Vel Tech
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R&D Institute of Science and Technology
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SCHOOL OF COMPUTING
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Programme Name	**: B.Tech(CSE)**
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Name of the Faculty	**: D. Santhadevi**
Name of the Course Coordinator	**: K. SRIRAMAN/ Dr. Almas Begum**

TASK PLAN

Database System Case of Task: Logistics Management System

A logistics management system (LMS) is a system of records and reports – whether paper-based or electronic – used to aggregate, analyse, validate, and display data (from all levels of the logistics system) that can be used to make logistics decisions and manage the supply chain. When talk about logistics, usually it means forward direction, which includes such operations as receiving and processing an order, checking and preparing inventory, packing and picking an item, dispatching it and selecting a transportation route that will deliver the product to a customer as quickly and efficiently as possible. Reverse direction means any operations with managing incorrect or damaged shipments, repairing items, and reusing or recycling. In a digital world, to manage these processes in both ways, businesses use logistics management systems – a combination of software tools that optimize all processes from making an order and delivering it to a customer's door.

The authorities/agencies involved in Logistics Management System

a) Customer
b) Employee
c) Supplier

S/w Eng. Process:

Stage I : Login
Stage II :View customer order
Stage III : Process order
Stage IV: Stock management
Stage IV: Dispatch order
Stage V : Billing / Payment Process
Stage V : Print invoice
Stage VI: Print delivery

Relations:

Customer(Cid,Cname, Caddress,CPhoneNumber)
Product(Pid,Pname,Type,Price)
Employee(Eid,EName,EPhone, EEmail,EPhone_Number)

Stock(Rackid, Pid,Pname,Quantity)
Dispatch(Did,Pid,Cname,Pname,Quantity,Senderaddress, Receiveraddress,date)
Supplier(Sid, Sname, Productname, unitprice, quantity, total_amount)
Order(Oid, Pid, quantity, sid, amount)

TASK 1: Conceptual Design through FTR(Tool: Creately, ALM: Learning by practice) **CO1, S3**

Using basic database design methodology and ER modeler, design Entity Relationship Diagram by satisfying the following sub tasks:

a) Devise ER diagram for Logistic Management System using ERWIN/ Creatly tool.

1. a Identifying the entities.

1. b Identifying the attributes.

Sample Output:

Entities: Customer

Attribute:Cid,CName, Caddress,CPhoneNumber

1. c Identification of relationships, cardinality, type of relationship.

1. d Reframing the relations with keys and constraint.

1. e Using creately, develop ER/EER diagram.

TASK 2: Generating design of other traditional database model (Tool: Creately, ALM: Concept Drawing) **CO1, S3**

2. a Identify the specificity of each relationship, find and form surplus relations.

2 .b Check is-a hierarchy/ has-a hierarchy and performs generalization and/or specialization relationship.

2. c Find the domain of the attribute and perform check constraint to the applicable.

2. d Rename the relations.

2. e Perform SQL Relations using DDL, DCL commands.

2. f Using creately, design Relational Hierarchical model and Relational Network Model ER diagrams.

TASK 3: Normalizing databases using functional dependencies upto BCNF CO1, S2

(Tool: Table Normalization/GU ALM: Mind Mapping)

Upon relational tables created in task-2, perform normalization up to BCNF based on given Dependencies as following for the assumed relations specified below.

Sample input:

Customer(Cid,CName, Caddress,CPhoneNumber)
Product(Pid,PName,Type,Price)
Dispatch(Did,Pid,Quantity,Senderaddress, Receiveraddress, amount, date)
Rack(rackid, Pid, description)

Cid->Pid
Pid->rackid
Cid->{ Cid, CName, Caddress,Ccity, CPhoneNumber}
Pid, rackid->{ Pid, rackid, PName, Type, Price,description }
Delivery_info (**CName,Caddress,CPhoneNumber,id, Pid,Quantity, Senderaddress, receiveraddress, amount, date, PName,Type,Price)**

3. a Apply the functional dependency, normalize to 1NF

3. b Normalize the relations using FD+ and α+

3. c Find the minimal cover, canonical cover.

3. d Normalize to 2NF, add/alter constraints if necessary.

3. e Normalize to BCNF, add/alter constraints if necessary.

3. f Normalize to 3NF, add/alter constraints if necessary.

Sample Output:

The given FD, MVD are resolved through BCNF.

3. g Perform SQL Relational operations using simple DML queries.

