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Assignment #1
DBMS

- (1) (1). Law Enforcement Management System - tracks cases
manages case files
2. Hospital Management System - manage patients
doctor, appointments info and records
3. LMS - Manage students, teaches records.
4. E-Commerce Platforms - for Online Retailers to
handle inventories, orders etc.
5. Banking Management System - manage customers accounts etc.
- If DBMS programs are not deployed properly,
Data can become disorganized and hard to manage.
leading to errors and inconsistencies. It is also
challenging to ensure data security.

single column or.

- (2) Primary Key is an attribute that uniquely identifies
the entity. Eg.: In Student entity, StudentName
and StudentID can be primary keys as each
student has a unique name and ID.
- Composite key is a combination of two or more
columns that together uniquely identify an
entity or table. None of the individual columns can
uniquely identify a record on their own. Eg.:
In an Order table, neither OrderID or Product ID
can uniquely identify a record on its own. But
both can tell precisely what the product is and
when to send them.

- (3) If my sharing a lot of data, I will use Database
~~file system when~~ DataBase System, as PBMS
grows significantly. and can handle the data
efficiently. with sophisticated relationships, allowing

for effective data retrieval and manipulation.

If there is simple and small amounts of data, like text file where, relationships between data are not complex. It's easy to set up and manage, making it a good choice for quick projects where data doesn't need to change much.

Database system can handle large volume of data, support multiple users accessing data at the same time, ~~and need not~~.

(4). A strong entity is an entity that can exist independently of other entities. It has a primary key that uniquely identifies each instance of the entity, Eg: Employee is a strong entity as each employee can be identified by their unique ID, and doesn't depend on any other entity for its identification.

Weak Entity is the one that cannot be uniquely identified by its own attributes alone.

It depends on a strong entity, usually used to represent dependent objects. Eg: like Order entity depends on Customers entity. It can not exist without customers.

Q2 (1)

Conceptual Data Model provides a high level overview of the data and its relationships without going into the details of how predata is stored or organized.

Eg: A Student enrolls in ^{multiple} course

Physical Data Model describes how the data is physically stored in the database. It includes details about the database structures, data types etc.

Eg: A student table with columns like int StudentID,

string. FirstName and dateofBirth (date)

The implementation data model is the final representation of the database design, including all the structures, relationships defined in the physical model. This model is created during the development phase and reflects the actual database schema for data manipulation.

Eg: In a university DataBase, the implementation data model includes SQL statements to create Student, Course tables

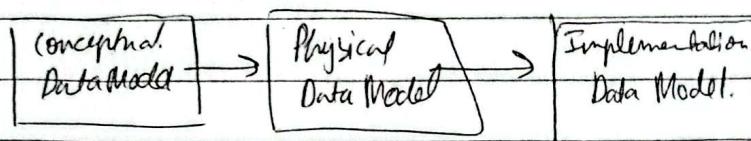
Eg: CREATE TABLE Student

StudentID INT PRIMARY KEY,

Date of Birth DATE,

FirstName VARCHAR(100);

;



(conceptual Data Model).

Entities.

STUDENT

Ssn (Primary Key), Name, Major, Bdate.

COURSE

Course# (Primary key), Name, Dept.

ENROLL

Ssn (foreign key), Course# (foreign key), Quarter, Grade

BOOK-ADOPTION.

Course# (foreign key), Quarter, Book-isbn (foreign key).

TEXT.

Book-isbn (Primary key), Book-title, Publisher, Author.

Relationships:

A STUDENT can enroll in Multiple COURSES.



A COURSE can adopt multiple TEXTS



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Physical Data Model

STUDENT (SSN: VARCHAR(9), Name: VARCHAR(50),
 Major: VARCHAR(30), Bdate: DATE)

Implementation Data Model

CREATE TABLE STUDENT (

SSN VARCHAR(9) Primary KEY,
 Name VARCHAR(50),
 Major VARCHAR(30),
 Bdate DATE

);

CREATE COURSE (

Course # VARCHAR(10), Primary Key,
 Chname VARCHAR(100),
 Dept VARCHAR(50)

);

