COMP-231

AGRI-INFORMATICS

LECTURE-01

INTRODUCTION TO COMPUTERS

DEFINITION

A computer can be defined as an electronic device capable of processing the data and producing information.

Classification of computers

Computers are classified as follows:

Super computer

The biggest in size, the most expensive in price than any other is classified and known as super computer. It can process trillions of instructions in seconds. Governments specially use this type of computer for their different calculations and heavy jobs. Different industries also use this huge computer for designing their products. In most of the Hollywood's movies it is used for animation purposes. This kind of computer is also helpful for forecasting weather reports worldwide.

Mainframes

Another giant in computers after the super computer is Mainframe, which can also process millions of instruction per second and capable of accessing billions of data. This computer is commonly used in big hospitals, air line reservations companies, and many other huge companies prefer mainframe because of its capability of retrieving data on a huge basis.

Minicomputer

This computer is next in the line but less offers less than mainframe in work and performance. These are the computers, which are mostly preferred by the small type of business personals, colleges, etc.

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Notebook computers

Having a small size and low weight the notebook is easy to carry to anywhere. A student can take it with him/her to his/her school in his/her bag with his/her book. This is easy to carry around and preferred by students and business people to meet their assignments and other necessary tasks. The approach of this computer is also the same as the Personal computer. It can store the same amount of data and having a memory of the same size as that of a personal computer.

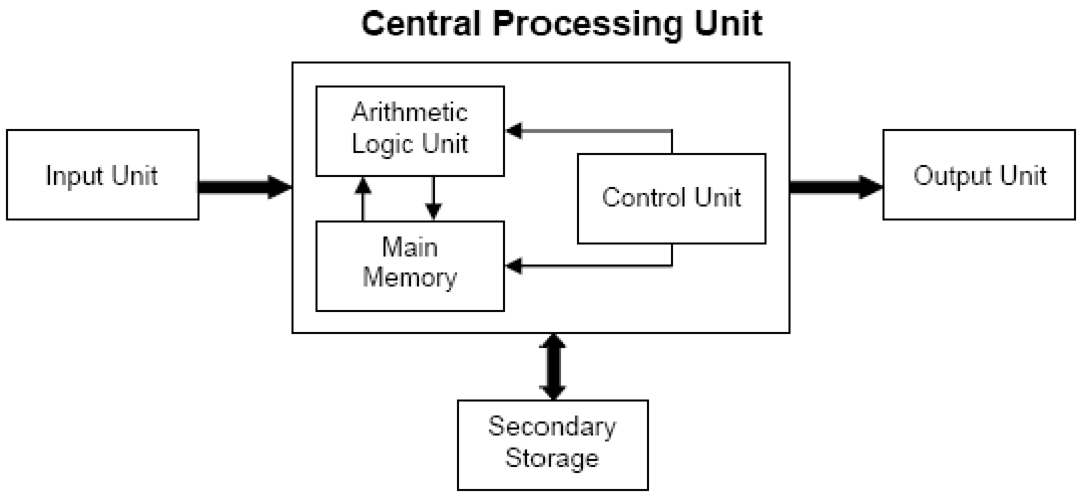
Components of computer

The computer systemessentially comprises three important parts

1.input device,
2.central processing unit (CPU) And
3.output device.

The CPU itself is made of three components namely,
1.
arithmetic logic unit (ALU),
2.
memory unit, and
3.
control unit.

Components of a computer system



On broad basis, a computer performs the following tasks:
Input:
Sending the data and command to the computer is known as input.
Processing:
Work done by the computer with the help of processing hardware and

software to
produce results is known as processing.
Output:
The result displayed by the computer is known as output.
Storage:
A place to save result inside or outside the computer is known as storage.

Anatomy of Computers

The following are the parts of a desktop computer.

Power Supply

When you plug your power cable into your computer, you are actually plugging into a socket in the power supply unit that has been fitted inside your case. This component is responsible for converting the 240 volt AC mains power to low voltage DC power needed by computer components.

Monitor

Commonly known as a "screen," the monitor gives you a visual display of what your computer is up to. Monitor displays are divided into pixels

Mother board

The mainboard I which is sometimes called a motherboard. This is usually the largest circuit-board in the computer, and every other component in the computer connects to it.

Central Processing Unit

The Central Processing Unit (CPU)is usually called either a CPU or just a Processor. The CPU is the brain of the system It executes all the programcode fromthe operating systemand the applications the user runs and processing of data. It sends CPU commands to direct the actions of all the other components in the computer.

Main Memory or RandomAccess Memory (RAM)

RAM, which stands for RandomAccess Memory, is the short termmemory that the computer uses to keep track of what it's doing. If the computer loses power, anything stored in RAM is lost.

Storage Device

Computer storage device is any type of hardware that stores data. The most common type of storage device, which nearly all computers have, is a hard drive

INPUT AND OUTPUT DEVICES

Input Devices

Input device is a hardware device that sends information to the computer.

Mouse

Mouse is a pointer device.The mouse allows an individual to control a pointer in a graphical user in (GUI). Utilizing a mouse a user has the ability to perform various functions such as opening a progra and does not requirere the user to memorize commands.

Digital camera

A type of camera that stores the pictures or video it takes in electronic format instead of to film

Web Cam

A camera connected to a computer that allows anyone connected to the Internet to view still pict motion video of a user.