TASK 4:Using Clauses, Operators and Functions in queries: (Tool: SQL, ALM: Flipped Learning) **CO2, S3**

Perform the query processing on databases for different retrieval results of queries using DML, DRL operations using aggregate, date, string, indent functions, set clauses and operators.

Aggregate function

a) Retrieve the count of items delivered in the month of FEb2022.
b) Retrieve the count of items in the stock for the month of Jan2022
c) Retrieve the count of new items added in the stock in the month of Dec 2021.
d) Which product sent minimum order in the month of Dec2021.
e) Which product sent maximum order in the month of Dec2021.
f) Display the total product sold on 28/2/2022
g) Retrieve products of the rackid which are sold using nested Queries

Date:

h) To select the records with an Order Date of "2006-11-21" from the customer
i) To select the records with an Order Date on "20-11-2021" from the dispatch

String:

j) Find all customer whose name as starts with “S”
k) Update the employee phone name where name the name of the designation is ‘manager’.
l) Retrieve all customers information who are from the city Chennai.

Sub-String:

m) Select the customer name with maximum characters.

Indent Functions:

To display the customer name after updating their payment in customer

4.a Retrieve available racks.
4.b Find the Eligible rack for particular product
4.c Find the product number and type
4.d Using where clause find similar cid from respective cities.
4.e Using % operator, retrieve all Cid whose want same product only.
4.f Find all customers with id, name and CPhoneNumber as starts with “An”
4.g Find any product which are not accommodate in their rack(check constraint).
4.h Find all the Customers who have paid more than 10000 rs as bill.
4.i Find all the customers who does not belongs chennai.
4.j Retrieve all product which is placed more than one month.
4.k Retrieve all customer who is from city=”Coimbatore”.
4.l Retrieve all Customers whose name contains “J” anywhere.

TASK 5: Writing Sub Queries and Join Queries: (Tool: SQL,ALM:Flipped Learning) **CO2, S3**

Perform the advanced query processing and test its heuristics using designing of optimal correlated and nested sub queries such as finding summary statistics.

Upon Audit of sales in the logistic, the following queries given by the logistic owner need to be answerable by the developed database system to view the required datafrom multiple tables of the database

5.a Retrieve stock, no of products available group by rack number and product id

5.b Retrieve all customer id ordered by same product
5.c Retrieve all the dispatch details (CustomerId, FirstName, City, PurchaseDate) who have ordered before Jan 2022
5.d Retrieve all dispatch details who have done a purchase of more than Rs.10000
5.e Retrieve all Customer id where Customer location is Chennai
5. f Retrieve all customers details who have done a purchase of less than Rs.30000 in the city chennai

Sample input:
<refer Customer and product Relation)
Sample output:

Cid	Pid
C1	P1

TASK 6: Procedures, Function and Loops: (Tool: SQL/Oracle) **CO3, S3**

Programming using Procedures, Functions and loops on Number theory and business scenarios like.

6.a Write PL/SQL procedure using while loop which customers having same vehicle name.
6.b Write PL/SQL function recursion for factorial finding and calculate nth term of a polynomial. (Assume, abscissa and ordinate values provided).
6.c Write PL/SQL block without procedure/function to print all even multiples of 4,8 and not of 32 below 500.
6.d Write a non-recursive procedure for palindrome checking.

Sample input

Enter input: malayalam

Sample Output:

Madam is Palindrome

TASK 7: **Triggers, Views and Exceptions:** (Tool : SQL/ Oracle) **CO3, S3**

Conduct events, views, exceptions on CRUD operations for restricting phenomenon.
The following queries are given by the logistics owner to view the certain required data from the database for analysing the sales in the logistic.

a) Create a view of all dispatches who have made a purchase in the year 2021
b) Create a view of all customers who have bought pop product.
c) Create a simple trigger BEFORE INSERT or update or delete trigger using the CREATE TRIGGER statement for dispatch schema assuming the number of product for update withexception

Triggers:

Find the name of customer who is avail more number of product after inserting some set of new product whose city is chennai.
Create a simple trigger before insert or update or delete trigger whenever Pid in Product schema.

Sample input:
<refer Customer schema>
Sample output:
Pid is inserted successfully

Views

Create a virtual table for Customer schema to display Cid and Cname.

Sample input:
<refer Customer schema>
Sample output:
create view Cview as

select Cname, Cid from Customer;
select * from Cview;

Exceptions

Raise an exceptional handling whenever a tries to choose the proper product to identify Pid that does not exists from already chosen product list.

