MEGA REVISION SERIES DAY 17 FOR BBA BBM BMS BCA COMPUTER DATABASE & SEGURITY

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Database

A Database is a <u>collection of logically related information</u> in an organized way so that it can be easily <u>accessed</u>, managed and <u>updated</u>

Charles Bachman designed the first database known as the Integrated Data Store, followed by the Information Management System developed by IBM.



Fundamentals of Database

For defining database, two terms, which are used frequently with database, should be known as Anything/Energibing => process





• These are raw and unorganized facts that need to be processed.

DATA

e.g. A student's test score is one piece of data.

• When data is processed, organized, structured or presented in context to make it useful or meaningful, it is called information.

INFORMATION

Data

Information

 e.g. The class's average score is the information that can be concluded from the given data



Relational Databases Store => Table

- Relational database organizes its data elements as multiple tables with rows and columns
- Each table column represents a data field, and each row represents a data record (also known as a tuple)



Basic Operations used on Tables

- Create: Adding new records or data to the database.
- Read: Retrieving data from the database.

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- U Update: Modifying existing data in the database.
 - Delete: Removing data from the database.



Queries =) action perform =) Ruenies Database

These are basically questions based on the data available in a database. A query consists of specifications indicating which fields, records and summaries a user wants to fetch from a database. Queries allow you to extract data based on the criteria that you define.

Forms pata collection point

Like tables, forms can be used to view and edit your data. However, forms are typically used to view the data in an underlying table one record at a time.

e.g. A user can create a data entry form that looks exactly like a paper form. People generally prefer to enter data into a well-designed form, rather than a table.





Reports

Query=

When you want to print those records which are fetched from your database, design a report.







Database Management System SQL = Structured Query language

A DBMS is a collection of interrelated data and a set of programs to retrieve data from a database. It is an organised collection of data viewed as a whole, instead of a group of separate unrelated files.

Poimary

The primary goal of DBMS is to provide an environment that is both convenient and efficient for user to store and retrieve database information. MS-Excel Wood Powenpoint Example: MySQL, Oracle, MS-Access MS-Access Microsoft Office

Major Database Software

- · Oracle => most used DBMS
- PostgreSQL = opensource
- · MongoDB Nosal. fables are not used documents, tree
- Redis -
- IBM Db2 18m
- SQLite -- opensource
- Amazon DynamoDB Amazon.
- Google's BigQuery / BigTable / Firebase



DBMS

SQL

tables

NOSQL

nodes

Smiltine.

tree



tiements Atom L

- Atomicity: each statement in a transaction (to read, write, update or delete data) is treated as a single unit. Either the entire statement is executed, or none of it is executed.
- Consistency: ensures that transactions only make changes to tables in predefined, predictable ways. procedure defined.
- **Isolation**: when multiple users are reading and writing from the same table all at once, isolation of their transactions ensures that the concurrent transactions don't interfere with or affect one another.
- **Durability**: ensures that changes to your data made by successfully executed transactions will be saved.



Application of DBMS



- 1. Banking: For customer information, accounts, loans and other banking transactions.
- 2. Reservation: For reservation and schedule information.
- 3. Universities: For student information, course registration, grades etc.
- 4. Sales: For customer, product and purchase information.



Computer Security

Computer security is also known as cyber security or <u>IT security</u>.

Computer security is a branch of information technology known as information security, which is intended to protect computers. It is the protection of computing systems and the data that they store or access.





Methods to Provide Protection

There are four primary methods to provide :

- System Access Control
- Data Access Control
- System and Security Administration
- System Design



System Access Control

It ensures that unauthorized users do not get into the system by encouraging authorized users to be security conscious.

For example, by changing their passwords on a regular basis.



Data Access Control

Read / View
Edit / modify
Owner/Adm/n

It monitors who can access what data, and for what purpose.

Your system might support mandatory access controls with these. The system determines access rules based on the security levels of the people, the files, and the other objects in your system.



System and Security Administration

It performs offline procedures that makes or breaks secure system.











It takes advantage of basic hardware and software security characteristics.

For example, using a system architecture that's able to segment memory, thus isolating privileged process from no privileged processes.



Objectives Computer Security







1. Confidentiality: It ensures that data is not accessed by any unauthorized person.

2. **Integrity**: It ensures that information is not altered by any unauthorized person in such a way that it is not detectable by authorized users.

3. Availability: It ensure that system work promptly and service is not denied to authorized users.

OR

Enabling access to data and resources

Coding becoding.
Cryptography
$$\Rightarrow$$
 Energyption + Decryption
ABCD \longrightarrow #215 \longrightarrow ABCD.

Cryptography is the practice and study of techniques for secure communication in the presence of third parties.

