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Grp - 4C7

DATE : 18-05-2021

DBMS assignment

Ques 1. Which database is used in google? How many servers does google own?

Ans Google stores data as Object based Storage in (data + Meta-data + global Identifiers). They uses Distributed File system (storing and reading data across diff servers through same interface) → Google File system
GFS has 3 layers - client, master and chunk servers
database - BigTables (stores petabytes of data)
(row URL, column feature of web page)
features - scalability, distributed master system, fast
(As per 2016 estimate by Gartner)
Google had 2.5 million servers (constantly changing)

Ques 2. When was the first database invented? Name the best 5 databases names used by the companies with their limitations.

Ans First database was invented in 1960s
But As per database history - June, 1970 IBM scientist Edgar F. Codd published the first relational model research paper

(1.) Oracle : Oracle 12c (single / multiple servers)
Enables management of databases.

Cons -
→ Cost is prohibitive, especially for smaller organizations
→ System can require significant resources once installed
So hardware upgrades may be required to implement it.

(2.) MySQL - Organization that needs robust database management tool but are on budget.

· cons - → No built-in support for XML or OLAP

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→ You may spend a lot of time and effort to get My SQL to do things that other system do automatically, like create incremental backups
→ Support is available for free version, but you'll need to pay for it.

(3.) Microsoft SQL Server - Ideal for large organizations that uses no. of microsoft products.

Cons - Enterprise pricing may be beyond what many organization can afford
- Even with performance tuning, Microsoft SQL server can gobble resources
- Many individuals have issues using SQL server integration service to import files.

(4.) PostgreSQL - ideal for organizations with limited budget that want ability to select interface and use JSON

Cons - Documentation can be spotty, leaving space for lot of searching and tweaking.
- Configuration can be confusing
- Speed may suffer during large bulk operations or read queries

(5.) MongoDB.

Cons - SQL is not used as a query language
- Tools to translate SQL to MongoDB queries are available but they add an extra step to using the engine
- Setup can be lengthy process
- Default settings are not secure.

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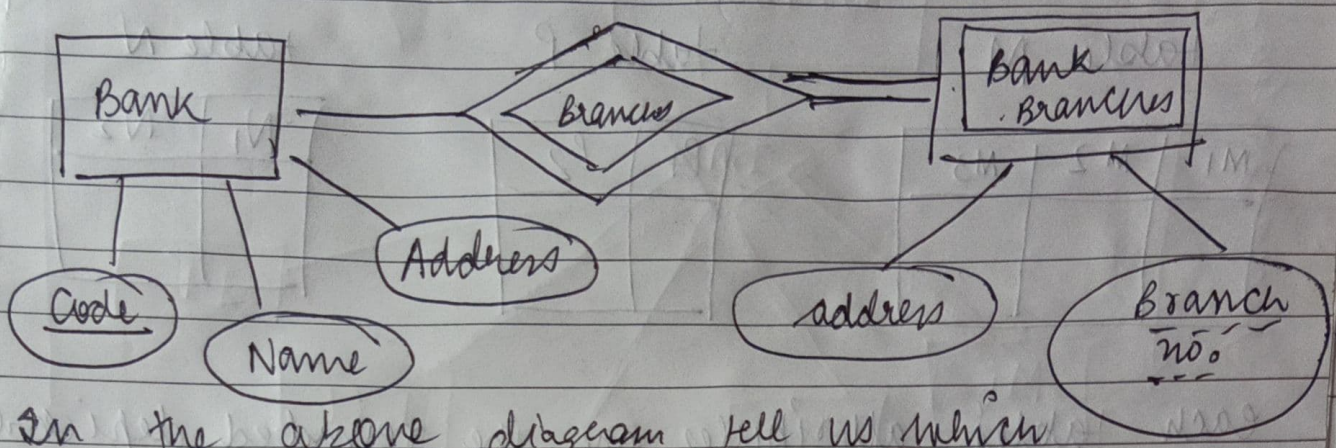
Ans 3. Consider the ER diagram given for Bank Database.



In the above diagram, tell us which is the weak entity, primary key, relationships type, and what does the double line indicate.

→ WEAK ENTITY

Bank Branches is the weak entity

→ PRIMARY KEY

code is the primary key of Bank
Branch no. is partial or discriminatory key

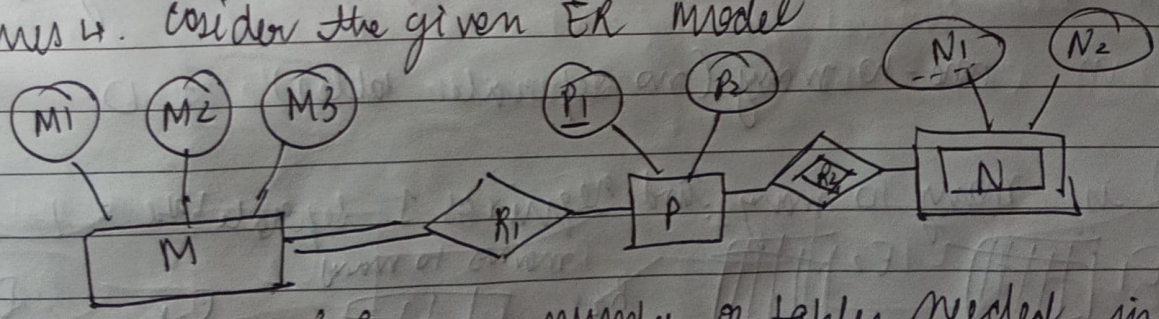
→ relationship type

Bank has a weak relation of Branches with a weak entity Bank branches

→ double line

double line means total participation in its relation (total participation of Bank Branches)

Ans 4. Consider the given ER Model



What is the minimum number of tables needed in the above E-R diagram? Explain the process in detail with tables.

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Ans 3 tables required namely M, P and N

table M

M1	M2	M3

table P

P1	P2

table N

N1	N2

each tables attributes are the rounded depicted attributes from the main square entity.

M, P, N → entities

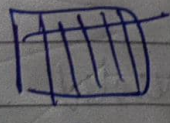
Qus 5. Let E1 and E2 be 2 entities in an ER diagram with single valued attributes R1 and R2 are 2 distinct relationships between E1 and E2, where R1 is one-to-many and R2 is many-to-many. R1 and R2 do not have any attributes of their own. What is the maximum number of tables required to represent this situation in the relational model

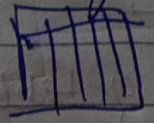
Ans One table for each entity : 2

entity tables → 2 (one table for each entity)

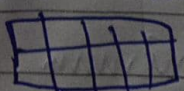
R1 is one-to many (no seperate tables) : 0

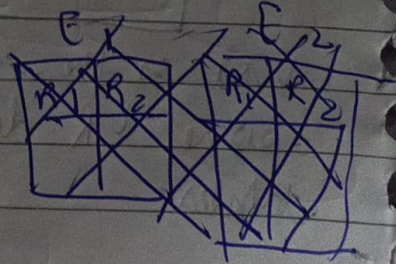
R2 is many to many and requires 1 seprate table : 1





many to many.





Hence, total no. of tables are 3

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Ans6. The following table has 2 attributes A and C where A is the primary key and C is the foreign key referencing A with on-delete cascade.