TASK 8: **CRUD operations in Document databases** (Tool: Mongo DB shell) **CO3, S3**

Perform Mongoose using NPM design on MongoDB designing document database and performing CRUD operations like creating, inserting, querying, finding, removing operations.

Perform the following tasks of Logistic databases.

a. Design mongoDB collection for current product
b. Insert single id at a time
    i. **Sample input/output:**
    ii. Db.Customer.insertOne({Pid:"123",},{Date:"22.1.2022"},{name: "Tamil","Story"});
        1. 1 document inserted
    iii. Db.Customer.find().pretty();
c. Insert multiple product name at a time
d. Insert all at a time.
    i. B. Find product which are inserted on 1.1.2022.
    ii. C. Find product name which is ordered by most number of customers
e. Delete product when it is dispatched.
f. Delete multiple product at a time when it is dispatched using multiple deliveries
g. Delete all at a time which it is packed
h. Update product at a time which supplied from single supplier
i. Update multiple product at a time which is received from same supplier and different supplier
j. Update product which is supplied on 10th Feb 2022.

TASK 9: CRUD operations in Graph databases(Tool: Neo4j) **CO3, S3**

Perform GraphQL/Neo4j graph space design for recommendation engines. Also perform CRUD operations like creating, inserting, querying, finding, deleting operations on graph spaces.

Create a graph database for availability of product in stock
Insert a product details.
Retrieve a total count of product available in stock.
Retrieve a total count of racks have in logistic for the product.
Delete the product who is available in many number of racks.
Update the supplier who is from Chennai city.

Sample input:

Create Table Dbo.Cusnode(Id Int Identity(1,1),Cid Numeric(4) Not Null,Cname Varchar(10)PSid Numeric(4),Dno Int) As Node;

Insert Into Cusnode(Cid,Cname,Cadd) Select Cid,Cname, Cadd From Customer

Output

C1	Amritha	Chennai	English Novel
C2	Sekar	Trichy	Tamil Novel

TASK 10: **Menus, Forms and Reports:(**Tool: MySql/Python/Java/Visual Studio) **CO4, S3**

For an application, creating and debugging Menus, Forms and reports using Oracle Forms and Report Builder.

Forms:

Prepare the menu driven list for logistic and list down the different menu item thatshows

list in stock System.

a) Insert the data into stock table
b) Once the data is added, the complete information of the stock has been uploaded in the database.
c) If any modifications has to be done, update in the database and retrieve that data.

Report:

Generate reports for Logistics System as such requesting item may be chosen from menu or form as per designed forms or menu (in task 8 and 9 respectively)

a. Genarate GIS report is incorporated in billing city.

b. Generate XML report for stock database with amount of available product of different companies.

Sample input:

Make a report of current stock with their details

Sample output:

Rackid,	Pid,	Pname,	Suppliername	Quantity
R1	P1	Book	S1	100

TASK 11: Design Datalog query and recursive queries **CO2, S2**

Make use of Datalog query designing and recursive query for AI based commerce escalation of logistics management system.

```
WITH Cname (column_list)
AS
(
   -- Anchor member
   initial_query
   UNION ALL
   -- Recursive member that references expression_name.
   recursive_query
)
-- references expression name
SELECT *FROM   Cname
```

Sample output:

Cname	**CCity**
Prithivi	Mumbai

TASK 12: Mini Project: **CO5, S3**

(Tool: Oracle SQL/ SQL Developer/MySQL/MongoDB/NetBeans ,ALM: Project based Learning)
Develop mini project based on business case scenario on use cases specified in Part-II.

Part-II

**In perusal to above task, every student shall select and incorporate for one of the following use cases for Task-12.

Use Cases:

Use case 1: Warehouse Stock Management System

A company has several warehouses, each warehouse is designated by a unique 4-letter symbol (by a letter we mean a..z and A..Z). Each warehouse has several bins that are identified uniquely by numbers (unsigned integers), i.e. each warehouse has bins 0, 1, 2, 3, … Each bin has a particular capacity.All items from the

same batch are stored together in the same bin (no batch is stored in more than 1 bin). Each item in a batch has a unique item number (unsigned integer).When a batch arrives, its date-in is recorded. A particular manager checks its arrival, and this fact must be recorded in the database.When an item is shipped out of the warehouse, its date-out is recorded together with the employee who checked its shipping.Employee has a unique employee number (a 6-digit number), phone number(s) (it consists of a 10-digit), name(s) (it consists of an up=to-10-characters fist name, an up-to-10- characters middle name, and an up-to-20-characters last name, an employee can have 1 to many names), address(s) (it consists of an up-to-6-characters street number, an up-to-20-characters street name, an up-to-20-characters city name, and a 2-character abbreviation of the province, an employee can have 1 to many address). Some of the employees are managers. Every employee who is not a manager works under supervision of a single manager. Managers do not work under other managers. Produce the report of stock in every day basis. Produce the report of manager and employee's working hours.

