Department of Computer Science and Engineering,
CS29202: Software Engineering Lab., Spring 2024

<u>Topics for Term Project</u>

1.   Airline Management System (AMS):

An airline deals with a lot of customers everyday and needs a management software. The key specificatio s of air-planes which have different types of sizes. Each type of plane has a fixed number of seats in each of the three classes.
- There is a schedule fixed for these flights between different cities. The schedule can be altered only by the management of the airline.
- There must be provision to check the system if the new schedule is possible or not (clash of timings or unavailability of plane etc.)
- The management will also input the fares of the flights.

The primary users of the system are customers who fly. It is expected that a customer would use the system as follows:
- A customer requests for a seat reservation by giving the date, the end-points of the journey and the preferred class.
- The airline shows all the available flights sorted according to the time and those with the available seat class are given priority.
- For each flight number of available seats in each 'seat type' is shown with the price. Then the user can book a seat in one of the flights. For some extra charges the user can also see the available seat numbers in the flight and book a seat number of his choice.
- A user can change / cancel a booking under suitable conditions. Separate penalty is levied in such cases.

The secondary users of the system is airlines management. It is expected that the management would use the system as follows:
- The management wants to keep track of the occupancy rate so that when there are large number of requests on a particular route they can try to increase the flight frequency between the end-points. Similarly low occupancy rate will result in decrease of flights.
- The management maintains the cost of flights (for each type of plane cost is entered in per km and we know the distance between the cities. Some fixed basic cost is also added).
- The management wants to check the net profit made between in a time period of their choice.

2.   Swimming Pool Management Software (SPMS):

You need to build a system to monitor the different activities which are taken care of by a Swimming Club like swimming classes, club membership, pool rentals, etc.

- Anyone should be able to apply for membership by filling in the required information like name, date of birth, address, email id, phone number and uploading relevant documents like photo, birth certificate, identity card, etc. The manager approves the membership request by verifying the documents. He should also be able to modify the requirements and the membership form should be updated accordingly. A member should also be able to cancel his membership after providing a suitable reason. Cancellation of membership and its reason should be notified to the swimming pool manager.
- A member has to pay some monthly membership fee according to the rules and regulations of the club and use the pool for a maximum of 5 hours each week. He or she can book slots by viewing the swimming pool time table. Note that each slot will have some maximum capacity and timing. Some slots are reserved specially for women and children. The pool committee members should be able to configure the slot timings and reserve them.
- The pool management committee also organizes courses to teach swimming to the general public. So, the system should support addition, removal and management of 3 months, 6 months and 1 year courses. Both members and non-members can enroll in these courses, but the requirement and verification criteria will be different for them.
- For every swimming course, the participants should get reminders for their classes and also be made aware of any changes in the schedule.
- Each course has a course coordinator. He or she selects the class timings and decides about any cancella- tions, extra classes and rescheduling.
- A member can book the pool for a party or any other event. Bookings should be made 2 weeks in advance and there is a limit of maximum 5 bookings per month. The feature of cancelling a booking should also be supported by the system. No classes can be held and other members cannot use the pool during the event and they should be notified about that accordingly and requested to book other slot in its place.
- Swimming competitions will be organized by the Pool Committee once in a while. The events manager decides the format of the competition and its schedule. Events may include free style, back stroke, breast stroke, butterfly for 20 m, 50m, 100 m, 200 m for men and women. Anyone who can take part in the competitions by providing medical certificate and other relevant information. Participation is free for members and people who have attended any swimming course but others have to pay a participation fee. Anyone can buy tickets to view the contest. No classes or bookings are allowed on the day of this kind of events.
- There should be a portal for suggestions, complaint and discussion among the pool users and the managing committee members. A post can be made privately or publicly. A public post can be viewed and addressed by any pool user whereas a private post is handled only by a pool committee member. Notices can also be published in the portal by management committee members and course coordinators. The course coordinator should address private complaints regarding courses.

3.   On-line Sales Portal (OSP):

A business group wants to set up an on-line portal where people can buy and sell on the same platform – one-stop store for both the buyer and the seller. The on-line portal should have the following features:

A. Categorization of items:
    a. Electronics & Technology,
    b. Books,
    c. Real Estate,
    d. Cars & Bikes,
    e. Education & Learning,
    f. Home & Lifestyle,
    g. Cellphone,
    h. …
    Manager can add / remove categories of items in the portal.

B. There are two types of users of the system:
    a. Managers: They manage the portal. Every manager has to create an account with the following information:
        i.   Name
        ii.   Gender
        iii.   Date-of-Birth
        iv.   Address including house no, street, locality and city
        v.   Telephone number
        vi.   Email
        vii.   IM ID
        viii.   Biometric ID
    b. Customers: They use the portal to buy and sell products. Every customer has to create an account with the following information:
        i.   Name
        ii.   City
        iii.   Telephone number
        iv.   Email
        v.   IM ID (optional)
        vi.   On creation of an account, the system generates an ID and a password for the user and communicates through the email. The ID is unique and cannot be changed. The password can be changed by the user.

C. For Seller: To sell, the users can upload various items by specifying the following information:
    a. Category of the item
    b. Photo of the item
    c. Price
    d. The age of the item (if not new)
    e. Name of the manufacturing company

     f. City
     g. Some specific information about that particular product.

D. For Buyer: The buyer can do the following:
    a. Search for item and find the list of the sellers who have uploaded that particular item for sale.
    b. Raise a request to buy an item. Offers a price.
    c. Negotiate on the selling price. It the seller agrees with a certain price then only buyer can buy it.
    d. Pay the money on-line.
    e. A buyer cannot buy a heavy item like refrigerator if its seller location (city) is not the same.

E. For Manager: The manager can do the following:
    a. Manage buyers / sellers
    b. Manage categories; change categories of items if needed
    c. Review items and rejects items of poor quality
    d. Help negotiations - talk to (over email or chat) buyer and seller both to help bridge small gaps or to assist with delivery logistics
    e. Perform audit of matched buy-sell of items

4. Online Placement Information Gathering System (OPIGS):

Online placement information gathering system (OPIGS) to help the placement department of college, students and the recruiters to ease the placement process. The system is an online placement information-gathering portal, which will be helpful not only for the institute but also for the recruitment companies to have a glance at the talent in the institute. Basically, the student will sign up and various notifications about the on going or to be conducted will be displayed. Information about various companies and their recruitment policy, work environment, etc. will also be displayed. The students can upload/make a resume too and this resume can be seen by the recruitment companies. A section for the institute's alumni, who have worked for various companies, can write in their feedbacks and the interested students may contact them for further information

The system should allow the following:
- Login by different entities (like Student, Company Admin, Institute Admin and Alumni)
- The students could upload their resume. The alumni can give their feedbacks. The company admin can enter the company details and the institute admin can enter the notifications related to the placement proceedings.
- The students can view the various notifications, the company details and the feedbacks given by the alumni.
- The company admin can view the resumes uploaded by the students to get a glimpse of the quality of student of the institute.
- The software should notify the students about any upcoming suitable recruitment for them.
- The software should notify the administrator about the companies trying to contact the college for placement.
- The software verifies if the recruiters are genuine.

5.   Motor Part Shop Software (MPSS):

A small auto-mobile spare parts shop sells the spare parts for a vehicles of several makes and models. Also, each spare part is typically manufactured by several small industries. To stream line the sales and supply ordering, the shop owner has asked us to develop the following motor part shop software.