- 1. Plaintext: The original, readable message or data.
- 2. Ciphertext: The encrypted message or data, which is unreadable without the proper key.
- 3. Encryption: The process of converting plaintext into ciphertext.
- 4. Decryption: The process of converting ciphertext back into plaintext.
- Key: A piece of information used in conjunction with an algorithm to encrypt or decrypt data. Keys can be symmetric (same key for encryption and decryption) or asymmetric (different keys for encryption and decryption).



Threats to Computer Security

Computer systems are vulnerable to many threat that can inflict various types of damage resulting in significant losses.

A threat is a potential violation of security and when threat gets executed, it becomes an attack. Those who execute such threats are known as attackers.



Malware

Malware stands for <u>malicious software</u>. It is a broad term that refers to a variety of malicious programs that are used to damage computer system, gather sensitive information, or gain access to private computer systems.

It includes computer viruses, worms, trojan horses, rootkits, spyware, adware etc.

ACADEMY ACADEMY ACADEMY *OR BBA/BBM/BMS

Virus

- Virus stands for VITAL INFORMATION RESOURCE UNDER SIEGE.
- Computer Viruses are small programs that can negatively affect the computer.
- It obtains control of a PC and directs it to perform unusual and often destructive actions.



- Viruses are copied itself and attached itself to programs which further spread the infection.
- The virus can affect or attack any part computer software such as the boot block, operating system, system areas, files and application program.



Worms

A computer worm is a <u>standalone malware computer program</u> which does not requires human intervention and replicates itself in order to spread to other computers.

- Often, it uses a computer network to spread itself relying on security failures on the target computer to access it.
- Unlike a computer virus, it does not need to attach itself to an existing program.
- Worms are hard to detect because they are invisible files.



Effects of Virus

- Monitor what you are doing.
- Slow down your computer's performance.
- Download illegal files onto your computer without you being able to delete them.
- Destroy all data on your local disk.
- Generate IP address randomly and sends those IP address automatically.
- Affect on computer networks and the connection to Internet.
- Steal confidential information like password, account number, credit card information by random e-mailing.
- Damage data files.



Trojan

- A Trojan, or Trojan Horse, is non-self-replicating type of malware which appears to perform a desirable function but instead facilitates unauthorized access to the user's computer system.
- Trojans do not attempt to inject themselves into other files like a computer virus. Trojan Horse may steal information, or harm their host computer systems.
- Trojans may use drive-by downloads or install via online games or Internet-driven applications in order to reach target computers. Unlike viruses, Trojan horse do not replicate themselves
- Example: Zeus Trojan, a banking Trojan designed to steal financial information.
 - And others as Beast, ZeroAccess Rootkit etc.



Spyware

- Spyware is a program which is installed on computer system to spy on the system owners activity and collects all the information which misused afterwards. It tracks the user's behaviour and reports back to a central source.
- These are used for either legal or illegal purpose. Spyware can transmit personal information to another person's computer over the internet.
- Example: Keyloggers



Spyware can harm you in many ways

- Steal your passwords.
- Observe your browsing choices.
- Spawn pop-up windows.
- Send your targeted e-mail.
- Redirect your web browser to phishing pages.
- Report your personal information to distant servers.
- Can alter your computer settings (like web browser, home page settings or the placement of your desktop icons).
- Can affect the performance of your computer system



Some other Threats

Spoofing :

- Spoofing is the technique to access the unauthorized data without concerning to the authorized user. It access the resource over the network.
- It also known as Masquerade.
- Pretends to be legitimate user and gain access via a network.



Some other Threats

Hacking:

- Hacking is the act of intruding into someone else's computer or network.
- It prevents authorised users from accessing the resources of the computer. A hacker is someone, who does hacking process.



Hacking Techniques





Attempting to guess passwords or encryption keys by trying all possible combinations.

SQL Injection:

Exploiting vulnerabilities in web applications to access or manipulate databases.





Hacking Techniques

Man-in-the-Middle (MITM) Attacks:

Intercepting and altering communication between two parties without their knowledge.

Denial-of-Service (DoS) and Distributed Denial-of-Service (DDoS) Attacks:

Overloading a system or network with traffic to make it unavailable to users.



Some other Threats



Cracking tools are widely distributed on the internet. They include password crackers, trojans, viruses, war-dialers, etc.

Some other Threats

Phishing :

- It is characterised by attempting to fraudulently acquire sensitive information such as passwords, credit cards details, etc. by masquerading as a trustworthy person.
- Phishing messages usually take the form of fake notifications from banks providers, e-pay systems and other organisation.
- It is a type of internet fraud that seeks to acquire a user's credentials by deception.




Some other Threats

Spam unwanted muils or trient It is the abuse of messaging systems to send unsolicited bulk messages in the form of E-mails. It is a subset of electronic spam involving nearly identical messages sent to numerous recipients by Emails.



Some other Threats

Adware Innecessary als

It is any software package which automatically renders advertisements in order to generate revenue for its author.

The term is sometimes used to refer the software that displays unwanted advertisements.