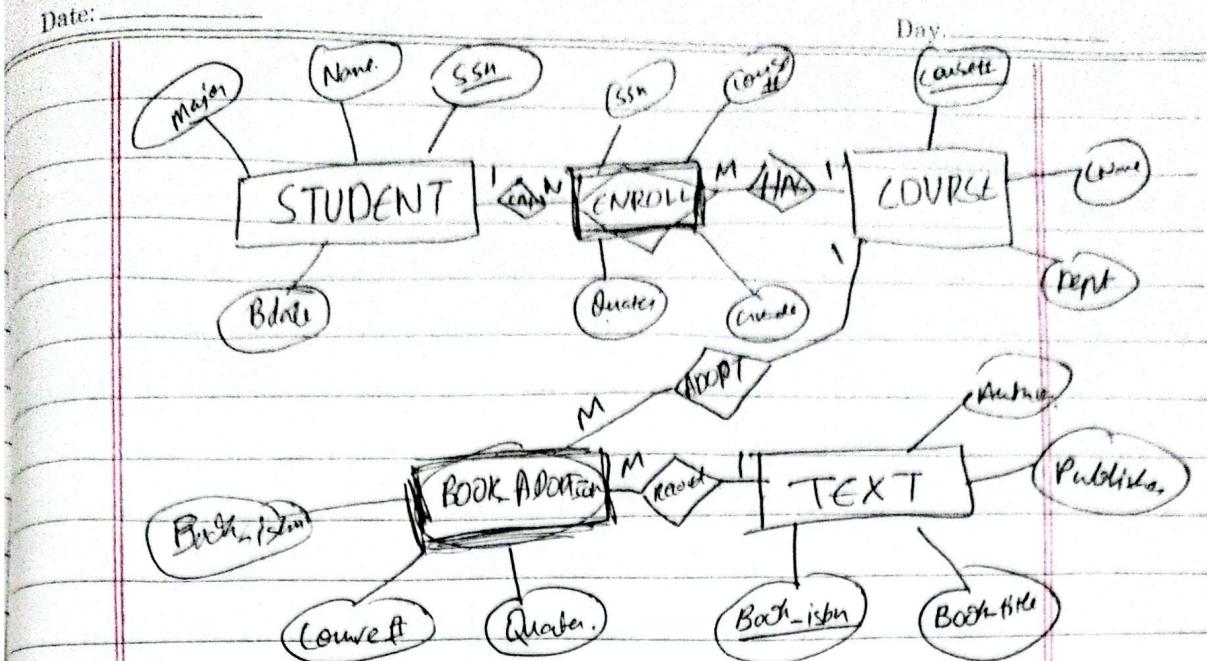
(2)

TABLE	PRIMARY KEY	FOREIGN KEY
STUDENT.	SSN	-
COURSE	Course #	-
ENROLL.	SSN, Course #	SSN (Reference Student) Course # (Reference COURSE)

BOOK_ADOPTION Course#, Quarter COURSE# (Reference
 BOOK-isbn COURSE (Course#)

TEXT

Book-isbn, TextTitle.
Author



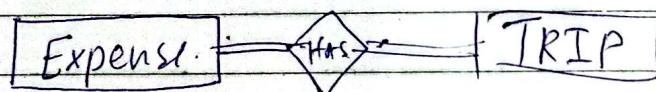
Q3 (1). Total Participation is when an entity set must participate in at least one relationship.

Eg: Every TRIP must be associated with a SALESPERSON.



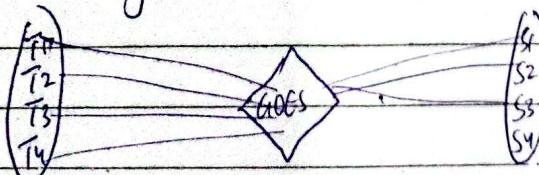
because each trip entry requires a salesperson.

Also every expense has a total participation in the trip relationship.



Partial Participation is when an entity set may or may not participate in the relationship.

Eg: Salesperson has a partial participation with TRIP. As it's not necessary for all salesperson to go on a trip.



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(2) TABLE

PRIMARY KEY

FOREIGN KEY

SALESPERSON

Ssn.

TRIP:

Trip-id

Ssn (relationship with
Salesperson
(ssn))

EXPENSE

Trip-id, Account#

Trip-id (relationship
with TRIP (Trip-id))

CREATE TABLE SALESPERSON (

Ssn CHAR(9) PRIMARY KEY,

Name VARCHAR(100),

Start-year INT,

Dept-no INT);

CREATE TABLE TRIP (

Trip-id INT PRIMARY KEY,

Ssn CHAR(9),

From-city VARCHAR(50),

To-city VARCHAR(50),

FOREIGN KEY (Ssn) REFERENCES SALESPERSON
(ssn)

);