The motor parts shop deals with large number of motor parts of various manufacturers and various vehicle types. Some of the motor parts are very small and some are of reasonably large size. The shop owner maintains different parts in wall mounted and numbered racks.

The shop owner maintains as few inventory for each item as reasonable, to reduce inventory overheads after being inspired by the just-in-time (JIT) philosophy.

Thus, one important problem the shop owner faces is to be able to order items as soon as the number of items in the inventory reduces below a threshold value. The shop owner wants to maintain parts to be able to sustain selling for about one week. To calculate the threshold value for each item, the software must be able to calculate the average number of parts sales for one week for each part.

At the end of each day, the shop owner would request the computer to generate the items to be ordered. The computer should print out the part number, the amount required and the address of the vendor supplying the part.

The computer should also generate the revenue for each day and at the end of the month, the computer should generate a graph showing the sales for each day of the month.

6.   NGO Management System (NMS):

The NGO works for providing free school education for poor children. It needs a system for its management. The broad requirements of the system are listed below:

- The NGO has a list of poor students registered who have sought their help. For each student the NGO maintains his/her age, class, school in which they are studying, parental income and kind of help provided by the NGO (like books, money, school dress etc.)
- The NGO has an estimate of the amount of money needed for the books, dress, fees for different classes. Therefore it can get an estimate of the funds it needs to continue its operations.
- The NGO maintains the track record of the performance of the students and in case of insufficient funds priority is given to brighter students, girls and low parental income (a suitable measure needed).
- The NGO maintains a list of donors who have pledged to help them with the amount of money pledged. The donors can register for the NGO and can enter the amount they intend to contribute. The donors can also choose if they wish to donate annually / semi-annually. Therefore whenever the NGO is in need of funds they check the list and contact the donors for money.
- The NGO also accepts other donations like books, dress, shoes, bags etc. and maintains an inventory for these items. Every year it checks how many items it has for the students so that there is not a need to buy them this year.
- The NGO maintains an account of all the expenditure it made in the present year.

7.   Travel in Good Health Management (TGHM) System:

Passengers traveling via train are often not satisfied with the food services provided by the pantry car due to limitations of choices. You are required to build a system which creates a bridge between railway passengers and restaurant / food stores. It would take orders from passengers inside a running train or before a passenger boards a train; and provide them food they order from nearby restaurants. When train enters a station, their agents would go and deliver the food, for a price. The broad specification of the expected system is given below:

- Each train has a particular route. The management decides which trains and routes the system will provide the services for. As the business expands new routes will be added. Some routes may also need to be removed. Make sure to test the system with long routes.
- Passengers should be able to place their order through the system. They expect to have the option of choosing food item, restaurant, time of delivery, etc. He or she may not specify all the fields, in which case the system has to suggest the suitable options available for him. Assume that they will always specify the train they have boarded.
- The system should be able to figure out how much time is required to deliver the order, based on the time to reach the nearest station, time required by the different restaurants to deliver the food and various other factors. Remember, the food can only be delivered at a station. It might happen that the customer has provided too strict constraints and thus no choices are available for him. In such cases, the system should then be able to suggest him options by relaxing some of the constraints.
- You should serve the passenger as soon as you can. Say, your agent has 3 hours and he can reach 4 stations in that time using their vehicle. However, they should serve at nearest station that the train reaches first.
- Restaurant owners or food chains should be able to register with the system as food supplier. During registration, they should provide their authentication certificate, location, phone number and their agent's details. Once their request is approved by the management, they can enter details of their menu and approximate time required for preparation and delivery of each item to its assigned railway stations. We note that a restaurant will be able to reach one or two railway stations, whereas a chain may be able to reach many spread across different routes. After registration, the agents should be able to provide the details about which stations they will be able to deliver orders to.
- After the customer places an order, and your system chooses the most optimal restaurant, the respective agent is notified about the order. If he accepts the order within 15 minutes, a confirmation is sent to the customer. Otherwise, it is assumed that the agent has declined the order and your system searches for the next possible choice and an apology message is sent to the customer. The customer may or may not modify his order at this point. Once an order is confirmed, the customer gets the receipt. Once the train reaches the station, he will be able to collect the food by showing this receipt.
- The management should be able to view the statistics about the number and percentage of successful deliveries, overall, for each train route and for each delivery agent.

8.   Road Repair and Tracking Software (RRTS):

Road Repair and Tracking Software to be developed for automating various book keeping activities associated with the road repairing task of the Public Works Department of the Corporation of a large city.

A city corporation has branch offices at different suburbs of the city. Residents raise repair requests for different roads of the city either over phone or through written complaints. These would be entered into the computer system by a clerk. Everyday in the morning an area-wise list of fresh complaints should be printed for the respective supervisors. The supervisors would visit their assigned areas, examine the complaints and study the severity of the road condition. Depending on the severity of the road condition and the type of the locality (e.g., commercial area, busy area, relatively deserted area, etc.), he determines the priority for carrying out this repair work. The supervisor also estimates the raw material requirement for carrying out the repair work, the types and number of machines required, and the number and types of personnel required. Based on this data, the computer system should schedule the repair of the road depending up on the priority of the repair work and subject to the availability of raw material, machines, and personnel. This schedule report is used by the supervisor to direct different repair work. The manpower and machine that are available are entered by the city corporation administrator and uptodate data regarding manpower and machine that are currently available and those already committed. The administrator can change these data any time; for example, he may use this feature when a machine goes down or becomes unavailable for some reason. Of course, any change to the available manpower and machine would require a reschedule of the project. The mayor of the city can request for various road repair statistics such as the number and type of repairs carried out over a period of time and the repair work outstanding at any point of time and the utilization statistics of the repair manpower and machine over any period of time.

9.   Judiciary Information System Software (JISS):

The attorney general's office has requested us to develop a Judiciary Information System (JIS), to help handle court cases and also to make the past court cases easily accessible to the lawyers and judges.. For each court case, the name of the defendant, defendant's address, the crime type (e.g., theft, arson, etc.), when committed (date), where committed (location), name of the arresting officer, and the date of the arrest are entered by the court registrar. Each court case is identified by a unique case identification number (CIN) which is generated by the computer. The registrar assigns a date of hearing for each case. For this the registrar expects the computer to display the vacant slots on any working day during which the case can be scheduled. Each time a case is adjourned, the reason for adjournment is entered by the registrar and he assigns a new hearing date. If hearing takes place on any day for a case, the registrar enters the summary of the court proceedings and assigns a new hearing date. Also, on completion of a court case, the summary of the judgment is recorded and the case is closed but the details of the case is maintained for future reference. Other data maintained about a case include the name of the presiding judge, the public prosecutor, the starting date, and the expected completion date of a trial. The judges should be able to browse through the old cases for guidance on their judgment. The lawyers should also be permitted to browse old cases, but should be charged for each old case they browse. Using the JIS software, the Registrar of the court should be able to query the following:

1. The currently pending court cases.

   In response to this query, the computer should print out the pending cases sorted by CIN. For each pending case, the following data should be listed: the date in which the case started, the defendant's name, address, crime details, the lawyer's name, the public prosecutor's name, and the attending judge's name.

2. The cases that have been resolved over any given period.

   The output in this case should chronologically list the starting date of the case, the CIN, the date on which the judgment was delivered, the name of the attending judge, and the judgment summary.