Joystick

A computer joystick allows an individual to easily navigate an object in a game such as navigating a flight simulator

Keyboard

One of the main input devices used on a computer, a computer keyboard looks very similar to the keyboards of electric typewriters, with some additional keys

Microphone

Sometimes abbreviated as mic, a microphone is a hardware peripheral that allows computer users to input audio into their computers.

Scanner

Input device that allows a user to take an image and/or text and convert it into a digital file, allowing the computer to read and/or display the scanned object

Output Device

Monitor
A monitor is a video display screen. Monitor is also called as Visual Display Unit (VDU) or Video Display Terminal (VDT).

Printer
A printer is an output device responsible for taking computer data and generating a hard copy of that data

Projector
Speakers etc… .
Objectives of computers

- **Learn Basic Computer Terminology**
- **Difference Between Hardware and Software**
- **Understanding Computer Components**
- **Basic Keyboard and Mouse Usage**
- **Proper Care For your PC**

SOFTWARE

Software is defned as Organised information in the formof operating systems,programs,and applications tat enable compters to work.

Types of Software

1.Systemsoftware
2.Application software

1.systemsoftware:
The software that directy operates computer hardware to provide basic functionality by users and other software and to provide a platform for running application software.

SYSTEMSOFTWARE INCLUDES:

1. Operating system
2. Device drivers
3. firmware
4. programme language translators
5. Utilies

2.APPLICATION SOFTWARE:
It is programor collection of programs sed by a end users.

TYPES OF APPLICATION SOFTWARES
There are several number of application softwares they are

1.application suite eg;Microsoft office
2.Word processing software eg;Ms word ,notepad
3.database software eg;oracle,Ms access

4.sppread sheet software e g;excel

5.multimedia software eg : media player,real player

6.content access software eg:web browsers

FIRMWARE

Firmware is the data that is stored in a computer or other hardware devices that provide instructions on how that device works.

LECTURE NO: 02

DTATA REPRESENTATION

DATA:

Collection of facts and figures is call as data.

TYPES OF DATA

There are two types of data

1. Numeric data
2. Character data

1. NUMERC DATA

Data that consists of onlynumbers is called numeric data.

TYPES OF NUMERC DATA

1.INTEGER DATA eg:253,+89,-77 etc… ..

2.real data

- fixed point data :it includes digits decimal points' +or – signs

Eg:+5.9926, .6637 etc… ..

CHARACTER DATA

IT INCLUDES STRING DATA AND GRAPHCA DATA

STRING DATA:

Alphabet data: data used ony alphabet eg:ali,kashi ,

Alphanumeric data:data used both alphabets and numerical

Eg:DC18 ,EEE 101 ETC… .

DATA REPRESENTATION

Data is represented in a computer using binary value of 0&1 And also explain such As bnary number system,octal numbering system, hexa decimal numbering system

This unit also describes how to represent various other characters such as EBCDIC,ASCII etc… ..

•The most basic unit of information in a digital computer is called a *bit*, which is a contraction of *binary digit*.

•Eight-bit bytes can be divided into two 4-bit halves called *nibbles*

•collection of 8 bits a *byte*

Some commonly used terms in data representation are

*BITS

*NIBBLE

*BYTES

*WORD

NUMBERING SYSTEM

A Numbering systemis a set of symbols used to represent vaues derived froma common base or radix .

TYPES OF NMBERING SYTEMS

1. **POSITIONAL NUMBERING SYSTEMS**

   There are few symbols called digits.

The general idea behind positional numbering systems is that a numeric value is represented through increasing powers of a *radix* (or base).

The set of valid numerals for a positional numbering systemis equal in size to the radix of that system For example, there are 10 digits in the decimal system, 0 through 9, and 3 digits for the ternary (base 3) system, 0, 1, and 2. The largest

valid number in a radix systemis one smaller than the radix, so 8 is not a valid

numeral in any radix systemsmaller than 9. To distinguish among numbers in different

radices, we use the radix as a subscript, such as in 33_{10} to represent the decimal

number 33. (In this book, numbers written without a subscript should be

assumed to be decimal.) Any decimal integer can be expressed exactly in any

other integral base system(see Example 2.1).

EXAMPLE 2.1 Three numbers represented as powers of a radix.

$243.51_{10} = 2 \_ 10_{2} + 4 \_ 10_{1} + 3 \_ 10_{0} + 5 \_ 10_{\_1} + 1 \_ 10_{\_2}$

212_3 = 2 _ 3_2 + 1 _ 3_1 + 2 _ 3_0 = 23_{10}

10110_2 = 1 _ 2_4 + 0 _ 2_3 + 1 _ 2_2 + 1 _ 2_1 + 0 _ 2_0 = 22_{10}

2. Non positional numbering system

In this systemwe have symbols such as I for 1. It is very difficult to performarthemietic with such a number system

Different encoding schemes

EBCDIC

Before the development of the IBMSystem/360, IBMhad used a 6-bit variation of BCD for representing characters and numbers. This code was severely limited in how it could represent and manipulate data; in fact, lowercase letters were not part of its repertoire. The designers of the System/360 needed more information processing capability as well as a uniformmanner in which to store both numbers and data. In order to maintain compatibility with earlier computers and peripheral equipment, the IBMengineers decided that it would be best to simply expand BCD from6 bits to 8 bits. Accordingly, this new code was called *Extended* Binary Coded Decimal Interchange Code (EBCDIC). IBMcontinues to use

EBCDIC in IBM mainframe and midrange computer systems. The EBCDIC code is shown in Figure 2.6 in zone-digit form Characters are represented by appending digit bits to zone bits. For example, the character *a* is 1000 0001 and the digit *3* is 1111 0011 in EBCDIC. Note the only difference between upper- and lowercase characters is in bit position 2, making a translation fromupper- to lowercase (or vice versa) a simple matter of flipping one bit. Zone bits also make it easier for a programmer to test the validity of input data.

