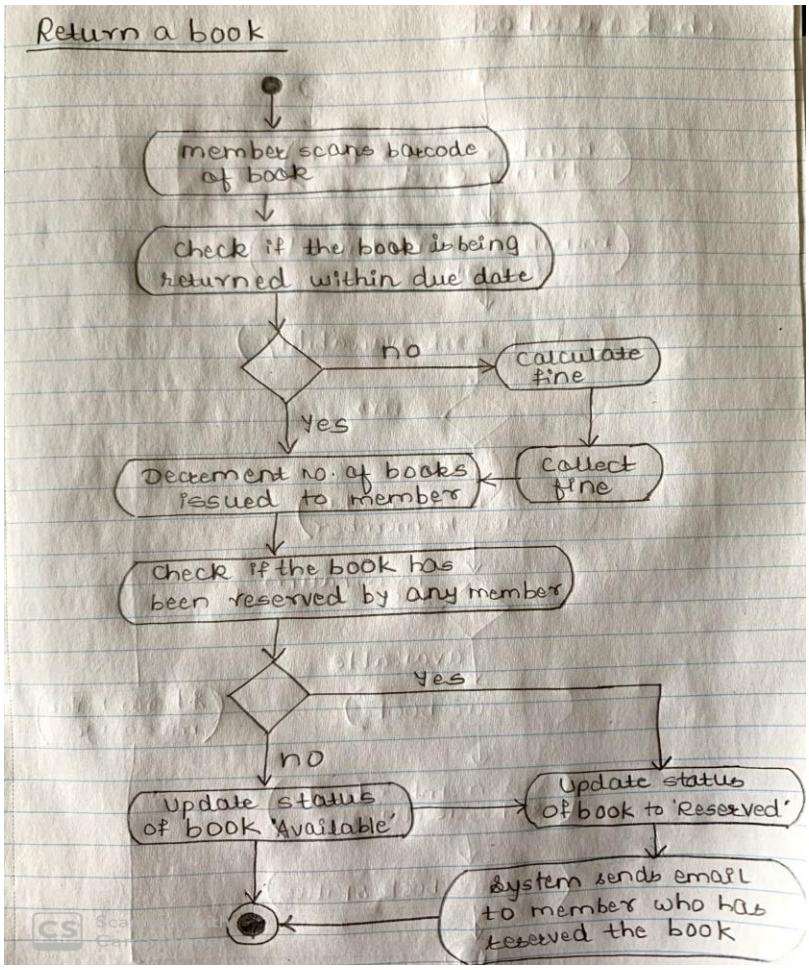
E-R Diagram

2. State Diagram for the book entity in library management system

Check-out a book: A librarian can perform this activity. Here are the set of steps to check-out a book:



Return a book: A librarian can perform this activity. The system will collect fines from members if they return books after the due date. Here are the steps for returning a book:



3. Explain Level Balancing with an example and in your own words

- Level Balancing ensures that information in one level is not lost in the next level.
- When performing top-down decomposition to a DFD to lower level DFDs, the inputs and outputs must be conserved between levels of DFDs. For example, level n & n+1 must have the same inputs and outputs
- Each process in parent diagram may in turn be exploded to create a more detailed child diagram. The process that is exploded is called the parent process, and the diagram that results is called the child diagram.
- The primary rule for creating child diagrams, dictates that a child diagram cannot produce output or receive input that the parent process does not also produce or receive. All data flow into or out of the parent process must be shown flowing into or out of the child diagram.
- The processes on the child diagram are numbered using the parent process number, a decimal point, and a unique number for each child process.

- As you see below, process 3 is exploded into child processes 3.1, 3.2 and 3.3 process. The decomposition is balanced as all the child processes are flowing into process 4(Dataflow D)