3. The cases that are coming up for hearing on a particular date.
4. The status of any particular case (cases are identified by CIN).

The lawyers and the judges need to refer to the past court cases. The lawyers need to refer these to prepare for their line of arguments. The judges need to refer the past court cases to examine the lines of judgments given previously to similar cases. It should be possible to search for the history of past court cases by entering key words. However, the lawyers should be charged for each time they see the details of a court case to recover some of the computerization costs. For this purpose, it is necessary to provide separate login accounts to the JIS software and keep track of how many court cases each lawyer views. The registrar should be able to create login accounts for the different users (i.e. judges, lawyers, etc) and should be able to delete these accounts.

10.   Library Information System (LIS):

Different activities of the library of our institute pertaining to the issue and return of the books by the members of the library and various queries regarding books as listed below are to be automated.

- The library has 10,000 books. Each book is assigned a unique identification number (called ISBN number). The Library clerk should be able to enter the details of the book into the LIS through a suitable interface.
- There are four categories of members of the library: undergraduate students, post graduate students, research scholars, and faculty members.
- Each library member is assigned a unique library membership code number.
- Each undergraduate student can issue up to 2 books for 1 month duration.
- Each postgraduate student can issue up to 4 books for 1 month duration.
- Each research scholar can issue up to 6 books for 3 months duration.
- Each faculty member can issue up to 10 books for six months duration.
- The LIS should answer user queries regarding whether a particular book is available. If a book is available, LIS should display the rack number in which the book is available and the number of copies available.
- LIS registers each book issued to a member. When a member returns a book, LIS deletes the book from the member's account and makes the book available for future issue.
- Members should be allowed to reserve books which have been issued out. When such a reserved book is returned, LIS should print a slip for the concerned member to get the book issued and should disallow issue of the book to any other member for a period of seven days or until the member who has reserved the books gets it issued.
- When a member returns a book, LIS prints a bill for the penalty charge for overdue books. LIS calculates the penalty charge by multiplying the number of days the book is overdue by the penalty rate.
- LIS prints reminder messages for the members against whom books are over due, upon a request by the Librarian.
- LIS should allow the Librarian to create and delete member records.
- The Librarian periodically needs to check if there are any books which have not been issued even once during the last five years. He uses this information in planning to dispose off unused and old books. For this purpose it is necessary for LIS to maintain the statistics regarding issuance of different books.
- When books are disposed off, the Library clerk should be able to delete the book from the list of books in the Library and when a book is procured the system should support entering the details.

11. Transport Company Computerization Software (TCCS):

A transport company wishes to computerize various book keeping activities associated with its operations.

- A transport company owns a number of trucks.
- The transport company has its head office located at the capital and has branch offices at several other cities.
- The transport company receives consignments of various sizes at (measured in cubic meters) its different offices to be forwarded to different branch offices across the country.
- Once the consignment arrives at the office of the transport company, the details of the volume, destination address, sender address, etc. are entered into the computer. The computer would compute the transport charge depending upon the volume of the consignment and its destination and would issue a bill for the consignment.
- Once the volume of any particular destination becomes 500 cubic meters, the computerization system should automatically allot the next available truck.
- A truck stays with the branch office until the branch office has enough cargo to load the truck fully.
- The manager should be able to view the status of different trucks at any time.
- The manager should be able to view truck usage over a given period of time.
- When a truck is available and the required consignment is available for dispatch, the computer system should print the details of the consignment number, volume, sender's name and address, and the receiver's name and address to be forwarded along with the truck.
- The manager of the transport company can query the status of any particular consignment and the details of volume of consignments handled to any particular destination and the corresponding revenue generated. The manager should also be able to view the average waiting period for different consignments. This statistics is important for him since he normally orders new trucks when the average waiting period for consignments becomes high due to non-availability of trucks. Also, the manager would like to see the average idle time of the truck in the branch for a given period for future planning.

12.   Supermarket Automation Software (SAS):

The manager of a supermarket wants us to develop an automation software. The supermarket stocks a set of items. Customers pick up their desired items from the different counters in required quantities. The customers present these items to the sales clerk. The sales clerk passes the items over a bar code reader and an automatic weighing scale and the data regarding the item type and the quantity get registered.

- SAS should at the end of a sales transaction print the bill containing the serial number of the sales transaction, the name of the item, code number, quantity, unit price, and item price. The bill should indicate the total amount payable.
- SAS should maintain the inventory of the various items of the supermarket. The manager upon query should be able to see the inventory details. In order to support inventory management, the inventory of an item should be decreased whenever an item is sold. SAS should also support an option by which an employee can update the inventory when new supply arrives.
- SAS should support printing the sales statistics for every item the supermarket deals with for any particular day or any particular period. The sales statistics should indicate the quantity of an item sold, the price realized, and the profit.
- The manager of the supermarket should be able to change the the price at which an item is sold as the prices of the different items vary on a day-to-day basis.

13.   Book-shop Automation Software (BAS):

We need to develop a software for automating various activities of a small book shop. From a discussion with the owner of the book shop, the following user requirements have been arrived at:

BAS should help the customers query whether a book is in stock. The users can query the availability of a book either by using the book title or by using the name of the author. If the book is not currently being sold by the book-shop, then the customer is asked to enter full details of the book for procurement of the book in future. If a book is in stock, the exact number of copies available and the rack number in which the book is located should be displayed. If a book is not in stock, the query for the book is used to increment a request field for the book. The manager can periodically view the request field of the books to arrive at a rough estimate regarding the current demand for different books. BAS should maintain the price of various books. As soon as a customer selects a book for purchase, the sales clerk would enter the ISBN number of the book. BAS should update the stock, and generate the sales receipt for the book. BAS should allow employees to update the inventory whenever new supply arrives. Also upon request, BAS should generate sales statistics (viz., book name, publisher, ISBN number, number of copies sold, and the sales revenue) for any period. The sales statistics will help the owner to know the exact business done over any period of time and also to determine inventory level required for various books. The inventory level required for a book is equal to the number of copies of the book sold over a period of two weeks multiplied by the average number of days it takes to procure the book. For every book, depending on the publisher of the book, the shop needs to maintain the details of a stockist (vendor) of the book. Every day the book shop owner would give a command for the BAS to print the books which have fallen below the threshold and the number of copies to be procured along with the full address of the stockist.

14.   Computer Aided Software Engineering (CASE) Tool:

We need to develop a software for automating various activities associated with structured software analysis and design. The summary of the requirements for this CASE tool are the following:

Structured Analysis:

- The case tool should support a graphical interface and the following features.
- The user should be able to draw bubbles, data stores, and entities and connect them using data flow arrows. The data flow arrows are annotated by the corresponding data names.
- Should support editing the data flow diagram.
- Should be able to create the diagram hierarchically.
- The user should be able to determine balancing errors whenever required.
- The software should be able to create the data dictionary automatically.
- Should support printing the diagram on a variety of printers.

Structured Design:

- The user should be able to draw modules, control arrows, and data flow arrows. Also, a symbol for library modules should be provided. The data flow arrows are annotated with the corresponding data name.
- The user should be able to associate a module with some bubbles of the DFD. It should be possible to check if all the bubbles are assigned to some module and also whether each module is assigned at least one bubble.
- The user should be able to modify his design. Please note that when he deletes a data flow arrow, its annotated data name automatically gets deleted.
- For large software, modules may be hierarchically organized and clicking on a module should be able to show its internal organization.
- The user should be able to save his design and also be able to load previously created designs.