CREATE TABLE EXPENSE (

Trip-id INT,

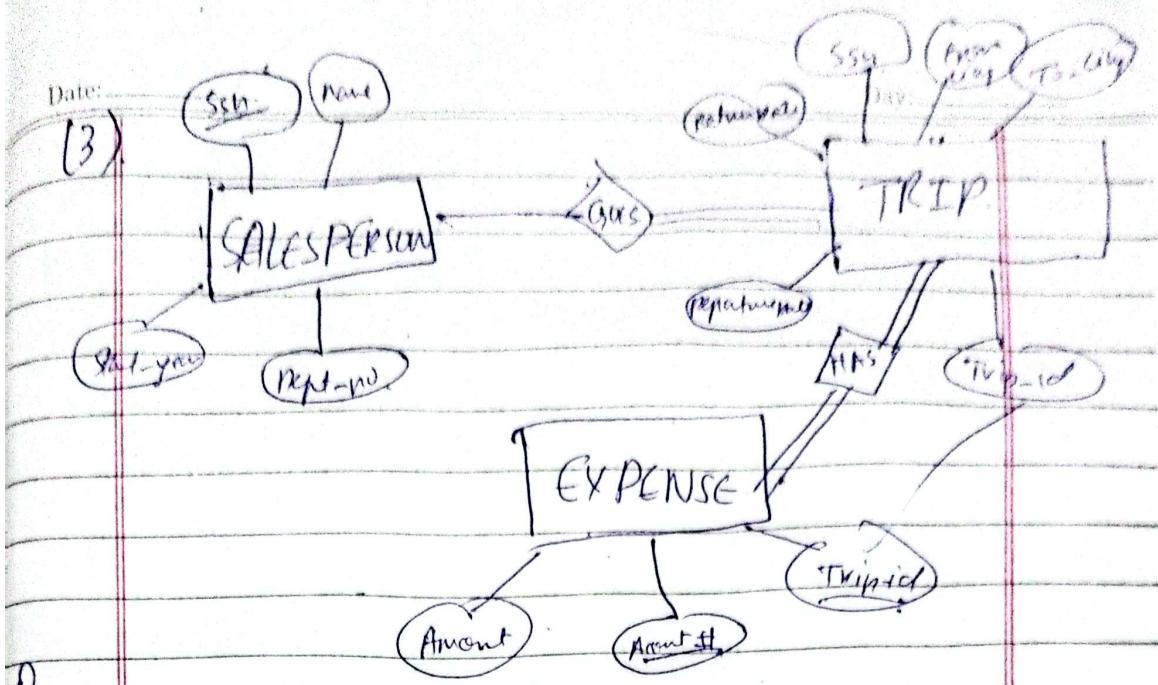
Account# INT,

Amount FLOAT,

PRIMARY KEY (Trip-id, Account#),

FOREIGN KEY (Trip-id) REFERENCES TRIP
(Trip-id);

);



(1) DOCTOR - DoctorID is primary key.

PATIENT - PatientID is primary key

TREATMENT - PatientID and Treatment Date.

Primary key = Composite key

- PatientID (reference PATIENT(PatientID)) Foreign key.

- DoctorID (reference DOCTOR(DoctorID)) Foreign key.