ASCII

While IBM was busy building its iconoclastic System/360, other equipment makers were trying to devise better ways for transmitting data between systems. The *American Standard Code for Information Interchange* (*ASCII*) is one outcome of these efforts. ASCII is a direct descendant of the coding schemes used for decades by teletype (telex) devices.

To allow compatibility with telecommunications equipment, computer manufacturers gravitated toward the ASCII code. As computer hardware became more reliable, however, the need for a parity bit began to fade.

Unicode

Both EBCDIC and ASCII were built around the Latin alphabet. As such, they are restricted in their abilities to provide data representation for the non-Latin alphabets

used by the majority of the world’ s population. As all countries began using computers, each was devising codes that would most effectively represent their native languages. None of these were necessarily compatible with any others, placing yet another barrier in the way of the emerging global economy.

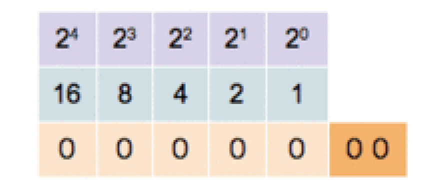
In 1991, before things got too far out of hand, a consortiumof industry and public leaders was formed to establish a new international information exchange code called Unicode. This group is appropriately called the Unicode Consortium

Unicode is a 16-bit alphabet that is downward compatible with ASCII and the Latin-1 character set. It is conformant with the ISO/IEC 10646-1 international alphabet. Because the base coding of Unicode is 16 bits, it has the capacity to encode the majority of characters used in every language of the world. If this weren’t enough, Unicode also defines an extension mechanismthat will allow for the coding of an additional million characters. This is sufficient to provide codes for every written language in the history of civilization.

Binary numbering system

Binary number system, in mathematics, positional numeral systememploying 2 as the base and so requiring only two different symbols for its digits, 0 and 1, instead of the usual 10 different symbols needed in the decimal system The numbers from0 to 10 are thus in binary 0, 1, 10, 11, 100, 101, 110, 111, 1000, 1001, and 1010. The importance of the binary systemto information theory and computertechnology derives mainly fromthe compact and reliable manner in which 0s and 1s can be represented in electromechanical devices with two states—such as “on-off,” “open-closed,” or “go–no go.”

Binary counting[edit]



2^4	2^3	2^2	2^1	2^0	
16	8	4	2	1	
0	0	0	0	0	00

This counter shows how to count in binary fromnumbers zero through thirty-one.

Binary counting follows the same procedure, except that only the two symbols *0* and *1* are available. Thus, after a digit reaches 1 in binary, an increment resets it to 0 but also causes an increment of the next digit to the left:

> 0000,
>
> 000**1**, (rightmost digit starts over, and next digit is incremented)
>
> 00**1**0, 0011, (rightmost two digits start over, and next digit is incremented)
>
> 0**1**00, 0101, 0110, 0111, (rightmost three digits start over, and the next digit is incremented)
>
> **1**000, 1001, 1010, 1011, 1100, 1101, 1110, 1111 ...

In the binary system, each digit represents an increasing power of 2, with the rightmost digit representing 2^0, the next representing 2^1, then 2^2, and so on. The equivalent decimal representation of a binary number is sumof the powers of 2 which each digit represents. For example, the binary number 100101 is converted to decimal formas follows:

$$100101_2 = [\,(\mathbf{1}) \times 2^5\,] + [\,(\mathbf{0}) \times 2^4\,] + [\,(\mathbf{0}) \times 2^3\,] + [\,(\mathbf{1}) \times 2^2\,] + [\,(\mathbf{0}) \times 2^1\,] + [\,(\mathbf{1}) \times 2^0\,]$$

$$100101_2 = [\,\mathbf{1} \times 32\,] + [\,\mathbf{0} \times 16\,] + [\,\mathbf{0} \times 8\,] + [\,\mathbf{1} \times 4\,] + [\,\mathbf{0} \times 2\,] + [\,\mathbf{1} \times 1\,]$$

$$\mathbf{100101_2 = 37_{10}}$$

Hexadecimal

Main article: Hexadecimal

0 hex	=	0 dec	=	0 oct	0	0	0	0
1 hex	=	1 dec	=	1 oct	0	0	0	1
2 hex	=	2 dec	=	2 oct	0	0	1	0
3 hex	=	3 dec	=	3 oct	0	0	1	1
4 hex	=	4 dec	=	4 oct	0	1	0	0
5 hex	=	5 dec	=	5 oct	0	1	0	1
6 hex	=	6 dec	=	6 oct	0	1	1	0
7 hex	=	7 dec	=	7 oct	0	1	1	1

$\mathbf{8}_{\text{hex}}$	=	8_{dec}	=	10_{oct}	1	0	0	0
$\mathbf{9}_{\text{hex}}$	=	9_{dec}	=	11_{oct}	1	0	0	1
$\mathbf{A}_{\text{hex}}$	=	10_{dec}	=	12_{oct}	1	0	1	0
$\mathbf{B}_{\text{hex}}$	=	11_{dec}	=	13_{oct}	1	0	1	1
$\mathbf{C}_{\text{hex}}$	=	12_{dec}	=	14_{oct}	1	1	0	0
$\mathbf{D}_{\text{hex}}$	=	13_{dec}	=	15_{oct}	1	1	0	1
$\mathbf{E}_{\text{hex}}$	=	14_{dec}	=	16_{oct}	1	1	1	0
$\mathbf{F}_{\text{hex}}$	=	15_{dec}	=	17_{oct}	1	1	1	1

Binary may be converted to and fromhexadecimal more easily. This is because the radix of the hexadecimal system(16) is a power of the radix of the binary system(2). More specifically, $16 = 2^4$, so it takes four digits of binary to represent one digit of hexadecimal, as shown in the adjacent table.