15.   Newspaper Agency Automation Software (NAAS):

The local newspaper and magazine delivery agency has asked us to develop a software for him to automate various clerical activities associated with his business.

- This software is to be used by the manager of the news agency and his delivery persons.
- For each delivery person, the system must print each day the publications to be delivered to each address. The addresses should be generated in consecutive order as far as possible so that the commutation of the delivery person is minimal.
- Customers usually subscribe one or more news papers and magazines. They are allowed to change their subscription list by giving one week's advance notice.
- For each delivery person, the system must print each day the publications to be delivered to each address. The system should also print for the news agent the information regarding who received what publications and a summary information of the current month.
- At the beginning of every month bills are printed by the system to be delivered to the customers. These bills should be computed by the system automatically and should include the publication type, the number of copies delivered during the month, and the cost for these.
- The customers may ask for stopping the deliveries to them for certain periods when they go out of station.
- Customers may request to subscribe new newspapers/ magazines, modify their subscription list, or stop their subscription altogether.
- Customers usually pay their monthly dues either by cheques or cash. Once the cheque number or cash received is entered in the system, receipt for the customer should be printed.
- If any customer has any outstanding due for more than one month, a polite reminder message is printed for him and his subscription is discontinued if his dues remain outstanding for periods of more than two months.
- The software should compute and print out the amount payable to each delivery boy. Each delivery boy gets 2.5% of the value of the publications delivered by him.

16.   University Department Information System (UDIS):

Department offices in different universities do a lot of book-keeping activities and it is necessary to develop a software to automate these activities.

- Various details regarding each student such as his name, address, course registered, etc. are entered at the time he/she takes admission.
- At the beginning of every semester, students register for courses. The information system should allow the department secretary to enter data regarding student registrations. When the secretary enters the roll number of each student, the computer system should bring up a form for the corresponding student and should keep track of courses he has already completed and the courses he has back-log, etc.
- At the end of the semester, the instructors leave their grading information at the office which the secretary enters into the computer. The information system should be able to compute the grade point average for each student for the semester and his cumulative grade point average (CGPA) and print the grade sheet for each student.
- The information system should also keep track of inventories of the Department, such as equipment, their location, furniture, etc.
- The Department gets an yearly grant from the University and the Department spends it in buying equip- ment, books, stationery items, etc. Also, in addition to the annual grant that the Department gets from the University, it gets funds from different consultancy service it provides to different organizations. It is necessary that the Department information system keeps track of the Department accounts.
- The information system should also keep track of information such as the research projects running in the Department, publications by the faculties, etc. These information are keyed in by the secretary of the Department.
- The information system should support querying the up-to-date details about every student by inputting his roll number. It should also support querying the details of the cash book account. The output of this query should include the income, expenditure, and balance.

17.   Students' Auditorium Management Software (SAMS):

The students' society of a large college wishes to develop the following software to more efficiently manage the various shows conducted in their auditorium than the present manual system.
Various types of social and cultural events are conducted in the students' auditorium. There are two categories of seats: balcony seats and ordinary seats. Normally balcony seats are more expensive in any show. The show manager fixes the price of these two categories of seats depending on the popularity of a show. The show manager also determines the number of balcony and ordinary seats that can be put on sale, since for each show some seats are offered as complimentary gifts to different functionaries of the students' society and to VIPs. The show manager also enters the show dates, the number of shows on any particular date and the show timings.

The spectators book their seats in advance by paying the full ticket price to the authorizes sales persons. The spectators indicate the type of the seat and the computer should print out the ticket clearly showing the seat numbers. The spectators' can cancel their booking before 3 clear days of the show. In this case the ticket price is refunded to them after deducting Rs.5/- as the booking charge per ticket. If a ticket is returned within 3 days and 1 day of a show, a booking charge of Rs.10/- is deducted for ordinary tickets and Rs.15/- is deducted for balcony tickets. On the last day of the show, there is a 50% deduction. The system should let the spectators query the availability of different classes of seats.

The show manager can query any time about the percentage of seats booked for various classes of seats and the amount collected in each case. The show manager creates login accounts for authorized sales persons. When any authorizes sales person logs in and makes a sale, the computer should record the sales person's id in the sales transaction. This information would help in computing the commission payable to each sales person and also the amount collected by each sales person. These data can be queried by the show manager.
The accounts clerk should be able to enter the various types of expenditures incurred for a show including payment to artists. The computer should prepare a balance sheet for every show and a comprehensive up-to- date balance sheet for every year. The different types of balance sheets should be accessible to the manager only.
Since the software product should be as much low cost as possible, it is proposed that the software should run on a high-end PC and free software such as Linux, mySQL, and Apache web server.

18.   Factory Service Simulation Software (FSSS):

We need to develop the following simulation software:

A factory has different categories of machines such as lathe machines, turning machines, drilling machines, soldering machines, etc. The factory can have different numbers of machines from each category such as 200 lathe machines, 50 turning machines, etc. These machines require frequent adjustments and repair. Each category of machine fails uniformly after continuous operation and the failure profile of the different categories of machines is given by its mean time to failure (MTTF). A certain number of adjusters are employed to keep the machines running. The adjusters have expertise in maintaining different categories of machines. An adjuster may be expert in maintaining more than one type of machine. A service manager coordinates the activities of the adjusters. The service manager maintains a queue of inoperative machines. If there are machines waiting to be repaired, the service manager assigns the machine at the front of the queue to the next available adjuster. Likewise, when some adjusters are not busy, the service manager maintains a queue of idle adjusters and assigns the adjuster at the front of the queue to the next machine that breaks down.

At any given time, one of the two queues will be empty. Thus, the service manager needs to maintain only a single queue, which when it is not empty contains only machines or only adjusters. The factory management wishes to get as much as possible out of its machines and adjusters. It is therefore interested in machine utilization — the percentage of time a machine is up and running and the adjuster utilization — the percentage of time an adjuster is busy. The goal of our simulation is then to see how the average machine and adjuster utilization depend on such factors as the number of machines, the number of adjusters, the reliability of the machines in terms of mean time to failure (MTTF). This software would be used by different factories to determine the optimum number of adjusters that they should employ.

19.   Hall Management Software (HMS):

The IIT students' Hall Management Center (HMC) has requested us to develop the following software to automate various book-keeping activities associated with its day to day operations.