Use the technologies: SQL/MYSQL

Use Case-2: Tour Operator System

The system need to keep track of people. For each person, it records all his/her address, of which exactly one is designated as the mailing address (so each person has at least one address). Each address consists of country, province/state, city, street, street number, P.O., cell phone numbers and an email address. Each person in the database can be an old customer, a new customer, a tour guide, an employee (works for the tour company), or any mixture of these (for instance an employee can take a tour and so can be a customer as well, or an employee can work as a tour guide for a particular tour and hence be an employee and a guide at the same time etc.). A guide contract references the tour and the total amount the tour guide will be paid for the tour. The guides do not pay for the accommodation and the meals. The system also keeps track of all tours, past and future. Each tour has a unique designation, itinerary, guide (at least one, but may be more than one), its status (completed, in-progress, in-the-future), and the list of participants (not including the guides). The itinerary consists of list of the dates the tour covers and for each date it includes the place of breakfast, the place of lunch, the place of diner, and the place of accommodation. For each of the places there is a contract reference. Each day in the itinerary also includes and a simple English description of the activities during that day. An accommodation can be a hotel, or a rented room or rooms from a rental company, or a rented room or rooms from a private person. A meal (breakfast, lunch, dinner) can be in hotel, restaurant, or a private place. The contract for accommodation or meal must bear the date of the contract becomes valid, the date or dates it covers, what the contract is for (accommodation, breakfast, lunch, dinner) if the pricing is per person or per group or per room or per the whole facility, per night or per a certain period and the corresponding price. It also may stipulate the minimum and the maximum of people for the accommodation/meal for each day it covers, financial penalty if less than minimum uses the accommodation. Each place is identified by a single address. Each provider of accommodation or meal has a unique designation.

Use Case-3: Car Rental Information System

Our company does car rental business and has several locations with different address (address consist of street or rural route with the number, city, province and postal code). The cars are classified as subcompacts, compacts, sedans, or luxury. Each car has a particular make, model, year made, and color. Each car has a unique identification number and a unique license plate. The cars rented in a particular location may be returned to a different location (so called drop off). For every car we keep the odometer reading before it is rented and after it is returned. However, we rent the car with full tank and record the volume of gas in the tank when the car is returned, but we only indicate if the tank is empty, quarter full, half full, three quarters full, or full. We keep track of which day a car was rented, but not of the time, similarly for car returning. Each car class has its own pricing, but all cars in the same class are priced the same. We have rental policies for 1 day, 1 week, 2 weeks, and 1 month. Thus, if a customer rents a car for 8 days, it will be priced as 1

week + 1 day. The drop-off charge only depends on the class of the rented car, the location it was rented from and the location it is returned to. About our customers, we keep their names, addresses, possibly all phone numbers, and the number of the driver's license (we assume a unique license per person). About our employees we keep the same information (we require that all our employees have a driver's license). We have several categories of workers, drivers, cleaners, clerks, and managers. Any of our employees can rent a car from our company for a 50% discount, if the rental is less than 2 weeks. However, for any longer rental they must pay 90% of the regular price.

Use Case - 4: Painting Hire Business System

A Masterpieces Ltd, hiring paintings to private individuals and commercial companies.The system must be able to manage the details of customers, paintings and those paintings currently on hire to customers. Customers are categorized as B (bronze), S (silver), G (gold) or P (platinum). These categories entitle a customer to a discount of 0%, 5%, 10% or 15% respectively. Customers often request paintings by a particular artist or theme (eg animal, landscape, seascape, naval, still-life, etc). Over time a customer may hire the same painting more than once. Each painting is allocated a customer monthly rental price defined by the owner. The owner of the painting is then paid 10% of that customer rental price. Any paintings that are not hired within six months are returned to the owner. However, after three months, an owner may resubmit a returned painting. Each painting can only have one artist associated with it. Several reports are required from the system. Three main ones are: 1. For each customer, a report showing an overview of all the paintings they have hired or are currently hiring 2. For each artist, a report of all paintings submitted for hire 3. For each artist, a returns report for those paintings not hired over the past six months.

- Use the technologies: Oracle / MySQL/MongoDB

Course Handling Faculty **Course Coordinator**

Date: