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EXAM TOPIC

What is a Database?

Database is a systematic collection of data. Databases support storage and manipulation of data. Databases make data management easy. Let's discuss few examples. An online telephone directory would definitely use database to store data pertaining to people, phone numbers, other contact details, etc. Your electricity service provider is obviously using a database to manage billing, client related issues, to handle fault data, etc. Let's also consider the Facebook. It needs to store, manipulate and present data related to members, their friends, member activities, messages, advertisements and lot more.

What is a Database Management System (DBMS)?

Database Management System (DBMS) is a collection of programs which enables its users to access database, manipulate data, reporting / representation of data.

Database Management Systems are not a new concept and as such had been first implemented in 1960s. Charles Bachmen's Integrated Data Store (IDS) is said to be the first DBMS in history.

With time database technologies evolved a lot while usage and expected functionalities of databases have been increased immensely.

Types of DBMS

There are 4 major types of DBMS:

- **Hierarchical** - this type of DBMS employs the "parent-child" relationship of storing data. This type of DBMS is rarely used nowadays. Its structure is like a tree with nodes representing records and branches representing fields. The windows registry used in Windows XP is an example of a hierarchical database. Configuration settings are stored as tree structures with nodes.
- **Network DBMS** - this type of DBMS supports many-to many relations. This usually results in complex database structures. RDM Server is an example of a database management system that implements the network model.

- **Relational DBMS** - this type of DBMS defines database relationships in form of tables, also known as relations. Unlike network DBMS, RDBMS does not support many to many relationships. Relational DBMS usually have pre-defined data types that they can support. This is the most popular DBMS type in the market. Examples of relational database management systems include MySQL, Oracle, and Microsoft SQL Server database.
- **Object Oriented Relation DBMS** - this type supports storage of new data types. The data to be stored is in form of objects. The objects to be stored in the database have attributes (i.e. gender, age) and methods that define what to do with the data. PostgreSQL is an example of an object-oriented relational DBMS.

Why it makes sense to learn SQL after NOSQL ?

With the advantages of NOSQL databases outlined above that scale out better than relational models, you might be thinking why one would still want to learn about SQL database?

Well, NOSQL databases are sort of highly specialized systems and have their special usage and limitations. NOSQL suit more for those who handles huge volumes of data. The vast majority, use relational databases and associated tools.

Relational databases have the following advantages over NOSQL databases:

- SQL (relational) databases have a mature data storage and management model. This is crucial for enterprise users.
- SQL databases support the notion of views which allow users to only see data that they are authorized to view. The data that they are not authorized to see is kept hidden from them.
- SQL databases support stored procedure SQL which allow database developers to implement part of the business logic into the database.
- SQL databases have better security models compared to NoSQL databases

TOPIC PLAN:

1. What is a Database
2. What about DMBS
3. Types of DBMS
4. SQL/NoSQL
5. Conclusion

COMPUTER NETWORKING

Computer networking is the engineering discipline concerned with communication between computer systems or devices. Such communicating computer systems constitute a computer network and these networks generally involve at least two devices capable of being networked with at least one usually being a computer. The devices can be separated by a few meters (e.g. via Bluetooth) or nearly unlimited distances (e.g. via the Internet). Computer networking is sometimes considered a sub-discipline of telecommunications, and sometimes of computer science, information technology and computer engineering. Computer networks rely heavily upon the theoretical and practical application of these scientific and engineering disciplines. A computer network is any set of computers or devices connected to each other. Examples of networks are the Internet, a wide area network that is the largest to ever exist, or a small home local area network (LAN) with two computers connected with standard networking cables connecting to a network interface card in each computer. There are two (broad) types of networks in existence at the moment. These are:

Local Area Network (LAN)

A Local Area Network is a network that spans a relatively small space and provides services to a small amount of people. Depending on the amount of people that use a Local Area Network, a peer-to-peer or client-server method of networking may be used. A peer-to-peer network is where each client shares their resources with other workstations in the network. Examples of peer-to-peer networks are: Small office networks where resource use is minimal and a home network. A client-server network is where every client is connected to the server and each other. Client-server networks use servers in different capacities. These can be classified into two types: Single-service servers, where the server performs one task such as file server, print server, etc.; while other servers can not only perform in the capacity of file servers

and print servers, but they also conduct calculations and use these to provide information to clients (Web/Intranet Server). Computers are linked via Ethernet Cable, can be joined either directly (one computer to another), or via a network hub that allows multiple connections.

Wide Area Network (WAN)

A Wide Area Network is a network where a wide variety of resources are deployed across a large domestic area or internationally. An example of this is a multinational business that uses a WAN to interconnect their offices in different countries. The largest and best example of a WAN is the Internet, which is the largest network in the world. A Wide Area Network involves communication through the use of a wide range of different technologies. These technologies include Point-to-Point WANs such as Point-to-Point Protocol (PPP) and High-Level Data Link Control (HLDC), Frame Relay, ATM (Asynchronous Transfer Mode) and Sonet (Synchronous Optical Network). The difference between the WAN technologies is based on the switching capabilities they perform and the speed at which sending and receiving bits of information (data) occur.

Wireless Networks (WLAN, WWAN)

A wireless network is basically the same as a LAN or a WAN but there are no wires between hosts and servers. The data is transferred over sets of radio transceivers. These types of networks are beneficial when it is too costly or inconvenient to run the necessary cables.

Q/A

1. What is a computer network?

Computer networks are an engineering discipline related to communication between computer systems or devices. Such cooperative computer systems constitute a computer network, and these networks typically include at least two devices that can be networked, at least one typically being a computer. Devices can be separated by several meters

(for example via Bluetooth) or by almost unlimited distances (for example via the Internet).

2. What types of networks are currently used?

These are: Local Area Network (LAN)& Wide Area Network (WAN)

A LAN is a network that spans a relatively small space and provides services to a small amount of people. Depending on the amount of people that use a Local Area Network, a peer-to-peer or client-server method of networking may be used.

A WAN is a network in which a large number of resources are deployed in a large internal zone or internationally. An example of this is a multinational business that uses WAN to connect its offices in different countries. The largest and best example of a global network is the Internet, which is the largest network in the world.

3. What about Wireless Network?

A wireless network is basically the same as a LAN or WAN, but there are no wires between hosts and servers. Data is transmitted over sets of radio transmitters. These types of networks are beneficial when laying the necessary cables is expensive or uncomfortable. But while they are significantly losing in speed wired.

4. How does the network work?

Computer networks connect nodes like computers, routers, and switches using cables, fiber optics, or wireless signals. These connections allow devices in a network to communicate and share information and resources.

Networks follow protocols, which define how communications are sent and received. These protocols allow devices to communicate. Each device on a network uses an Internet Protocol or IP address, a string of numbers that uniquely identifies a device and allows other devices to recognize it.

5. Network architecture

There are two types of network architecture: peer-to-peer (P2P) and client/server. In P2P architecture, two or more computers are connected as “peers,” meaning they have equal power and privileges on the network. A P2P network does not require a central server for coordination. Instead, each computer on the network acts as both a client (a computer that needs to access a service) and a server (a computer that serves the needs of the client accessing a service). Each peer makes some of its resources available to the network, sharing storage, memory, bandwidth, and processing power.

GRAMMAR:

- 41. A
- 42. B
- 43. B
- 44. C
- 45. B
- 46. D
- 47. D
- 48. B
- 49. A
- 50. D