- After a student takes admission, he/she presents a note from the admission unit, along with his/her name, permanent address, contact telephone number, and a photograph. He/she is then allotted a hall, and also a specific room number. A letter indicating this allotted room is issued to the concerned student.
- Students incur mess charges every month. The mess manager would input to the software the total charges for each student in a month on mess account.
- Each room has a fixed room rent. The newly constructed halls have higher rent compared to some of the older halls. Twin sharing rooms have lower rent.
- Each hall provides certain amenities to the students such as reading rooms, play rooms, TV room, etc. A fixed amount is levied on each student on this count.
- The total amount collected from each student of a hall towards mess charges is handed over to the mess manager every month. For this, the computer needs to print a sheet with the total amount due to each mess manager is printed. Printed cheques are issued to each manager and signatures are obtained from them on the sheet.
- Whenever a student comes to pay his dues, his total due is computed as the sum of mess charge, amenity charge, and room rent.
- The students should be able to raise various types of complaints using a web browser in their room or in the Lab. The complaints can be repair requests such as fused lights, non-functional water taps, non- functional water filters, room repair, etc. They can also register complaints regarding the behavior of attendants, mess staff, etc. For this, round-the-clock operation of the software is required and down-time should be negligible. Considering that about 10,000 students live in hostels, the response time of the web site should be acceptable even under 1000 simultaneous clicks.
- The HMC receives an annual grant from the Institute for staff salary and the upkeep of the halls and gardens. The HMC chairman should be provided support for distribution of the grant among the dif- ferent halls. The Wardens of different halls should be able to enter their expenditure details against the allocations.
- The controlling warden should be able to view the overall room occupancy.
- The warden of each hall should be able to find out the occupancy of his hall. He should also be able to view the complaints raised by the students and post his Action Taken Report (ATR) to each complaint.
- The halls employ attendants and gardeners. These temporary employees receive a fixed pay on a per day basis. The Hall clerk enters any leave taken by an attendant or a gardener from at the terminal located at the hall office. At the end of every month a consolidated list of salary payable to each employee of the hall along with cheques for each employee is printed out.
- The HMC incurs petty expenses such as repair works carried out, news paper and magazine subscriptions, etc. It should be possible to enter these expenses.
- Whenever a new staff is recruited his details including his daily pay is entered. Whenever a staff leaves, it should be possible to delete his records.

- The warden should be able to view the statement of accounts any time. The warden would take a print out of the annual consolidated statement of accounts, sign and submit it to the Institute administration for approval and audit verification.

The software should be very secure to prevent the possibility of various types of frauds and financial irregularities.

**20.	Medicine Shop Automation (MSA):**

Perform structured analysis and structured design for the following Medicine Shop Automation (MSA) software: A retail medicine shop deals with a large number of medicines procured from various manufacturers. The shop owner maintains different medicines in wall mounted and numbered racks.

- The shop owner maintains as few inventory for each item as reasonable, to reduce inventory overheads after being inspired by the just-in-time (JIT) philosophy.
- Thus, one important problem the shop owner faces is to be able to order items as soon as the number of items in the inventory reduces below a threshold value. The shop owner wants to maintain medicines to be able to sustain selling for about one week. To calculate the threshold value for each item, the software must be able to calculate the average number of medicines sales for one week for each part.
- At the end of each day, the shop owner would request the computer to generate the items to be ordered. The computer should print out the medicine description, the quantity required, and the address of the vendor supplying the medicine. The shop owner should be able to store the name, address, and the code numbers of the medicines that each vendor deals with.
- Whenever new supply arrives, the shop owner would enter the item code number, quantity, batch number, expiry date, and the vendor number. The software should print out a cheque favoring the vendor for the items supplied.
- When the shop owner procures new medicines it had not dealt with earlier, he should be able to enter the details of the medicine such as the medicine trade name, generic name, vendors who can supply this medicine, unit selling and purchasing price. The computer should generate a code number for this medicine which the shop owner would paste the code number in the rack where this medicine would be stored. The shop owner should be able to query about a medicine either using its generic name or the trade name and the software should display its code number and the quantity present.
- At the end of every day the shop owner would give a command to generate the list of medicines which have expired. It should also prepare a vendor-wise list of the expired items so that the shop owner can ask the vendor to replace these items. Currently, this activity alone takes a tremendous amount of labour on the part of the shop owner and is a major motivator for the automation endeavour.
- Whenever any sales occurs, the shop owner would enter the code number of each medicine and the corresponding quantity sold. The MSA should print out the cash receipt.
- The computer should also generate the revenue and profit for any given period. It should also show vendor-wise payments for the period.

21.   Travel Agency Automation Software (TAAS):

A travel agency requires to automate its various operations. The agency has a fleet of vehicles. Currently the company has the following vehicles :

Model	Type	
	Non-AC	AC
Honda City	10	2
Tata Sumo	5	5
Maruti Omni	10	
Maruti Dzire		10
Mahindra Bolero	10	

The company rents out vehicles to customers. When a customer requests for a car, the company lets them know what types of vehicles are available, and the charges for each car. For every car, there is a per hour charge, and a per kilo-meter charge. A car can be rented for a minimum of 4 hours. The amount chargeable to a customer is the maximum of (per hour charge for the car times the number of hours used, and per kilo-meter charge times the number of kilo-meters run) subject to a minimum amount decided by the charge for 4 hours use of the car. An AC vehicle of a particular category is charged 50% more than a non-AC vehicle of the same category. There is a charge of Rs 150 for every night halt regardless of the type of the vehicle.

When a customer books a car, he has to deposit an advance amount. The customer also informs the company when he expects to return the car. When the car is returned, depending on the usage, either the customer is refunded some amount, or he has to pay additional amount to cover the cost incurred.

The company can acquire new vehicles and add them to the fleet of its vehicles. Cars may be condemned and sold off. A car which is currently with the company can be in one of these three states: it may have gone for repair, it may be available, it may be rented out. If it is rented out, the company records the data and time when it has been rented out, and the mile-meter reading of the car at that time. The company also wants to maintain the amount of maintenance expense each vehicle incurs.

The company wants to collect statistics about various types of vehicles : the price of the car, average amount of money spent on repairs for the car, average demand, revenue earned by renting out the car, and fuel consumption of the car. Based on these statistics, the company

may take a decision about which vehicles are more profitable. The statistics can also be used to decide the charge for different types of vehicles.

22. Food delivery service Management Software (FDSM)

The software should provide a platform for a food delivery service, such as swiggy or zomato, to manage it's business. There are 4 main types of users:

- Customer: who orders food from various restaurants. He should be able to:
  - See menus of restaurants and order a subset of items.
  - View his / her past orders
  - See the status of his pending orders
  - Provide feedback about quality of restaurant or delivery agent
  - See promotional offers if any.
- Restaurant:
  - Should be able to create a menu
  - See the orders placed to this restaurant in the past.
  - See the pending orders, accept or reject them and also provide a time of service
  - See available nearby delivery agents, and send delivery requests for accepted orders.
  - Mark accepted orders as "out for delivery".
- Delivery Agent:
  - Should be able to mark their location and see delivery requests from nearby restaurants
  - Should be able to accept delivery request, pick up the order, and deliver the order, while updating status for all the tasks.
  - Should be able to provide estimated pickup time for accepted order and estimate delivery time for picked up order.
  - Should be able to rate the customer
- Management:
  - Should be able to manage the lists of customers, Restaurants, and delivery agents
  - Maintain ratings for customers, Restaurants, and delivery agents
  - Provide restaurant and food recommendation for customers
  - Provide promotional offers for to good customers

23. Furniture Rental store system (FRSS)

When people relocate to a new city for a limited period of time, they find it more economically viable to rent the furniture than to buy them permanently.

There is a shop which is providing furniture of various types for rent. A Furniture Rental Store System helps to maintain all the information related to the rental operations. FRSS stores the data of furniture like the type, relevant images, rental price, cost price, age, etc. There are two types of users for FRSS viz. Admin and customer. Customers need to create an account in order to get services from FRSS. Admin can also create accounts for any customer or can also be able to delete accounts from the system.

- When a new product is introduced, Admin should be able to enter that in the catalog. Admin can enter the price or change the price of any item any time.

- The customer can take any furniture present in the catalog as well as inventory.

- If the number of any item present in the inventory falls below some threshold then a message is sent to the admin for its need.

