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Subject - DBMS

Assignment - 01

[Tutorial sheet - I]

1] List four significant difference between a file-processing and a DBMS.

Ans-

File processing	DBMS
(i) The file system is a way of arranging the files in a storage medium within a computer.	DBMS is a software for managing the database.
(ii) Data sharing is difficult.	Data sharing is easy.
(iii) File system provides the details of the data representation and storage of data.	DBMS gives an abstract view of data that hides the details.
(iv) Data lost in file system can't be recovered.	DBMS provide back up and recovery.

[2] Major advantages and disadvantages of a DBMS.

Advantages of DBMS

(i) DBMS provides various level of security, for data protection
(ii) Data retrieval is possible
(iii) Minimum data inconsistency
(iv) Better data sharing facility.

Disadvantages of DBMS

(i) DBMS is expensive
(ii) DBMS is very complex to operate and manage.
(iii) Not beneficial for small firms.

[3] Difference between physical and logical data independence.

Physical data independence	logical data independence
[1] It is concerned with internal schema.	It is concerned with conceptual schema.
[2] It mainly concern about how the data is stored into the system.	It mainly concerned about the structure or data defination changes
[3] It is easy to retrieve.	difficult to retrieve.

[4] List five responsibilities of a database management system. For each responsibility explain the problems that would arise if the responsibility were not discharged.

Sol^n:- Five responsibilities of a DBMS :-

1] Data storage and Retrieval :-

DBMS is responsible for efficiently storing data and allowing for quick retrieval.

Problems :- (i) data loss
(ii) inefficient access.

2] Data integrity :-

Ensuring that the data is accurate, consistent and reliable through constraints and validation.

problem :- inconsistent
data corruption

(3] Concurrency control :-

Managing simultaneous access to the database by multiple use prevent conflicts.

(4] Developing user views.

[5] Training the users.

Five main functions of a database administrator :-

[1] Designing Logical model :-

After analysing the user environment, DBA develops a logical data mode for the organisation.

[2] Preliminary Database Planning :-

DBA may participate in preliminary database planning if appointed easy.

[3] Developing physical model :-

DBA creates the exact layout of data according the facilities of selected of DBMS and available resource of software and hardware.

[4] Developing user views.

[5] Training users.

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[6] List seven programming language that are procedural and two that are non-procedural, which group is easy to learn and use.

Procedural languages :- C, C++, Java, Python, Ruby, Go, Pascal

non-procedural :- SQL - DQL, DML, LISP.

* Procedural :- It is easy to use, learn because it tells the programmer on what needs to be done, rather than how to do impl

[7] Six major steps that you would take in setting up a database for a particular enterprise :-

step 1] Define data model containing all datatypes and their relationships
step (2] Define integrity constraints on data.
step (3] Define conceptual schema for model.
step (4] Define physical level.
step [5] Define views of the database.
step [6] Create and initialize the database.

[8] Given :- 2D integer array of size (n×m)
To illustrate :- (i) difference b/w three levels of data abstraction
(ii) schema and instance.

soln :- Taking 2D array of size n×m,

(i) difference between three levels of abstraction :-

(a) Physical level :-
It is lowest level of abstraction and deals with how data is stored, in case of 2D array, we can understood this in terms of memory addresses and datatypes.

(b) Logical level :-
It describes what data is stored, in case of array, op^n perform on it is involved.

(c) View level :-
It provide user-level experience, i.e., different perspective of data.

) difference b/w schema and instance :-

a Schema :- It is the overall structure of the data.
b Instance :- Structure of data at a particular time.

Difference between relation schema and instance with example :-

Relation schema	Relation instance
• Relation schema defines the structure of a relation. It specifies the name of the relation, attributes, data types of that attributes. • It is blueprint of how data is organised. Example :- Relation schema for a table called Students : Students (StudentID : INT, Name : VARCHAR(100)) ↳ relation :- Students attributes :- StudentID, Name.	A specific set of data that confirms the relation schema at given time period. ex :- An instance for Students, StudentID | Name 1 | DJ 2 | DE

(10) Define :-

(a) Data :-

Collection of Raw facts and figures that can be used to generate information

ex :- Marks : 78, 97, 65, 100

(b) ~~DBM~~ Database :-

An organised collection of data [structured data]

ex :- Student database containing StudentID, Name, Age, Class.

(c) DBMS :-

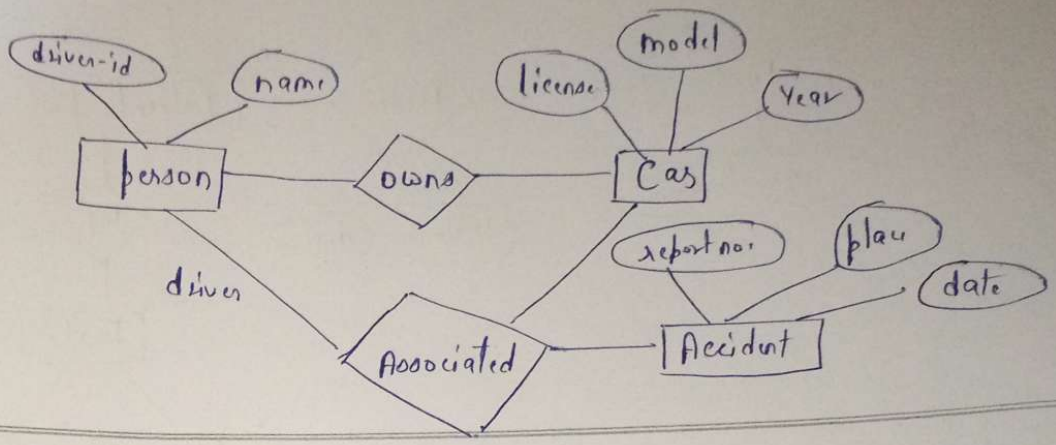
A software that manages databases, enabling data creation, manipulation and administration.