To convert a hexadecimal number into its binary equivalent, simply substitute the corresponding binary digits:

$3A_{16} = 0011\ 1010_2$

$E7_{16} = 1110\ 0111_2$

To convert a binary number into its hexadecimal equivalent, divide it into groups of four bits. If the number of bits isn't a multiple of four, simply insert extra **0** bits at the left (called padding). For example:

1010010_2 = 0101 0010 grouped with padding = 52_{16}

11011101_2 = 1101 1101 grouped = DD_{16}

To convert a hexadecimal number into its decimal equivalent, multiply the decimal equivalent of each hexadecimal digit by the corresponding power of 16 and add the resulting values:

$C0E7_{16} = (12 \times 16^3) + (0 \times 16^2) + (14 \times 16^1) + (7 \times 16^0) = (12 \times 4096) + (0 \times 256) + (14 \times 16) + (7 \times 1) = 49{,}383_{10}$

Hexadecimal Number system

The “Hexadecimal” or simply “Hex” numbering systemuses the **Base of 16** systemand are a popular choice for representing long binary values because their format is quite compact and much easier to understand compared to the long binary strings of 1’s and 0’s.

Being a Base-16 system, the hexadecimal numbering system therefore uses 16 (sixteen) different digits with a combination of numbers from0 through to 15. In other words, there are 16 possible digit symbols.

Representation of a Hexadecimal Number

MSB				Hexadecimal Number				LSB
16^8	16^7	16^6	16^5	16^4	16^3	16^2	16^1	16^0
4.3G	2.6G	16M	1M	65k	4k	256	16	1

This adding of additional hexadecimal digits to convert both decimal and binary numbers into an **Hexadecimal Number** is very easy if there are 4, 8, 12 or 16 binary digits to convert. But we can also add zero’s to the left of the most significant bit, the MSB if the number of binary bits is not a multiple of four.

For example, 11001011011001_2 is a fourteen bit binary number that is to large for just three hexadecimal digits only, yet too small for a four hexadecimal number. The answer is to ADD additional zero’s to the left most bit until we have a complete set of four bit binary number or multiples thereof.

DIFFERENCE BETWEEN ASCII AND UNICODE

1. ASCII defines 128 characters, which map to the numbers 0–127. Unicode defines (less than) 2^{21}characters, which, similarly, map to numbers 0–2^{21} (though not all numbers are currently assigned, and some are reserved).

Unicode is a superset of ASCII, and the numbers 0–128 have the same meaning in ASCII as they have in Unicode. For example, the number 65 means "Latin capital 'A'".

Because Unicode characters don't generally fit into one 8-bit byte, there are numerous ways of storing Unicode characters in byte sequences, such as UTF-32 and UTF-8.

2. ASCII has 128 code points, 0 through 127. It can fit in a single 8-bit byte, the values 128 through 255 tended to be used for other characters. With incompatible choices, causing the *code page*disaster. Text encoded in one code page cannot be read correctly by a programthat assumes or guessed at another code page.

Unicode came about to solve this disaster. Version 1 started out with 65536 code points, commonly encoded in 16 bits. Later extended in version 2 to 1.1 million code points. The current version is 6.3, using 110,187 of the available 1.1 million code points. That doesn't fit in 16 bits anymore.

3. ASCII has 128 code positions, allocated to graphic characters and control characters (control codes).

Unicode has 1,114,112 code positions. About 100,000 of themhave currently been allocated to characters, and many code points have been made permanently noncharacters (i.e. not used to encode any character ever), and most code points are not yet assigned.

1.ASCII uses an 8-bit encoding while Unicode uses a variable bit encoding.

2.Unicode is standardized while ASCII isn’t.

3.Unicode represents most written languages in the world while ASCII does not.

4.ASCII has its equivalent with in unicode

Lecture: 03

Memory :

a : a device (such as a chip) or a component of an electronic device (such as a computer or smartphone) in which information can be inserted and stored and fromwhich it may be extracted when wanted; *especially* : RAM

Types of memory
Computers use several different types of memory. They are:
1. Main Memory / Primary Memory units

– Two most important are
• RAM (Random Access Memory)
• ROM (Read-only Memory)

– They work in different ways and perform distinct functions
– CPU Registers
– Cache Memory
2. Secondary Memory/Auxiliary Memory

Also termed as ‘ auxiliary’ or ‘ backup’ storage, it is typically used as a supplement to main storage. It is much cheaper than the main storage and stores large amount of data and instructions permanently. Hardware devices like magnetic tapes, Floppy Disk, Hard Disk, Optical disks, Compact Disk (CD), Digital Versatile Disk (DVD) and Blu-ray Disc (BD) fall under this category.

Computer’ s memory can be classified into two types – RAM and ROM.
RAM or Random Access Memory is the central storage unit in a computer system It is the place in a computer where the operating system, application programs and the data in current

use are kept temporarily so that they can be accessed by the computer’s processor. The more RAM a computer has, the more data a computer can manipulate. **Random access memory**, also called the Read/Write memory, is the temporary memory of a computer. It is said to be ‘volatile’ since its contents are accessible only as long as the computer is on. The contents of RAM are cleared once the computer is turned off.

ROM or Read Only Memory is a special type of memory which can only be read and contents of which are not lost even when the computer is switched off. It typically contains manufacturer’s instructions. Among other things, ROM also stores an initial program called the ‘bootstrap loader’ whose function is to start the computer software operating, once the power is turned on.

Units of Memory

The memory unit is the principal storage of the computer. All the data and instructions that the computer needs at a moment are stored here. All storage devices are characterized with the following features:

1. Speed
2. Volatility
3. Access method
4. Portability
5. Cost and capacity

Basic Units of Measurement

The components of the computer can recognize only two states that is presence or absence of an electrical signal. Two symbols used to represent these two states are 0 and 1, and are known as BITS (an abbreviation for BInary DigiTS). 0 represents the absence of a signal, 1 represents the presence of a signal. A BIT is, therefore, the smallest unit of data in a computer and can either store a 0 or 1.

Since a single bit can store only one of the two values, there can possibly be only four unique combinations:
00 01 10 11
Bits are, therefore, combined together into larger units in order to hold greater range of values.
BYTES are typically a sequence of eight bits put together to create a single computer alphabetical or numerical character. More often referred to in larger multiples, bytes may appear as Kilobytes (1,024 bytes), Megabytes (1,048,576 bytes), GigaBytes (1,073,741,824), TeraBytes (approx. 1,099,511,000,000 bytes), or PetaBytes (approx. 1,125,899,900,000,000 bytes).
Bytes are used to quantify the amount of data digitally stored (on disks, tapes) or transmitted (over the internet), and are also used to measure the memory and document size.

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Lecture :05

FILE MANAGENT

File management describes the fundamental methods for naming, storing and handling files. By using appropriate file and folder naming strategies, along with good metadata practice and catalog software, you can make the most of your image collection

FILE:

(1) a collection of related data records (as for a computer)
(2)**:** a complete collection of data (such as text or a program) treated by a computer as a unit especially for purposes of input and output.

File Management System

A file management systemshould not be confused with a file system, which manages all types of data and files in an operating system(OS), or a database management system(DBMS), which has relational database capabilities and includes a programming language for further data manipulation.

A file management system's tracking component is key to the creation and management of this system, where documents containing various stages of processing are shared and interchanged on an ongoing basis.

The systemmay contain features like:

- Assigning queued document numbers for processing
- Owner and process mapping to track various stages of processing
- Report generation
- Notes
- Status
- Create, modify, copy, delete and other file operations

Types of file systems[edit]

File system types can be classified into disk/tape file systems, network file systems and special-purpose file systems.

Disk file systems[edit]

A *disk file system* takes advantages of the ability of disk storage media to randomly address data in a short amount of time. Additional considerations include the speed of accessing data following that initially requested and the anticipation that the following data may also be requested. This permits multiple users (or processes) access to various data on the disk without regard to the sequential location of the data. Examples include FAT (FAT12, FAT16, FAT32), exFAT, NTFS, HFS and HFS+, HPFS, APFS, UFS, ext2, ext3, ext4, XFS, btrfs, ISO 9660, Files-11, Veritas File System, VMFS, ZFS, ReiserFS and UDF. Some disk file systems are journaling file systems or versioning file systems.

Optical discs[edit]

ISO 9660 and Universal Disk Format (UDF) are two common formats that target Compact Discs, DVDs and Blu-ray discs. Mount Rainier is an extension to UDF supported since 2.6 series of the Linux kernel and since Windows Vista that facilitates rewriting to DVDs.

Flash file systems[edit]

Main article: Flash file system

A *flash file system* considers the special abilities, performance and restrictions of flash memory devices. Frequently a disk file system can use a flash memory device as the underlying storage media but it is much better to use a file system specifically designed for a flash device.

Tape file systems[edit]

A *tape file system* is a file system and tape format designed to store files on tape in a self-describing form[clarification needed]. Magnetic tapes are sequential storage media with significantly longer random data access times than disks, posing challenges to the creation and efficient management of a general-purpose file system

In a disk file system there is typically a master file directory, and a map of used and free data regions. Any file additions, changes, or removals require updating the directory and the used/free maps. Random access to data regions is measured in milliseconds so this system works well for disks.

Tape requires linear motion to wind and unwind potentially very long reels of media. This tape motion may take several seconds to several minutes to move the read/write head from one end of the tape to the other.

Consequently, a master file directory and usage map can be extremely slow and inefficient with tape. Writing typically involves reading the block usage map to find free blocks for writing, updating the usage map and directory to add the data, and then advancing the tape to write the data in the correct spot. Each additional file write requires updating the map and directory and writing the data, which may take several seconds to occur for each file.

Tape file systems instead typically allow for the file directory to be spread across the tape intermixed with the data, referred to as *streaming*, so that time-consuming and repeated tape motions are not required to write new data.

However, a side effect of this design is that reading the file directory of a tape usually requires scanning the entire tape to read all the scattered directory entries. Most data archiving software that works with tape storage will store a local copy of the tape catalog on a disk file system, so that adding files to a tape can be done quickly without having to rescan the tape media. The local tape catalog copy is usually discarded if not used for a specified period of time, at which point the tape must be re-scanned if it is to be used in the future.

IBM has developed a file system for tape called the Linear Tape File System. The IBM implementation of this file system has been released as the open-source IBM Linear Tape File System — Single Drive Edition (LTFS-SDE) product. The Linear Tape File System uses a separate partition on the tape to record the index meta-data, thereby avoiding the problems associated with scattering directory entries across the entire tape.

Tape formatting[edit]

Writing data to a tape, erasing, or formatting a tape is often a significantly time-consuming process and can take several hours on large tapes.[a] With many data tape technologies it is not necessary to format the tape before over-writing new data to the tape. This is due to the inherently destructive nature of overwriting data on sequential media.

Because of the time it can take to format a tape, typically tapes are pre-formatted so that the tape user does not need to spend time preparing each new tape for use. All that is usually necessary is to write an identifying media label to the tape before use, and even this can be automatically written by software when a new tape is used for the first time.

Database file systems[edit]

Another concept for file management is the idea of a database-based file system. Instead of, or in addition to, hierarchical structured management, files are identified by their characteristics, like type of file, topic, author, or similar rich metadata.[11]

IBM DB2 for i [12] (formerly known as DB2/400 and DB2 for i5/OS) is a database file system as part of the object based IBM i [13] operating system (formerly known as OS/400 and i5/OS), incorporating a single level store and running on IBM Power Systems (formerly known as AS/400 and iSeries), designed by Frank G. Soltis IBM's former chief scientist for IBM i. Around 1978 to 1988 Frank G. Soltis and his team at IBM Rochester have successfully designed and applied technologies like the database file system where others like Microsoft later failed to accomplish.[14] These technologies are informally known as 'Fortress Rochester'[citation needed] and were in few basic aspects extended from early Mainframe technologies but in many ways more advanced from a technological perspective[citation needed].

Some other projects that aren't "pure" database file systems but that use some aspects of a database file system:

- Many Web content management systems use a relational DBMS to store and retrieve files. For example, XHTML files are stored as XML or text fields, while image files are stored as blob fields; SQL SELECT (with optional XPath) statements retrieve the files, and allow the use of a sophisticated logic and more rich information associations than "usual file systems". Many CMSs also have the option of storing only metadata within the database, with the standard filesystem used to store the content of files.

- Very large file systems, embodied by applications like Apache Hadoop and Google File System, use some *database file system* concepts.

Transactional file systems[edit]

Some programs need to update multiple files "all at once". For example, a software installation may write program binaries, libraries, and configuration files. If the software installation fails, the program may be unusable. If the installation is upgrading a key system utility, such as the command shell, the entire system may be left in an unusable state.

Transaction processing introduces the isolation guarantee[*clarification needed*], which states that operations within a transaction are hidden from other threads on the system until the transaction commits, and that interfering operations on the system will be properly serialized with the transaction. Transactions also provide the atomicity guarantee, ensuring that operations inside of a transaction are either all committed or the transaction can be aborted and the system discards all of its partial results. This means that if there is a crash or power failure, after recovery, the stored state will be consistent. Either the software will be completely installed or the failed installation will be completely rolled back, but an unusable partial install will not be left on the system

Windows, beginning with Vista, added transaction support to NTFS, in a feature called Transactional NTFS, but its use is now discouraged.[15] There are a number of research prototypes of transactional file systems for UNIX systems, including the Valor file system,[16] Amino,[17] LFS,[18] and a transactional ext3 file system on the TxOS kernel,[19] as well as transactional file systems targeting embedded systems, such as TFFS.[20]

Ensuring consistency across multiple file system operations is difficult, if not impossible, without file system transactions. File locking can be used as a concurrency control mechanism for individual files, but it typically does not protect the directory structure or file metadata. For instance, file locking cannot prevent TOCTTOU race conditions on symbolic links. File locking also cannot automatically roll back a failed operation, such as a software upgrade; this requires atomicity.

Journaling file systems are one technique used to introduce transaction-level consistency to file system structures. Journal transactions are not exposed to programs as part of the OS API; they are only used internally to ensure consistency at the granularity of a single system call.

Data backup systems typically do not provide support for direct backup of data stored in a transactional manner, which makes recovery of reliable and consistent data sets difficult. Most backup software simply notes what files have changed since a certain time, regardless of the transactional state shared across multiple files in the overall dataset. As a workaround, some database systems simply produce an archived state file containing all data up to that point, and the backup software only backs that up and does not interact directly with the active transactional databases at all. Recovery requires separate recreation of the database from the state file, after the file has been restored by the backup software.

Network file systems[edit]

Main article: Distributed file system

A *network file system* is a file system that acts as a client for a remote file access protocol, providing access to files on a server. Programs using local interfaces can transparently create, manage and access hierarchical directories and files in remote network-connected computers. Examples of network file systems include clients for the NFS, AFS, SMB protocols, and file-system-like clients for FTP and WebDAV.

Shared disk file systems]

Main article: Shared disk file system

A *shared disk file system* is one in which a number of machines (usually servers) all have access to the same external disk subsystem (usually a SAN). The file system arbitrates access to that subsystem, preventing write collisions. Examples include GFS2 from Red Hat, GPFS from IBM, SFS from DataPlow, CXFS from SGI and StorNext from Quantum Corporation.