- Customers are also allowed to take furniture on loan, on some interest rate, based on whether he has taken any furniture in the past.

- Customers should be able to see their past order history as well as amount due.

- After the item is returned with all the dues that item is added in inventory.

- The rental price of each item is decreased by 10% after its use by a customer for each year.

- If the item is damaged or destroyed by a customer then it should not be returned but the full payment of furniture should be done.

- For the above mentioned case, delete the respective entries of the furniture from the inventory.

- Admin should also be able to see the total investment and profit on his dashboard.

- Customers can give review/feedback to the item they have taken.

24. Video Rental System (VRS)

Video Rental System(VRS) helps people in renting/buying the movies they like to watch. The system is an online video renting portal, which will be helpful not only for the customers to buy or rent movies but also staff to maintain the inventory. Basically, the customer will sign up and they can surf through various genres to find the movie they like to rent. Information about various movies, their genres, Cast and crew and similar movies will also be displayed. The customers can add the required movies to the cart, order and pay for the movies. The staff on the other hand makes sure the movies on demand are being stocked up frequently and customers do not cross the deadlines to return the movies back. Any inclusion of data science here is welcomed.

The system should allow the following:

- Login by different entities (like Customer, Staff, Manager). Requires phone numbers and mail Ids.

- The customers can surf through the list of movies sorted by the genres and see details about movies, a short summary of the plot to give a little info about the movie. A search bar can be provided to search movies based on keywords.

- Once the customer adds his movies to the cart and moves to buying/renting them, the system needs to provide the combined cost or bill to the customer and after the payment an invoice is always helpful. The number of pieces of movies which are rented should automatically be decreased after renting/buying and be back after returning them.

- Customer profiles need to show the previous order details with the dates by which they have to return them.

- The staff keeps a check on the movies rented out and their respective duration. They make sure that no customer has any dues. They also manage the inventory by stocking up the movies. System can provide notifications to staff about the movies which are currently absent in inventory.

- The manager overlooks over the inventory and has the sole power to remove any movies, change their genres, perform audits over the sold and rented movies.

- Data science can be incorporated from recommending movies to customers by their search history, purchase history and the current trends in purchases. They can also predict the number of days after which we need to order movies to stock the inventory based on the current rate of purchases saving time and improving efficiency.

25. Online Guest House Booking System (OGHBS)

In IIT Kharagpur, a few guest houses are available. Any visitor who wants to visit the IIT campus, can register and verify the identity of the user. S/he also can check the room availability status for all the guest houses available in the campus. They will also get to know the price per room and the facilities available. Additionally, if food will be available or not, and cost for it also can be checked before booking the room.

Once a room is booked, the remaining room details need to be updated automatically for that particular guest house. The booking details such as name of visitors, their address, age, gender, relations, duration of stay, also needs to be filled up. Accordingly, the guest house staff are notified.

If there is no room available, the visitor can add him/her-self to the waiting queue. If there is any cancellation, the booking would be confirmed automatically. If the waiting queue is nil, the room availability status needs to be updated.

On booking a room, the visitor needs to pay 20% of the actual amount for booking. On cancellation of the room, a fraction of the money would be deducted and the remaining amount would be returned. On the other hand, if the booking does not get confirmed, deposited money would be returned.

There must be an online feedback system also for the visitors. Before leaving the guest house, the visitor would be asked to fill up a form with experience details, which would be helpful to upgrade the service quality.

Major Functionality – room availability, facilities, waiting queue, payment information, refund, feedback system etc.

26. Cricket Tournament Management System (CTMS)

In this project, you will be required to develop a simple Cricket Tournament Management System (think of IPL or World Cup as example). This software would store and manage information related to a cricket tournament such as the teams, players, match details and statistics. The relevant entities for this project are - players, teams and matches.
The software would store details of players which can be of different roles - bowler, batsman, wicket-keeper, all-rounder such as their name, age, left-handed/right-handed and details specific to their role like fast bowler/spin bowler etc. The software involves storing a lot of information (for which using a database is important) and computing various statistics and summaries. For simplicity in the project, the data has to be generated randomly rather than manually entering all the information.

The software would store team details - like team name, list of players (for simplicity, assume only 11 players in the team with no extras), captain etc.

The software would also store details regarding each match which would include - the two teams, match result (which team won), which team batted first and details like runs scored and balls faced by each player, wickets taken and overs bowled by each player etc.

For the tournament, assume a round-robin system where each team faces every other team once.

The use cases are -

1. Randomly generate player and team details.
2. Generate a random match schedule. This must follow the restriction that each team faces every team team and only once.
3. For a particular match whose details are not yet generated, generate random match details.
4. View a player's statistics. This would include the basic player details like their name, age, team and would include tournament statistics like runs scored, strike rate, average, wickets taken etc.
4. View a team's statistics. This would include matches played, total matches won, highest run-scorer, highest wicket-taker, last 5 match results.
5. View a match's scorecard.
6. [Optional] View tournament statistics - five highest wicket takers, five highest run scorers.

It is up to you to add any other use cases if you want to. You can think of IPL or Cricket World Cup and make simplifying assumptions for better understanding.

27. Work Management System (WMS)

In this project, you will be required to develop a Work Management System, which manages various works, workers and resources. There can be different kinds of works which will need some required number of workers, a start date,duration and priority. There will also be workers which have different roles, skill level and availability. Work Management System manages the details of workers and the works, and performs an assignment of workers to the works.

The requirements of this system are -

1. Add/edit/delete a worker's details.

2. Add details of a new work.

3. Perform an assignment of workers to the works.

For performing an assignment of workers to the works, it can be that there are workers without any assigned work or works whose required number of workers are not fulfilled. For performing the assignment any suitable method may be used. On performing the assignment, the software should suitably manage the status of the workers and the works.

4. Mark work status as complete

5. Display worker's details - display their basic details and include any statistics such as number of hours worked, works completed etc.

6. Display work's details - completed/not completed, requirements, workers assigned, duration, priority etc.

28. Airline ticket booking and confirmation system (ATBCS)

The current pandemic situation calls for proper precautionary measures in every aspect of our lives, with one of the most important measures being getting vaccinated. In this project, we intend to build a prototype of a flight management system with special functionalities that can make every passenger's trip comparatively safer.

There will be two components to this system:
1. *Booking*
   a. One of the tasks of this component will be letting a user enter the details of his/her journey (source, destination, date of travel). This will be followed by a listing down of the available flight options along with the fares, for the above-given input.
   b. On choosing any particular option, the user will be asked to enter the personal details of his/her own and other co-passengers if any (name, age, email id, phone number, first-time flyer).
   c. The first-time flyer option if held valid, the user should be presented with a safety guide instruction(if possible, for download).
   d. If the person is not a first-time with this airline and has frequent flier miles (ffm) accumulated, then he/she can use those points to get a discount for the tickets(1000 frequent flier miles = Rs 100 discount).
   e. The total fare should be listed along with the GST and convenience charges. Also, make sure, if a passenger is less than 2 years, the fare will be halved for the particular passenger.
   f. Following this, the passenger (if above 15 years) has to upload his/her covid vaccination certificate (either in pdf or image format whichever applicable).
2. *Confirmation*
   a. The vaccination certificate has to be validated by this system in order to avoid any miscreants. One can adopt any technique for this validation (either obtaining details from QR code available at the bottom of the certificate or any other possible way to validate).
   b. When the ticket gets confirmed, a backend process should add the frequent flier miles to the user's account. One can consider <name, email address,phone number> as the identification for a person to avail the ffm discount.