Ex :- MySQL, Oracle, MongoDB, etc.

Tutorial sheet - II

[1] To construct :- ER diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any no. of recorded acc.

Construction :-



[3] Distinctions among :-

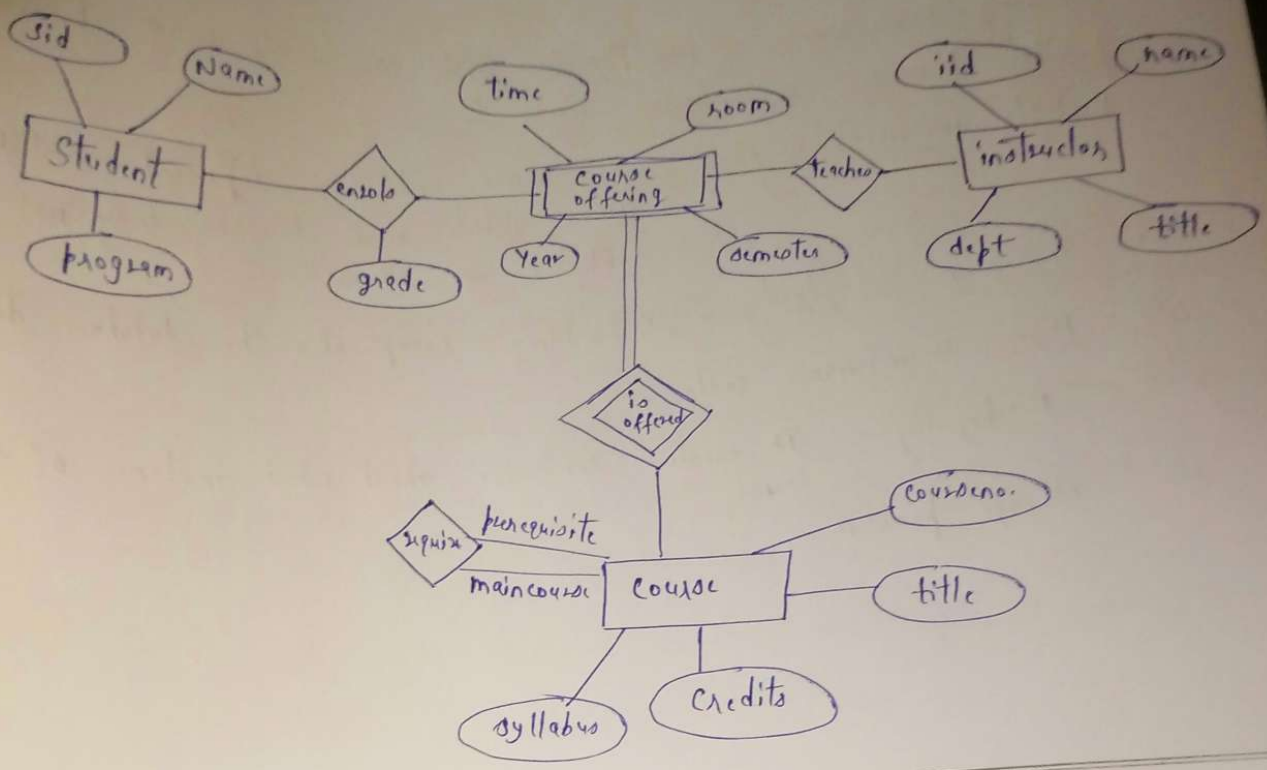
(a) Primary Key :- Primary is the candidate key chosen to uniquely identify records with a table. It must contain unique value and cantain no NULL values.

(b) Candidate Key :- A candidate key is a minimal super key, i.e., it can uniquely identify records without any extra column.

(c) Super Key :- A super key is any combination of column that can uniquely identify a record in a table.

To construct -: ER diagram for the registrar's office

Construction



[8] Define Aggregation and give two examples of where this concept is useful.

Ans Aggregation -:

- Aggregation refers to the process of combining data from multiple entities into a single summary form, allowing for analysis of complex data relationships and extraction of meaningful insights.
- Some of the aggregation function involves sum, max, min, average,...
- Examples where this concept is useful -:
  (i) Sales reporting -: We could calculate total sale using AF like 'S
  (ii) Employee performance Analysis -: Using AF like 'Average'.

[9] Consider an ER diagram in which same entity set appears several times. Why is allowing this redundancy a bad practice that one should avoid whenever possible.

Sol:- Allowing redundancy a bad practice that one should avoid whenever possible because, Redundancy leads to :-

(i) Data inconsistency :- when same entity is represented multiple times, update made to one may not be reflected in other.

(ii) Increased Complexity :- Redundancy complicates the database design.

(iii) Higher maintenance costs.

(iv) Ambiguity :- It creates confusion about which instance of entity to use.

(v) Storage problem.

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[10] An ER diagram can be viewed as a graph, what do the following mean in Terms of structure of an Enterprise schema.

(a) The graph is disconnected :-

An ER diagram can be viewed as a graph but of type disconnected as there are multiple subsets of entities and relationships that do not interact with each other, this means some entities are isolated or grouped in such a way that no direct relationships linking them to parts of schema.

(v) The graph is acyclic :-

- Acyclic means that there are no cycles or loop within the relationships among entities.
- In ER diagram, we can not start from one entity, follow the relationships and return to the same entity.
- Acyclic structure is crucial for maintaining data integrity and consistency, as it avoid situations like infinite loop.

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[6] To design :- ER diagram for keeping track of exploits of our favourite sports team

Requirement :- ER diagram should includes match played, score, individual player, his stats, ...

design :-

ER diagram for CSK team :-