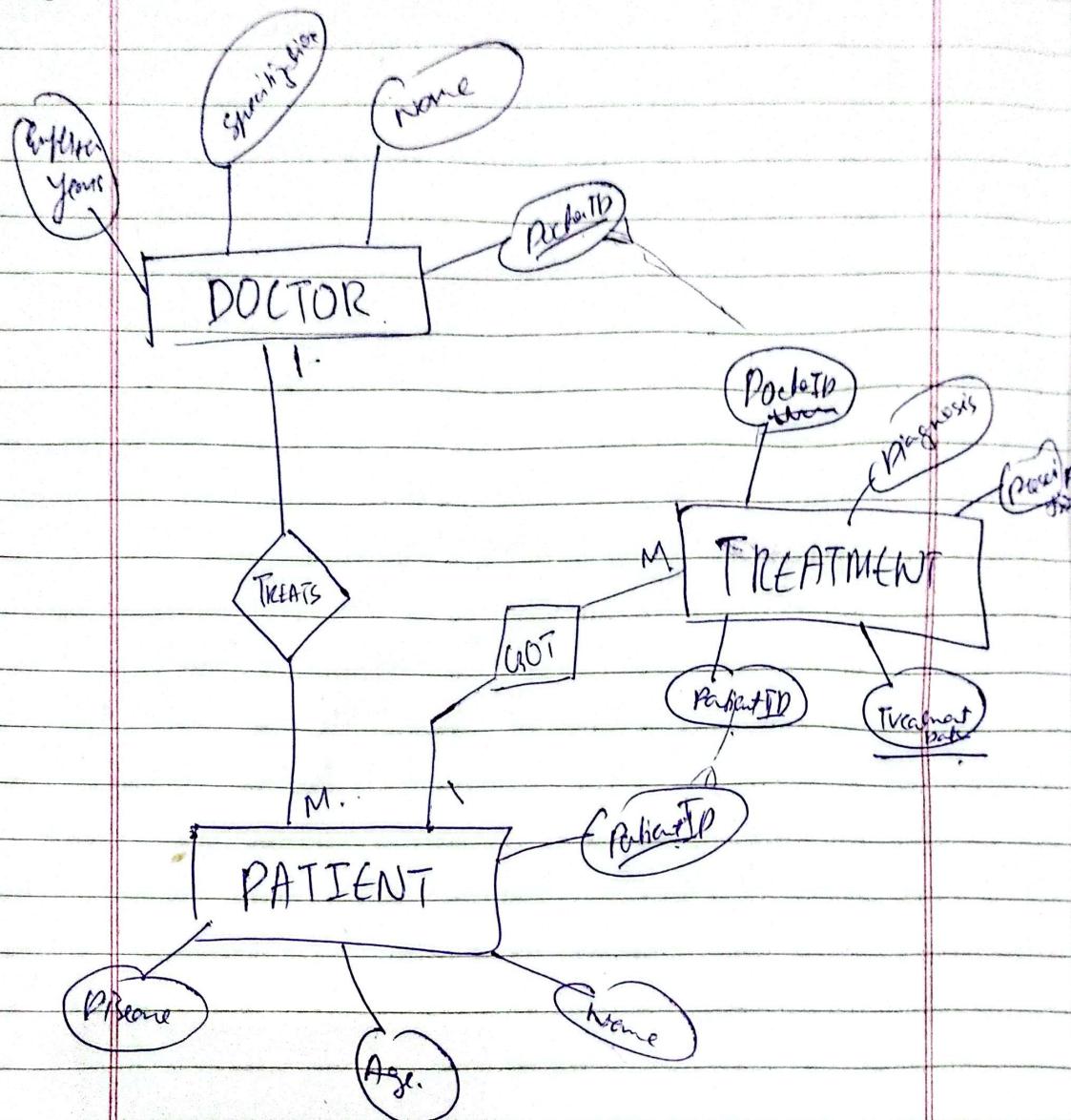
DOCTOR 1 M PATIENT

PATIENT 1 M TREATMENT

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(2).



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Q5. (1) DBMS is important for handling large amounts of data.

In Banking Systems, DBMS manages customer accounts, transactions without it more would be slower transactions, Data inconsistency.

In Hospital Management System, it stores records and appointments etc., which is a huge amount of data. Without it, it will be hard to manage the data.

Leading to data loss also making process slower like fetching records.

In E-commerce websites, not able store and manage inventories, customers etc. Without a proper DBMS system it will hard to upgrade records etc.

In LMS DBMS is used to manage student registrations, grades etc.; Having a DBMS is important for automating student grading & enrollment, without it, manually entering of data would be there, even causing duplication of data..

(2) Casual: Access the database occasionally when needed.

Parametric: They make up a large section of the end users. They interact with the database through predefined queries or forms, typically used in environments where they need to perform structured data retrieval or manipulations.

Sophisticated: are highly skilled individuals who possess a deep understanding of database systems, data management. And often the underlying techniques.

Standalone: are individuals who interact with databases through independent applications etc. that do not require a connection to a centralized DBMS.

Main Activity: Casual users use they create simple queries, and access reports for quick information retrieval.

Parametric Users do input parameters into predefined forms to generate customized reports.

Sophisticated users, write complex SQL queries and perform advanced data analysis.

Standalone Users manage and manipulate local data using independent applications.

(3) In small-scale applications, such as a small retail shop managing its inventory with text files or spreadsheets, traditional file processing is easier and more cost-effective. This approach is sufficient for limited data needs, and a small user base, allowing no business to avoid the complexity.

Embedded systems ~~such that~~ store settings in flat files, require minimal overhead and quick access to data, making file processing suitable.

Single-user applications like personal finance software for tracking expenses, find file processing easier and more straightforward for managing basic data needs.

(4) If I was designing YouTube and using file processing system, I would be managing a large number of video files and metadata which can become disorganized and difficult to retrieve. DBMS offers structured storage in tables, allowing efficient data retrieval. Multiple users upload videos and access data simultaneously can lead to conflict and data corruption. DBMS supports concurrent access.

Managing & Maintaining data integrity and security is hard in file system, making it harder to enforce rules and protect sensitive info. A DBMS system enforces integrity constraints.