      [Frequent Flier miles calculation: (Distance between source and destination)/5]

   c. On successful validation of the certificate, the user will be directed to the payment gateway (mock gateway like Stripe or any other preferred gateways) where the transaction takes place.
   d. The flight details (source, destination, passenger details, flight arrival and departure hours, gate closing hour (45 mins before departure), and a validation check of vaccination certificate) should be displayed (if possible, mailed to one of the mail IDs) with some happy greeting message!

29. Social serving food delivery system (SSFDS)

Restaurants and hotels have always been a hub of leftover food, no matter which time of the year it is. In this project, we intend to develop an application for a non-profit organisation (NPO) that tracks leftover food from restaurants and hotels and uses it for several purposes - an NGO can buy the food at a higher discount rate, any user can buy the food at a comparatively discounted rate or can donate it to an NGO that will be distributed among the poor and needy children.

There will be two components to this system:
1. ***Food tracking***
    a. The NPO has a portal where restaurants are asked to create their accounts, if not already created. In that case, the restaurant has to login using its credentials. There should be a check during the login to ascertain validation.
    b. The portal should allow the restaurant to enter the details of the leftover food at a certain hour of the day.
    c. The restaurant should log the details (food item, #plates, price per plate, address of the restaurant [lat, lon]) by logging into its account.
    d. The NPO opens the portal at a time for the other task, while it remains closed for restaurants.
2. ***Distribution or Sales***
    a. The NPO now opens its portal for two purposes:
        i. *For distribution to an NGO* - Here, the NGO fills in the details (name, address [lat, lon]), views the available items (items from restaurants within a distance of 10km), places its order from the portal (food item, #plates). The price per plate is given a rebate of 40%. The NPO team assigns a delivery executive to deliver the food from the restaurant to the NGO.
        ii. *For sales* - Here, any user can place an order, mention their address [lat,lon] and opt for prepaid or cash on delivery option. The items from restaurants within a distance of 10km will be shown to the user.
            1. The price per plate will be given a rebate of 20% during delivery.
            2. If the user is located within a proximity of 2 kilometers from the restaurant, the food will be delivered at no extra charge.
            3. However, if it's more than 2 kilometers, a minimal price of Rs.5 per kilometer will be charged on the transportation.
            4. There can also be a provision of self-pickup in which case the mode of payment has to be prepaid.
            5. One can also donate to an NGO willingly whose information(name, address) will be accumulated from the last module (*For distribution to an NGO).*

The details of the transaction like restaurant name, food items, date (be it by NGO or any user) will be updated on the NPO portal with a message of happy serving to society!

30. Attendance Application (AA)

In this project, an application should be developed which is used to save time in taking attendance. It should work with a unique code which was set by the attendance taker and will be announced to all the attendees. Implement should be done both server side and the client side.

User Types:
1) Who wants to take the attendance
    a) Generally teacher. Teacher generates a unique code which will be given in class.
2) Who gives the attendance
    a) Generally students. They enter the code given by the teacher in class to mark their attendance.
3) Developer who update the software
    a) Maintains and creates the classes and other technical issues.

Requirements of **student**:
1) Students should get all the statistics of the classes he attended.
2) Students can mark the attendance in the time span allotted. (only if code matches with the unique code generated by Teacher)

Requirements of **teacher**:
1) Get the statistics of all the classes he teaches.
2) Start the attendance.
3) Get possible proxies(Detect multiple attendances from the same IP)

Requirements of **Admin**:
1) Can create/delete/modify a course from the database.

Android application requirements:
1) Any user should have his own login/registration credentials.
2) Option to login as student or teacher or admin
3) Three different interfaces should be generated for all the three users for their tasks.

This attendance application is fun, you can explore new techniques to avoid the proxies as much as possible !

31. Travel Card Vending Machine (TCVM):

TCVM is a Travel service system which provides Travel Cards to the passengers for traveling in five different zones via metro . It reduces the manpower and time which will be much more if done manually without any machine. By using this software we can easily track all the transactions done (which is very useful information sometimes) . This system is linked with the banks (to add money to the card) which also serves as a business strategy for those banks. This software is a replacement of the previous ticketing system where there were many counters both offline and online.

1) USER FUNCTIONS **:-**
   a) Registering manually by giving details along with valid proof .
   b) Adding money to the card through credit/debit cards
   c) Getting the card issued.
   d) Deleting the account.
2) ADMIN FUNCTIONS :-
   a) ˙Should take care of all the registrations and transactions made by the passengers.
3) SYSTEM FUNCTIONS :-
   a) Reading both travel cards and credit/debit cards
   b) Printing a receipt for all the transactions done
   c) Display

Functional Requirements (must need to implement):

1) Register: purpose to register new users.
2) Card Printing: Showing the entered details and amount paid which is different for different users.
3) Card reading and login:This functionality is only for the users who have valid travel card or who have registered in the machine
4) Payment: Functions for payment gateway.

User interface is a web page where implementation is done according to the requirements. (example: for login a login/Registration pages are needed)

Note: You can also implement additional functional requirements according to the situation and the developer ideas. Have fun implementing.

32. Online Paper Review System(OPRS):

 Peer review is a widely adopted quality control mechanism in which the value of scientific paper is assessed by several reviewers with a similar level of competence. The primary role of the review process is to decide which papers to publish and to filter information, which is particularly true for a top conference that aspires to attract a broad readership to its papers. The novelty, significance, and technical flaws are identified by reviewers, which can help the chair make the final decision.

The main objective of the Online Peer Review System is that it helps authors to publish an error free papers and get feedback from competent reviewers. It helps the authors for the publicity of the papers. It has two main perspective:

1. Author's Corner

2. Reviewer's Corner

The main purpose of the system is to efficiently evaluate the papers through a fully automated system that not only saves a lot of time but also gives fast results. It is cost effective and popular means of mass-evaluation system.

The admin of the system sends each paper to the two or more expertise reviewer for the review. The reviewer have two weeks time to give the review, after two weeks the comment option will be disabled. On the authors corner before the reviewer's comment the paper's status will be open, after that it will show published with or without modifications or rejected.

Administrator:

·   The administrator is the one who manipulates and maintains the system. He can enter into the system by entering login name and password.

·   He/She is responsible for publishing a paper such as Reject/Re-modification or publish.

·   Again, he/she can send a paper to an expertise reviewer or automate the process.

·   Manage status, manage reviewer, manage author as well as manage reviewer comments.

Author:

·   Can do member registration.

- · After registration, he can publish a paper.

- · After reviewer comment, author will know the status of paper.

- · Before publication the paper status shows Open.

Reviewer:

- · Can do member registration.

- · After registration, he can give a comment to a particular paper.

- · The Reviewer can send a paper for modification or can accept or reject it.

You should try to build a double-blind review system, which means that both the reviewer and author identities are concealed from the reviewers, and vice versa, throughout the review process.

To facilitate this, authors need to ensure that their manuscripts are prepared in a way that does not give away their identity.

Note the above functions stated above and not limited and you may use your best ability to build the system.

33. Online Bus Ticket Booking System (OBTBS)

 The Online Bus ticket Booking System is a system that replaces the conventional way of waiting for tickets in queues and purchasing tickets after going to Bus station manually. The Online Bus Reservation System is a web-based application that allows visitors check bus ticket availability, buy bus ticket and pay the bus ticket online.

