

Database Management System (DBMS)

What is Database?

Database is a collection of related data organized for rapid search and retrieval. It can also be defined as a structural collection of data about an entities.

Definition of Database Management System(DBMS)

DBMS (Data Base Management System) is the application software that controls the data in the database, including overall organization, storage, retrieval, security and data integrity.

Database Management System (DBMS) can also be defined as a software for storing and retrieving users' data while considering appropriate security measures. It consists of a group of programs which manipulate the database.

Examples of DBMS packages are:

Dbase, Rbase, MS Access, Oracle, Paradox, SQL Server, SyBase, FOXPRO, IBMS, and System 2000.

Application of DBMS

Below are the popular applications of DBMS:

Sector	Use of DBMS
Banking	For customer information, account activities, payments, deposits, loans, etc.
Airlines	For reservations and schedule information.
Schools	For student information, course registrations, colleges and grades.

Telecommunication	It helps to keep call records, monthly bills, maintaining balances, etc.
Finance	For storing information about stock, sales, and purchases of financial instruments like stocks and bonds.
Sales	Use for storing customer, product & sales information.
Manufacturing	It is used for the management of supply chain and for tracking production of items. Inventories status in warehouses.
HR Management	For information about employees, salaries, payroll, deduction, generation of paychecks, etc.

Types of DBMS

Four Types of Database Management System are:

1. Hierarchical database
2. Network database
3. Relational database
4. Object-Oriented database

Hierarchical DBMS

In a Hierarchical database, model data is organized in a tree-like structure. Data is Stored Hierarchically (top down or bottom up) format. Data is represented using a parent-child relationship. In Hierarchical DBMS parent may have many children, but children have only one parent.

Network Model

The network database model allows each child to have multiple parents. It helps you to address the need to model more complex relationships like as the orders/parts many-to-many relationship. In this model, entities are organized in a graph which can be accessed through several paths.

Relational model

Relational DBMS is the most widely used DBMS model because it is one of the easiest. This model is based on normalizing data in the rows and columns of the tables. Relational model stored in fixed structures and manipulated using SQL.

Object-Oriented Model

In Object-oriented Model data stored in the form of objects. The structure which is called classes which display data within it. It defines a database as a collection of objects which stores both data member's values and operations.

Advantages of DBMS

DBMS offers a variety of techniques to store & retrieve data

1. DBMS serves as an efficient handler to balance the needs of multiple applications using the same data
2. Uniform administration procedures for data
3. Application programmers never exposed to details of data representation and storage.
4. A DBMS uses various powerful functions to store and retrieve data efficiently.
5. Offers Data Integrity and Security
6. The DBMS implies integrity constraints to get a high level of protection against prohibited access to data.
7. A DBMS schedules concurrent access to the data in such a manner that only one user can access the same data at a time
8. Reduced Application Development Time

Disadvantage of DBMS

DBMS may offer plenty of advantages but, it has certain flaws-

1. Cost of Hardware and Software of a DBMS is quite high which increases the budget of your organization.
2. Most database management systems are often complex systems, so the training for users to use the DBMS is required.
3. In some organizations, all data is integrated into a single database which can be damaged because of electric failure or database is corrupted on the storage media
4. Use of the same program at a time by many users sometimes lead to the loss of some data.
5. DBMS can't perform sophisticated calculations

Basic Terminologies

1. **Field:** A field is a specific item of information containing a homogenous set of values throughout the table. Fields appear as columns in a table and as cells in a form.
2. **Record:** an individual listing of related information consisting of a number of related fields stored in a table. A record is also called a row in the datasheet.
3. **File:** this is a collection of records, for example a school database.
4. **Primary Key:** a field in a table whose value is uniquely identifies each record in the table.
5. **Foreign keys:** foreign key used to create relationships between tables.
6. **Object:** An object is a component of a database, such as a table, query, form, or report
7. **Query:** Query is a request for a particular collection of data in a database.
8. **Report:** a formatted collection of information organized to provide printed data on a specific subject.
9. **Form:** A form is a window or screen that contains numerous fields, or spaces to enter data
10. **Table:** In database a table is where all the data in a database is stored.

Features of Database Format

- i. Files are designed as table
- ii. Tables comprise of rows and columns
- iii. Row contains related information about a record
- iv. Column contains specific type of information a field.

Basic Operations on Already created Database

- i. Searching
- ii. Modifying
- iii. Sorting
- iv. Reporting
- v. Selecting
- vi. Inserting, etc

COMPUTER ETHICS

What is Computer Ethics?

Ethics could be defined as a set of moral principles that govern the behaviour of a group or individual. Computer ethics is, therefore, a set of moral principles that govern and regulate the use of computers. Some ethical issues that will be discussed here include: how to take care of a computer room/laboratory, and rules and regulations guiding a computer laboratory.

Legal Issues

Legal issues are number of issues related to the use and misuse of ICT and its related fields.

Some common issues of include:

1. Intellectual property right: Intellectual property refers to creations of the mind. A right that is had by a person or by a company to have exclusive rights to use its own plans, ideas, or other intangible assets without the worry of competition, at least for a specific period of time. These rights can include copyrights, patents, trademarks, and trade secrets
2. Piracy: Software piracy is the illegal copying, distribution, or use of software. etc

Privacy concerns in computer ethics

Issues about the computer system deals with hardware and software. The computer system makes duplication and distribution of software easy and simple. As a result, there are ethical issues that protect privacy and intellectual properties of owners.

- It is unlawful to hack into another person's computer or network. **Hacking** is a means of gaining unauthorized access to another person's computer or network. To prevent hacking, things like anonymity and data protection are put in place. **Anonymity** is a system that protects and hides the information or identity of users of an application. **Data protection** is a system put in place to secure and protect data and information from unauthorized access.

- It is unlawful to distribute malware that invades a person's computer and steals private information. [Computer malware](#) is software that destroys, deletes, or steals information from another computer or network.
- In computer ethics, copyright law is put in place to protect the intellectual properties of owners from being stolen. This law gives the proprietary rights to owners to publish and distribute their invention such that others are not permitted to do so.
- Software licensing is used to grant permission to others to use someone's invention. Therefore, when someone creates an app, you may require licensing to use such an app. In computer ethics, there are different kinds of [software licensing](#) including proprietary and LGPL.
- In computer ethics, piracy and cracking of software are prohibited. Piracy is when someone uses commercial software by means of by-passing payment for it. Cracking is the same as piracy, It is a means of using malware to break the licensing security of software. It has a lot of disadvantages including loss of revenue to owners.

Social issues

In computer ethics, there are social concerns which affects computer usage. There are responsible and abusive ways of using the computer, especially the internet which students must learn.

Responsible ways to use the internet

Students should use the internet for the following responsible operations:

1. To check and reply to emails. Students should check their emails regularly and always politely respond to important emails.
2. Students should use chat platforms to chat with friends and colleagues on topical issues relating to education. They can collaborate online to do assignments as well as solve technical problems.
3. Students should use the internet to research for personal, scientific and technical problems bothering all issues of life. For example, you can research how to prevent malaria, hepatitis, etc.
4. Students can collaborate with others in network group sites to learn from each other. Such sites as school website platform.

5. Students should not open unknown emails (emails from an unknown source), especially emails with attachment. Some of such emails are viruses in disguise, by opening them, the computer can be infected.
6. Always ensure your privacy is protected on the internet. Do not use credit cards on untrusted websites, do not register your data (email, name, telephone, etc) on untrusted websites.
7. Avoid downloading free software, except a trusted company or website.

Misuse of the computer and Internet

The student should avoid doing any of the following when using the computer and the internet:

1. When using the internet, avoid hacking other people's privacy. Always be honest in your dealings with people.
2. Do not spread computer viruses on the internet. Always ensure that you scanned your files for viruses before sharing them with people.
3. Do not send fraudulent emails to people, and always ensure that you are not using the internet as a medium to commit fraud.
4. Do not watch pornography on the internet. It is a waste of time and resources.
5. When researching on the internet, always acknowledge the source of your document to avoid committing plagiarism. Plagiarism is academic stealing, as a student, always avoid it.
6. Do not use or download pirated software on the internet. Also, do not attempt to crack original software or use cracked software. It is piracy and stealing someone's resources.
7. Do not get involved or allow yourself to be used in cyber warfare. According to RAND, cyber warfare could be defined as the actions by a nation-state or international organization to attack and attempt to damage another nation's computers or information networks through, for example, computer viruses or denial-of-service attacks. It is a criminal offense.

Responsible Ways of using the Computer

As a [computer user](#), you should always do the following to ensure that your computer is working properly.

1. Dust your computer properly every morning and avoid clustering of dust on the keyboard and screen your computer.

2. To appropriately prevent the clustering of dust on your computer, you can use a dust cover to cover your desktop computer after each day's use.
3. Ensure that you connect your computer to a good power source. Always protect your computer from power surges and spikes by using UPS (Uninterruptible Power Supply) and surge protection equipment.
4. Appropriately shut down your computer after use, please do not turn off (switch off) your computer from the power button, except if your power button is configured to shut down when it is pressed.
5. When using a notebook computer, always avoid using the system until the battery is completely down and turns off by itself. Shut down your notebook computer when the battery level reaches the critical level (say 5%). It will help extend your battery's life.
6. Do not pour liquids on your computer system. You can clean your system with a wet cloth, but make sure that it is completely unplugged from the power source. Also, make sure that the system is completely dry before connecting it to a power source.
7. Unplug your computer from the power source after each day's use.
8. Ensure that your antivirus software is updated on a regular basis, say, on a daily basis or at most on a weekly basis.
9. Avoid sharing files from your computer when you do not have updated antivirus software on your system.

Computer Room/Laboratory Rules and Regulations

For students, the following computer ethics are necessary to implement.

1. Students should not enter the lab unless granted access.
2. Diskettes and flash drives should be scanned before use.
3. All problems related to the system should be reported to the teacher.
4. No student should attempt to repair a system with the laboratory equipment.
5. Use all equipment and software in the lab responsibly.
6. Arrange chairs and tables in a comfortable manner.
7. Do not move any equipment and facility from its original position.
8. Arrange the computers and their peripherals in an orderly manner.
9. Do not install or remove any software from any system.
10. Do not change the settings in the computer system.

11. Save all work in an external storage device or the location specified by the teacher on the computer.
12. Do not bring bags, foods, and drinks into the laboratory.
13. Shut down the computer properly and turn off other equipment after use.
14. Turn off all power supplies before leaving the laboratory.
15. Internet facilities are strictly for educational purposes only.
16. The computer lab should be kept clean always.
17. All users of the computer lab should keep a record of a logbook.
18. There should be no illegal copying of any materials.
19. Sound levels should be kept to the barest minimum.

Managing the Computer Laboratory

1. The computer laboratory and environs should be dust-free.
2. Computer systems should be kept dust-free at all times.
3. There should be adequate ventilation in the laboratory.
4. The lighting system in a computer laboratory should be adequate.
5. The computer systems should be orderly arranged to enhance free movement.

Human Issues Safety Measures

Health Safety Measures

The following health and safety measure should be taken when using the computer.

1. Ensure that the computer room is well illuminated.
2. Always position your monitor to minimize glare and reflections on the screen. Make adjustment from time to time, if necessary.
3. Use antiglare protector on your screen.
4. Do not work on a screen for a long time without taking a break. It may affect your eyes, especially, make your eyes feel tired or sore.
5. Adjust the position of your chair to ensure you have a suitable viewing distance and posture. It is recommended that the screen should be somewhere between eighteen and thirty inches away from you.
6. It is recommended that you keep your upper body as relaxed as possible and avoid overstretching your wrists and fingers. Also, your forearms should be roughly horizontal and your elbows level with the keyboard or the mouse.

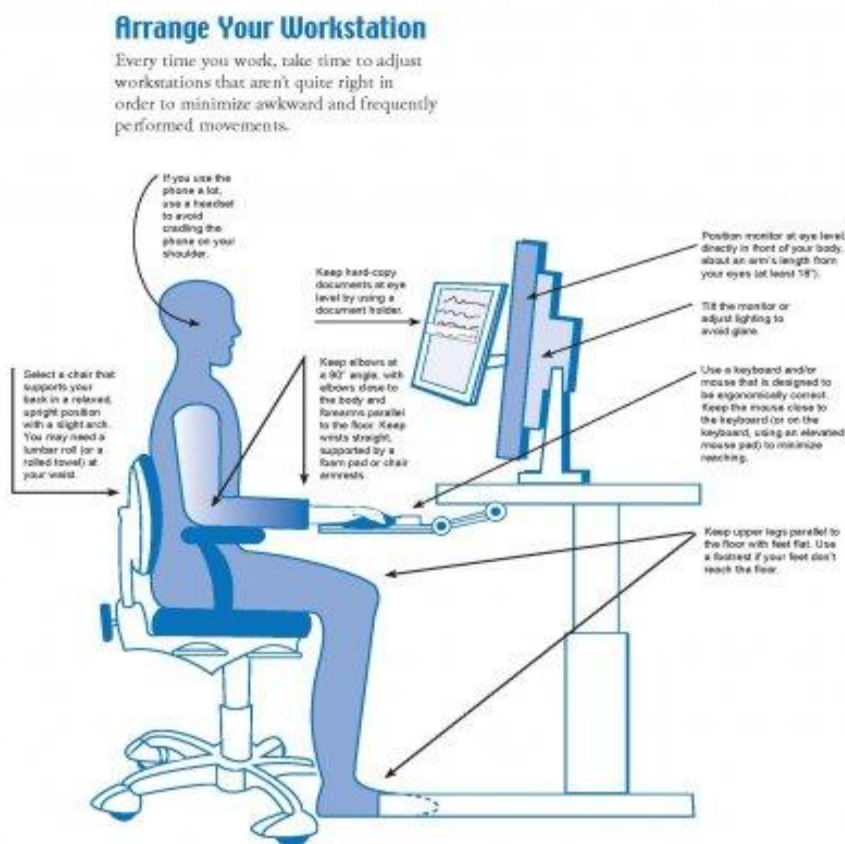
7. Always take a break intermittently while working on the screen. Short, frequent breaks of thirty seconds to two minutes after twenty or thirty minutes of continuous work with the screen and keyboard are recommended that a fifteen-minute break every two hours.

What is Computer Ergonomics?

Ergonomics is a field of study that attempts to reduce strain, fatigue, and injuries by improving product design and workspace arrangement. The goal is to provide comfortable, relaxed posture.

Why computer ergonomics?

Many people spend hours a day in front of a computer without thinking about the impact on their bodies. They physically stress their bodies daily without realizing it by extending their wrists; slouching, sitting without foot support and straining to look at poorly placed monitors



The Computer Ergonomics in place