Special file systems

A *special file system* presents non-file elements of an operating system as files so they can be acted on using file system APIs. This is most commonly done in Unix-like operating systems, but devices are given file names in some non-Unix-like operating systems as well.

Device file systems

A *device file system* represents I/O devices and pseudo-devices as files, called device files. Examples in Unix-like systems include devfs and, in Linux 2.6 systems, udev. In non-Unix-like systems, such as TOPS-10 and other operating systems influenced by it, where the full filename or pathname of a file can include a device prefix, devices other than those containing file systems are referred to by a device prefix specifying the device, without anything following it.

Other special file systems[edit]

- In the Linux kernel, configfs and sysfs provide files that can be used to query the kernel for information and configure entities in the kernel.

- procfs maps processes and, on Linux, other operating system structures into a filespace.

Minimal file system / audio-cassette storage[edit]

In the 1970s disk and digital tape devices were too expensive for some early microcomputer users. An inexpensive basic data storage system was devised that used common audio cassette tape.

When the system needed to write data, the user was notified to press "RECORD" on the cassette recorder, then press "RETURN" on the keyboard to notify the system that the cassette recorder was recording. The system wrote a sound to provide time synchronization, then modulated sounds that encoded a prefix, the data, a checksum and a suffix. When the system needed to read data, the user was instructed to press "PLAY" on the cassette recorder. The system would *listen* to the sounds on the tape waiting until a burst of sound could be recognized as the synchronization. The system would then interpret subsequent sounds as data. When the data read was complete, the system would notify the user to press "STOP" on the cassette recorder. It was primitive, but it worked (a lot of the time). Data was stored sequentially, usually in an unnamed format, although some systems (such as the Commodore PET series of computers) did allow the files to be named. Multiple sets of data could be written and located by fast-forwarding the tape and observing at the tape counter to find the approximate start of the next data region on the tape. The user might have to listen to the sounds to find the right spot to begin playing the next data region. Some implementations even included audible sounds interspersed with the data.

Flat file systems

Not to be confused with Flat file database.

In a flat file system, there are no subdirectories; directory entries for all files are stored in a single directory.

When floppy disk media was first available this type of file system was adequate due to the relatively small amount of data space available. CP/M machines featured a flat file system, where files could be assigned to one of 16 *user areas* and generic file operations narrowed to work on one instead of defaulting to work on all of them. These user areas were no more than special attributes associated with the files; that is, it was not necessary to define specific quota for each of these areas and files could be added to groups for as long as there was still free storage space on the disk. The early Apple Macintosh also featured a flat file system, the Macintosh File System. It was unusual in that the file management program (Macintosh Finder) created the illusion of a partially hierarchical filing system on top of EMFS. This structure required every file to have a unique name, even if it appeared to be in a separate folder. IBM DOS/360 and OS/360 store entries for all files on a disk pack (*volume*) in a directory on the pack called a *Volume Table of Contents* (VTOC).

While simple, flat file systems become awkward as the number of files grows and makes it difficult to organize data into related groups of files.

A recent addition to the flat file system family is Amazon's S3, a remote storage service, which is intentionally simplistic to allow users the ability to customize how their data is stored. The only constructs are buckets (imagine a disk drive of unlimited size) and objects (similar, but not identical to the standard concept of a file). Advanced file management is allowed by being able to use nearly any character (including '/') in the object's name, and the ability to select subsets of the bucket's content based on identical prefixes.

LECTURE:06

APPLICATIONS USED FOR DOCUMENT CREATION ANDEDITING

Top 10 applications used for document preparation and edtng are:

1. PDFelement
2. Zoho Docs
3. Quip
4. Foxit PhantomPDF
5. DesignBold
6. Fotor
7. Adobe Acrobat
8. Conga Composer
9. FormSwift

10. UltraEdit

and also there are so many application softwares to prepare documents

DATA PRESENTATION USING SLIDES

TIPS: There are five steps to make an effective presentation. They are

PowerPoint Data Visualization Tip #1 – Mix and Match

Looking at their slides, we love the way they mixed up their presentation of the data, using numbers on one side and a simple chart on the other. It flows really nicely, and they make sense together, but it mixes up the style just enough to keep you engaged.

Charts can be super helpful – they are great for when you are trying to talk while your audience is looking at the slide. You can use themas a visual aid to complement what you are talking about, instead of the text on the slide competing with the words coming out of your mouth.

Charts are also often a very clear way to present your data because the visual cues are a lot easier to get across. You can use a couple nice colors to make it stand out, and easily compare things like profits across years or responses across different ages. That kind of stuff is hard (and boring) to present using just text.

But not all data is like that. You see in the slide above that they are **highlighting numbers fromjust one group**, or results froma single question. This is an excellent example of how to present numbers in an interesting way. It looks great to have the text with the number highlighted by being a bit bigger. Those are some impressive stats, too, which draws the eye right to it – 270% is quite the attention-getter.

But to mix things up on the other side of the slide, they presented the data in a **simple donut chart**. It’ s a really nice visual contrast to the left half of the slide and makes the slide as a whole way more inviting and engaging. Wouldn’ t you agree?

As a side note, **we also love their overall presentation on the slide here**. The text both complements the slide and stands out, and they used one of our tips that we recommend in [this article about how to overlay text on an image]: the white text on a transparent shape technique. It allows the image to still show, but be more in the background, and really lets the text pop. It is an easy way to use an image that is super relevant, but too busy to put text directly on

PowerPoint Data Visualization Tip #2 – Avoid the PPT Default Trap

Sure, the PowerPoint default chart is easy. But it is also boring, and you are better than that!