This system is established for all the home/office users after gaining access from the administrator. Online Bus Reservation System provides bus transportation system, a facility to reserved seats, cancellation of seats and different types of inquiry which need an instant and quick reservation. This system can be used by the users in performing online reservation via internet for their all business or personal purposes.

You may build program which is accessible directly on websites or build an application.

Some responsibilities of the Administrator:

· Admin takes care of the authentication of the users and provides the information about the availability of the seats between the cities.

· Admin logins to the system and manage all the functionalities of Bus Booking System. Admin can add, edit, delete and view the records of Bus, Customer, Ticket Booking.

· Login Admin can manage all the details of Booking, Sales.

· Admin can also generate reports of Bus, Booking, Customer, Sales, Ticket Booking

· Admin can search the details of Ticket Booking.

· Admin can apply different level of filters on report of Bus, Sales, Ticket Booking.

· Admin can tracks the detailed information of Booking, Customer, Sales, Ticket Booking

Note the above functions stated above and not limited and you may use your best ability to build the system.

34. Online C program evaluation (OCPE):

Online Judge is an online system used to test correctness and efficiency of programs written in various programming languages. They are used on programming competitions held online as well as on site. Most importantly they are used to practicing for programming contests. These systems are used by lots of people, particularly students, to learn issues related to programming languages, algorithms, data-structures and to improve programming skills through training and competing in several programming contests. Furthermore, they have been used by recruiters of well known companies for job applications.

1. What is the need?
The need of this project is to evaluate any given input C program. Competitive programming is a mind sport usually held over the internet or a local network, involving participants trying to program according to provided specifications. This project deals with the evaluation of time complexity and space complexity of a Program.

2. Addressing the need:
Programmers generally use IDE's (Integrated Development Environment) to test their programming skills. But an IDE requires a platform to work on where an online evaluator doesn't require any platform. It works on any device if there is availability of internet.

3. Prospective Users:
Developers : in order to be sure they are developing the right program that fulfills their requirements like time and space complexity.

Contestants, Users : to get familiar with the idea of the programming.
Judges : to get familiar with procedures involved in assigning contest problems and grading them according to their evaluation pattern.

Administrators : in order to know exactly what they have to expect from the system, right inputs and outputs and response in error situations.

4. Issues/Challenges to be overcome while developing the System:
The main challenge is checking the errors that go out of bounds like infinite loop cases. We need to restrict the input size so that all the memory is not used up. We need to link an IDE as everything is done online.

The TCCS is a software that can help a transport company computerize various book keeping activities associated with its operations. The transport company receives consignments of various sizes at (measured in cubic meters) its different offices to be forwarded to different branch offices across the country.

Once the consignment arrives at the office of the transport company, the details of the volume, destination address, sender address, etc. are entered into the computer. The computer would compute the transport charge depending upon the volume of the consignment and its destination and would issue a bill for the consignment.

Once the volume of any particular destination becomes 500 cubic meters, the the computerization system should automatically allot the next available truck. A truck stays with the branch office until the branch office has enough cargo to load the truck fully.

The manager should be able to view the status of different trucks at any time. The manager should be able to view truck usage over a given period of time.

When a truck is available and the required consignment is available for dispatch, the computer system will print the details of the consignment number, volume, sender's name and address, and the receiver's name and address to be forwarded along with the truck.

The manager of the transport company can query the status of any particular consignment and the details of volume of consignments handled to any particular destination and the corresponding revenue generated. The manager would be able to view the availability, waiting period and idle time of the trucks.

Product Functions:

Manager :

The manager will be responsible for the following use cases :-
1. Buying new trucks
2. Viewing Consignment Status
3. Viewing Truck Status
4. Viewing Average Waiting Time of Consignment
5. Viewing Average Truck Idle Time
6. Viewing Truck Usage
7. Viewing Branch Consignment Handling

Employees :

The employees will be associated with the following use cases :-

1. Dispatching Truck
2. Validating consignment
3. Receiving Truck

Customer :

The customer will be associated with the following use cases :-
1. View truck and route details
2. Place order

Note: The Internet connection is also a constraint for the application. Since the application fetches data from the database over the Internet, it is crucial that there is an Internet connection for the application to function.

36. Online Class Management System (OCMS)

You need to build a web-based class management system like MS Teams which will majorly comprise of two major use cases: Students and Professors. The main focus for the software will be uploading lectures, implementation of live classes is a bonus. The class management system should take care of the following:

- Have a login for students and professors, both of these use cases will have different functionalities.
- Create virtual 'classrooms' in which students have to attend classes during the scheduled hours which will have a messaging interface in which students can ask doubts.
- A file-sharing system where only the Professor can upload video lectures, assignments and class tests. And the students added to that classroom will have access to these files.
- A personalised Calendar for Professors and Students alike will prompt the user to attend classes and show the schedule of the day/week.
- Each student will have a Grades tab for each subject, which will contain evaluated submissions by Professors or TAs.

We have 2 major use cases, namely Professors and Students. The basic functionalities for each of them are -

Professors:
1. Create Classes that they are supposed to take and add existing students (whose login ID exists) to their respective Classrooms.
2. Schedule the timetable of their classes, which will be linked with all the students are added to the classroom.
3. Option to upload video lectures, Assignments, and Tests, which when uploaded a notification should be sent in the messaging interface about the upload.
4. Option to allot TAs (which are students) that can also upload files, and video lectures (for eg: lab demonstration) and evaluate the submission.

Students:
1. Option to download the video lectures, Assignment (Pdf or Docx format), and Class tests (Pdf or Google form link)
2. Check his/her Grade sheet card which will contain marks of assignment and class test along with the name who has evaluated it.
3. Option to upload Assignment before the deadline, which will be hidden from all other participants except the Professors and TA.

37. Online Medical Consultation System (OMCS)

With the recent advent of Covid-19, the healthcare infrastructure has been overburdened with patients as a result patients are not getting proper treatment or have trouble scheduling appointments. To tackle this issue and to streamline this process we introduce an Online Medical Consultation System.

This will be a web-based application that will consist of login for doctors and customers, upon new signup the interface should ask for personal details and other relevant information for Doctors and Customers. The application should work based on location-based filtering. That is, for every Patient it should show doctors available, if any, based on his/her location.

After the login is completed, it would take to a different home page based on the use case. The Patient should see a list of all specializations (like Ophthalmologist, Dermatologist, etc.) and his/her personal information which he/she can update if they wish to do so.

The functionalities for the patients are -
- Search for specialized doctors in their location, which will show them a list of all doctors present in the area, and the relevant data like Hospital/Clinic name, etc.
- Schedule an appointment in which he/she can list various symptoms that ails them, after which the software will schedule the physical appointment slot after review by the doctor based on the doctor's availability and the queue of patients.
- The patient should be able to change his/her location to their liking after which the home page should show an updated list of doctors based on the selected location.

The functionalities for the doctor are-
- Mention their available working hours for the week, which can be updated on particular days, in case of emergencies, if they wish.
- Update their details like specialization, Medical certificates, Location etc.
- Review the list of pending appointments and issue an online prescription or schedule a physical appointment accordingly.
- In case the patient has already been examined, the software should have a feedback messaging system between the doctor the patient for 'x' number of days after the consultation.