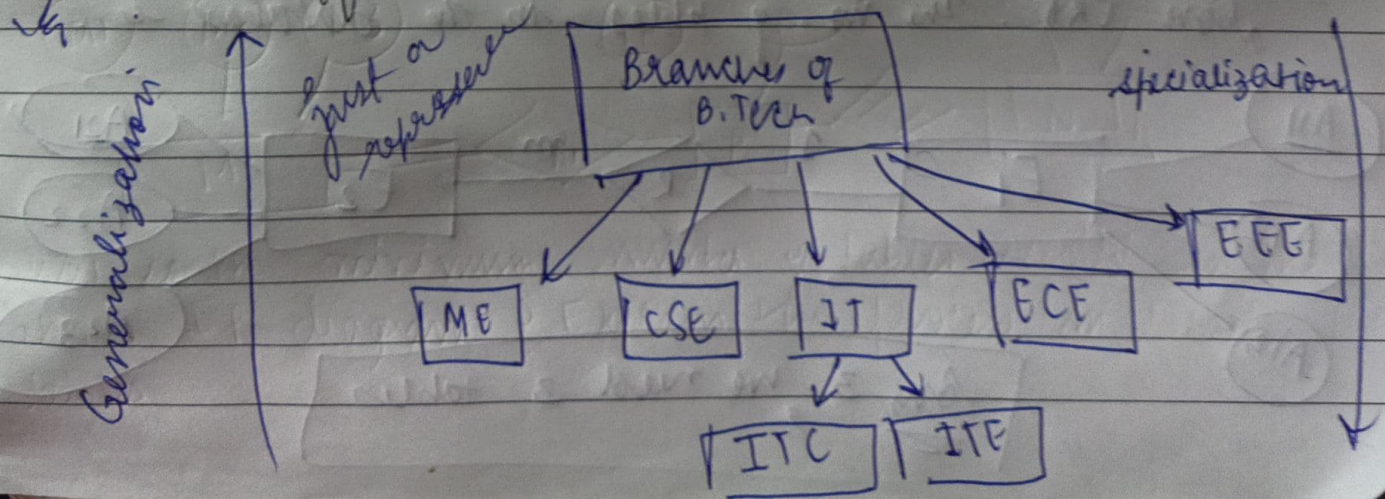
A	C
2	4
3	4
4	3
5	2
7	2
9	5
6	4

The set of all tuples that must be additionally deleted to preserve referential integrity when the tuple 2,4 is deleted is

(5,2), (7,2) and (9,5)

when (2,4) is deleted, since C is a foreign key referring A with delete on cascade, all entries with value 2 in diagram must be deleted on cascade, all entries with the value 2. As a result of this, 5 and 7 are deleted from A which causes (9,5) to be deleted.

Ans7. Suppose students are going to college to take an admission in a particular course let suppose B.Tech and one said that I will choosing ME, so here B.Tech is general but the branch in which they want to enrol is a specialisation. Show this in the form of a diagram showing difference b/w generalization and specialization.



