Database Management Systems
Assignment-1

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Q1. Discuss in detail the functions performed by the DBA.

Ans- In a database environment, the primary resource is the database itself and the secondary resource is the DBMS and the related software. Administering these resources is the responsibility of the database administrator (DBA). The DBA is responsible for authorizing access to the database, for coordinating and monitoring its use and for acquiring software and hardware resources as needed. He is responsible for problems such as breach of security or poor system response time. So the functions are:

- schema definition - giving particular space to users
- storage structure and access method definition.
- schema & physical organization modification.
- granting of authorization for data access.
- routine maintainance - taking periodic backup of the database.

Q2. Discuss in details the database system architecture.

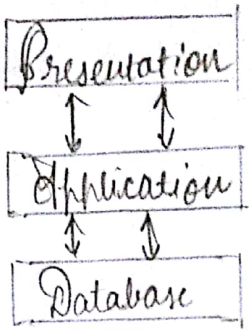
Ans- The design of a DBMS depends on its architecture-

In 1-tier architecture, DBMS is the only entity where the user directly sits on the DBMS and uses it. Any changes done here will directly be done on the DBMS itself.

In 2-tier architecture, an application is present through which the DBMS can be accessed.

In 3-tier architecture, the tiers are separated from each other based on the complexity of the users and how they use the data present in the database.

- **Database (data) tier:**
  the database resides along with its query processing languages



- **Application (middle) tier:**
  here resides the application server and the programs that access the database. Acts as the mediation between the end users and the database.
- **User (presentation) tier:**
  end users operate on this tier and they know nothing about ~~the~~ any existing database ~~below~~ beyond this layer.

The database system architecture has the following:

1) Storage manager
2) Query processor

When a large database stored in the disk needs to be brought to the main memory for some execution then a large amount of time is wasted in doing so. Therefore, to optimise this, a storage manager is kept.

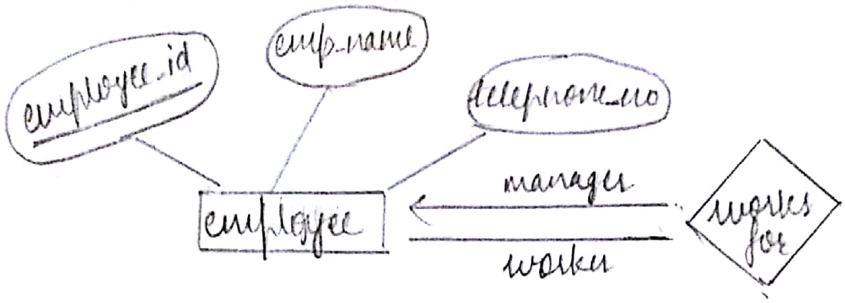
- Authorization & integrity manager.
- Transaction manager
- File manager
- Buffer manager

The query processor breaks up a query into distinct components & creates a step by step process to solve. Here we have the -

- DDL interpreter
- DML compiler
- Query evaluation engine

93. Discuss in detail about the concept of role indicator and cardinality limits in case of an E-R diagram with proper examples.

Ans - To explain the concept of role indicator we consider the following E-R diagram where the manager and the workers are all employees. The relation is 'works-for' as shown below:

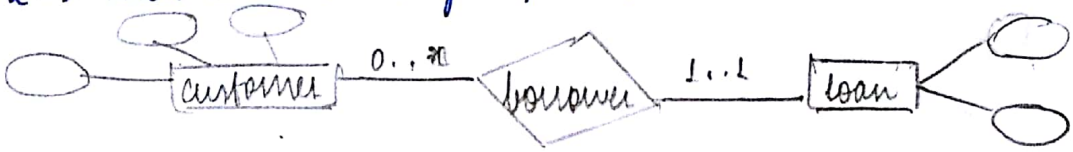


In the above ER diagram, employee_id is the primary key. There is only one manager, hence the arrow whereas there are several ~~customers~~ workers hence no arrow. The employee entity has the 'works for' relationship. e.g. Emp1 is manager i'd and Emp2,3... are all worker ids. Thus the above E-R diagram describes the roles hence acts as the role indicator.

Cardinality limits: shows that how many times an entity in an entity set participates in a relationship.

l : min limit range 0 to *
h : max limit

If l=1 then at least single participation



This shows that customers can have 0 or more no. of loans (0..*) but for one particular loan in the loan entity set there has to be one customer. (1..1) means a loan cannot be shared by customers.