Solution of Computer Security Threats

To safe the computer system from unauthorized access and threats, it is necessary to design some safeguards that handles these efficiently.

- Digital Software
- Digital Signature
- 🛫 Firewall
 - Password 、
 - File Access Permission
 - Intrusion Detection System 、
 - Secure Socket Layer(SSL)
 - IP Security Protocol

Firewall Systen internet gatekeepers FIREWALL

- A firewall is a network security device or software that monitors and controls incoming and outgoing network traffic based on predetermined security rules.
 - It acts as a barrier between a trusted internal network and untrusted external networks, such as the internet, to prevent unauthorized access, cyberattacks, and data breaches.
 - Firewalls are a fundamental component of network security and are used in both personal and enterprise environments.



File Access Permission

• File access permissions are rules that determine who can access a file or directory and what actions they can perform (e.g., read, write, execute).

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- These permissions are a fundamental aspect of operating system security, ensuring that only authorized users and processes can interact with files and directories.
- File permissions are commonly used in multi-user systems like Linux, Unix, and Windows.



What is Cyber Security? a) Cyber Security provides security against malware b) Cyber Security provides security against cyberterrorists c) Cyber Security protects a system from cyber attacks All of the mentioned



Who is the father of computer security?
August Kerckhoffs
b) Bob Thomas
c) Robert
d) Charles



Which of the following is an objective of network security? a) Confidentiality b) Integrity c) Availability d) All of the above



Which of the following is a type of cyber attack? a) Phishing b) SQL Injections c) Password Attack All of the above



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Junk E-mail is also called ?

A. Spam
B. Spoof
C. Sniffer script
D. Spool



A person who uses his or her expertise to gain access to other people computers to get information illegally or do damage is a

A. Spammer
B. Hacker
C. Instant messenger
D. All of these



Security Patches

Vendor created program modifications are called ?

A. Patches
B. Anti-viruses
C. Hales
D. Fixes



A hacker contacts your phone or E-mails and attempts to acquire your password is called.

A. Spoofing D. Phishing C. Spamming D. Buging



The phrase describes viruses, worms, trojan horse attack applets and attack scripts.

A. Malware B. Spam C. Phishing D. Virus



A malware is a

(a) program
(b) hardware
(c) person
(d) None of these



It is a self-replicating program that infects computer and spreads by inserting copies of itself into other executable code or documents.

(a) Keylogger
(b) Worm
(c) Virus
(d) Cracker



The first computer virus is (a) Creeper (b) PARAM (c) The famous (d) HARLIE



- The Creeper virus is considered the first computer virus. It was created in the early <u>1970s</u> as an experimental program by Bob Thomas.
- Creeper infected computers running the <u>TENEX</u> operating system and displayed the message: "I'm the creeper, catch me if you can!"
- It spread through ARPANET, the precursor to the modern internet.



Which of the following is the type of software that has self-replicating software that causes damage to files and system?

(a) Viruses

(b) Trojan horses

(c) Bots



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Masquerading is also known as (a) phishing (b) spam (c) spoofing (d) hacking



Which of the following is a type of malware? A. Antivirus B. Firewall C. Router D. Spyware



What is purpose of a firewall?

A. To protect against viruses
B. To block unwanted traffic
C. To speed up internet connection.
D. To monitor internet usage



Which of the following is not a type of computer virus?

A. Trojan Horse
B. Worm
C. Spyware
D. VMware



A hacker that changes or forges information in an electronic resource, is engaging in _____.

- A. Denial of service
- B. Sniffing
- C. Terrorism
- D. Data Diddling



What is the function of a firewall?



Which of the following is a type of malware?

- A. Trojan •
- B. Router
- C. Switch `
- D. Hub



A computer checks the _____ of username and password for a match before granting access. A. Website B. Network C. Backup file D. Database



What is a database?

a) Organized collection of information that cannot be accessed, updated, and managed
b) Collection of data or information without organizing
c) Organized collection of data or information that can be accessed, updated, and managed
d) Organized collection of data that cannot be updated



Who created the first DBMS? a) Edgar Frank Codd b) Charles Bachman c) Charles Babbage d) Sharon B. Codd



In which of the following formats data is stored in the database management system? a) Image b) Text c) Table d) Graph



Which of the following is not an example of DBMS? a) MySQL b) Microsoft Acess c) IBM DB2 d Google - Scarch Engine



Which of the following is not a feature of DBMS? a) Store large amount of interconnected data b) High Level of Security c) Single-user Access only d) Support ACID Property



What does an RDBMS consist of?
a) Collection of Records
b) Collection of Keys
c) Collection of Tables
d) Collection of Fields



The DBMS acts as an interface between ______and _____of an enterprise-class system. a) Data and the DBMS b) Application and SQL c) Database application and the database d) The user and the software



Which of the following is a database management system? A. MySQL B. Windows C. Python D. JavaScript visit: updatestoday.in

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