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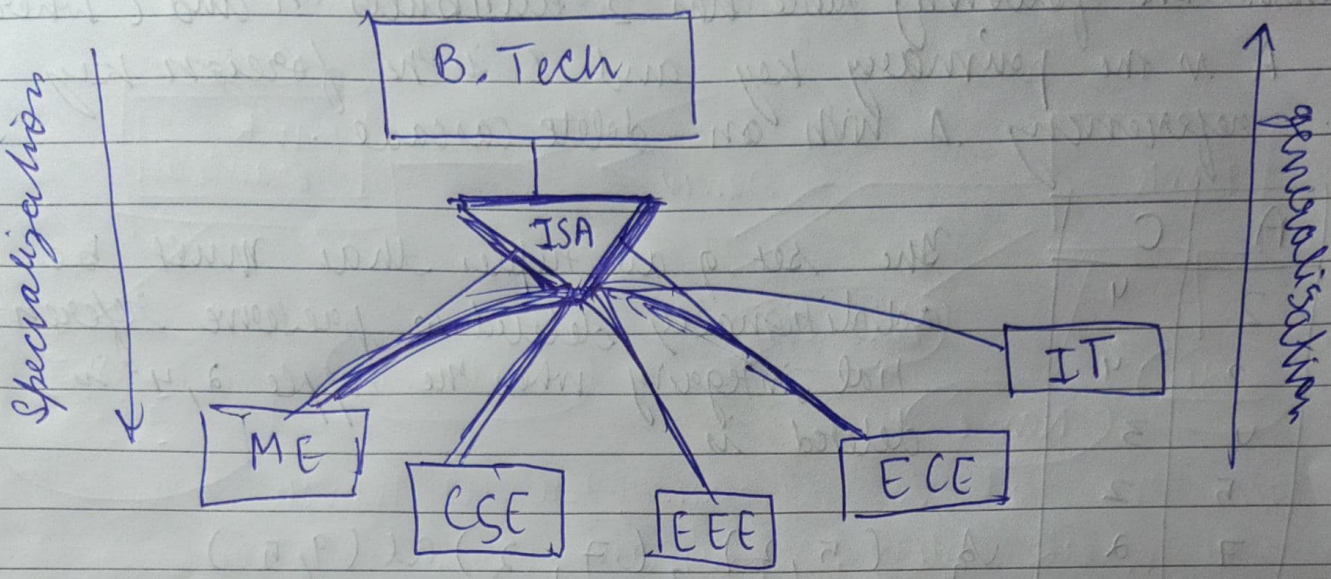
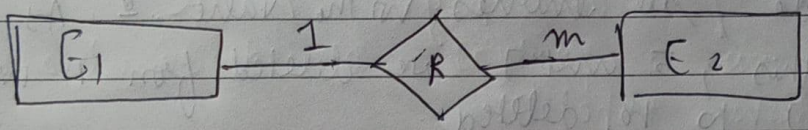
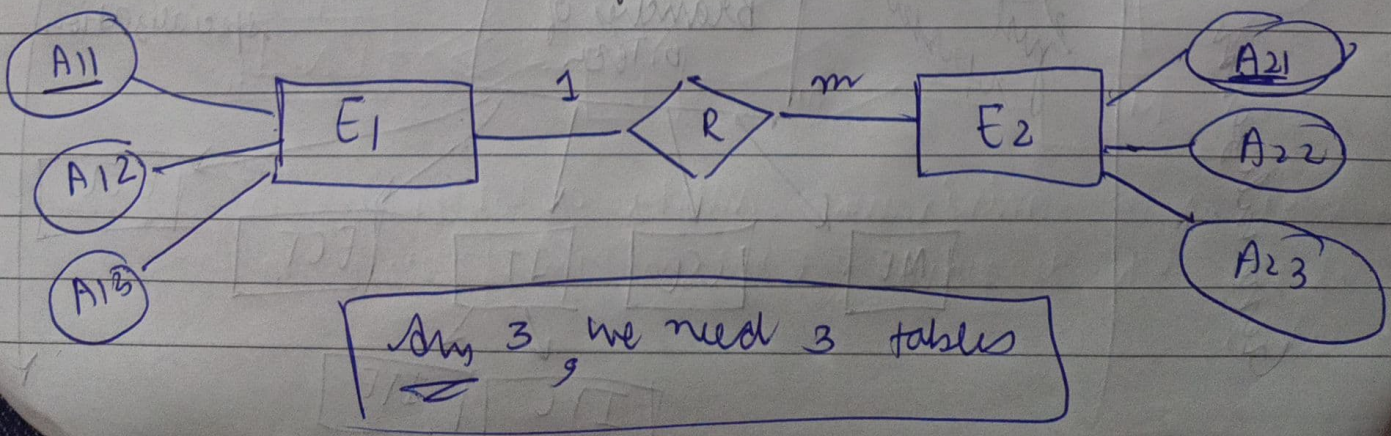


Ans 8. Consider the following entity relationship diagram (ERD), where entities E_1 and E_2 has a relation R of cardinality 1:m



The attributes of E1 are A11, A12 and A13 where A11 is the key attribute.
The attributes of E2 are A21, A22 and A23 where A21 is the key attribute
A relational database consisting minimum number of tables with each table satisfying the requirement of 3rd normal form (3NF) is designed from the above ERD. The no. of tables in the database is



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A we need 2 tables for 1NF

T_1 : { $\underline{A_{11}}$, A_{12} , A_{13} }
T_2 : { $\underline{A_{21}}$, A_{22} , A_{23} , A_{11} }

A_{23} being multivalue , A_{21} , A_{23} becomes the key for T_2 as we need to repeat multiple values corresponding to multivalued attribute to make it 1NF. But , this cause partial FD $A_{21} \rightarrow A_{22}$ and makes the table not in 2NF. In order to make it tables in 2NF we create a seperate table for multivalued attribute. Then we get

T_1 : { $\underline{A_{11}}$, A_{12} , A_{13} }
T_2 : { $\underline{A_{21}}$, A_{22} , A_{11} }
T_3 : { $\underline{A_{21}}$, $\underline{A_{23}}$ }

Here all determinants of all FDs are keys and hence the relation is BCNF and so 3NF also.
There was no transitive functional dependency in all tables so 3 NF

Hence, 3 tables are required