For all the effort you put into creating amazing slides, you do not want to just slap your results into a basic, default chart (with the same tired default color scheme) and be done with it. You want to go beyond the standard PowerPoint chart defaults and look for CREATIVE ways to display your information.

If you look, you will see that there are defaults for everything; there are even PowerPoint presentation templates for surveys. But who wants to present their survey the way everyone else is?

Using the default charts is easy, sure. But it just does not look that great – it takes a little more effort to make them look awesome. **Expert presentation designers always find a way to go above and beyond the standard formatting that PowerPoint provides**.

Taking a look at our example, **notice how the pie charts have their own unique style to them** The minimalist style, with the larger yellow portion representing the results, contrasted against the smaller blue portion, is fantastic and very unique. There is also no data shown on the chart itself, but instead, it is shown in large bold font in the text underneath the chart.

Even when they present the data in the text underneath the pie charts, **they keep it simple**. They only highlight the important portion, and when they reference the percentage, the font color is the same

as the corresponding part of the chart. The minimalist text really complements the overall simple presentation.
We definitely do not mean simple in the way that we refer to the PowerPoint default charts here. For sure, these took some work to make them look this great. The difference here is that the design is purposefully simple and clear, to enhance the presentation and make it easy to scan and get the key takeaways quickly. Ultimately, it is simple for the audience, not for you. But it is so worth it!

Another thing we love is their use of color. Notice how bright and fun the slide looks. They used colors that contrast beautifully (teal and yellowish orange) with the white text, which was an excellent choice. If you love these color choices but are a little confused at how to do that yourself, check out our list of tips on how to pick colors for your PowerPoint presentation.

PowerPoint Data Visualization Tip #3 – Sometimes the Best Chart is No Chart

We know, that seems like kind of a funny tip on a list about how to present data effectively in PowerPoint – your mind kind of automatically jumps to charts and graphs – but just hang in there.

This is a bit of the “ less is more” kind of advice. **Sometimes all you need is the data highlights and a nice way of presenting them on the slide.**
Look at the example slide for this – notice that there is no chart showing the proportions or anything. Really, it’ s just a few stacked boxes with some text and numbers. If you’ re wondering how to present numbers in PowerPoint, this is it. The background image helps a lot because it relates to their biggest finding, so it is relevant and creates interest.

Also, notice that there are only three data points on the slide. We bet the survey included a lot more answer choices – but who cares? The presentation designer probably ignored those on purpose. But why?

But why?

It is likely that they understand their data, they understand their audience, and they know that they just need to focus on the most important findings. Is the audience really going to care if 2% of singles got the best results when they flirted at their local zoo? The audience does not really care about the lower numbers because they want to know what to do and where to go to have the most success. These are the most important results, so those are what are shown on the slide. This is the type of survey results PowerPoint example that shows how you can really edit down the data *and* make the slide look great.
Do you feel like something is missing from their presentation? We don't! We get the message, it is easy to read through and understand quickly. This is the information we want to know, we don't need a complicated bar chart showing the percentage of EVERY option presented in the survey.

Also, as a quick tip, you may notice that the percentage of the three answers adds up to more than 100%. This means that they let their audience choose more than one option, which means it would not work as a pie chart even if you wanted it to.

When you have data like that, where the audience was allowed to choose more than one and your audience really only cares about a portion of the findings, a simple numerical presentation like this is the simplest and most effective.

PowerPoint Data Visualization Tip #4 – Think Outside the Box

We know the phrase "think outside the box" is an overused buzz word but you really should be thinking outside the box and having fun with presenting your data.

Before you go running for the standard bar chart or pie chart, do a little brainstorming to think about some potential ideas of how presenting your data could be a little more UNIQUE.
It is geographical, like the example above? A map is an easy reference point, and it is just as easy to see what they are trying to get across. If your data is about a group of people, try using icons to represent theminstead of the bar in the bar chart. There are all sorts of fun ways you can play with your data. Data visualization in PowerPoint doesn't have to mean graphs! This is a really fun way to turn your survey results into presentations that are interesting and fun.

You can see in our example that it looks so much cooler than something you would see in a typical bar chart. We all know the map of the U.S. pretty well, and we know where we live. It is easy to see where those locations are, and they have themlabeled on the right for clarity as well.

Of course, don't go extreme with it:

We're not saying you should always avoid charts – sometimes charts are genuinely the best choice for your data. All we are saying is to think about how you can present your data well. This especially applies if you have a ton of data to present (which is sometimes unavoidable) because bar chart after bar chart is going to put your audience to sleep. Experiment with different styles and colors and images to keep it interesting!

PowerPoint Data Visualization Tip #5 – Overlay Data Onto Images

A super cool way to make your data look awesome is to find images that match the topic of your data and overlay your data onto the image. This will immediately cue the audience into what you are talking about, and help themremember it – and of course, it will look

great!
Look at the slide for this example. The theme of the slide is communication, so the data is presented over the length of the megaphone image in the background.

This image is even a little more clever than that because it is talking about annoying dating advice. Who is more annoying than that guy with a megaphone, shouting useless cliches about love at you? This checks all the boxes for us.

Of course, creating slides like this takes a bit of effort. You have to find just the right image to work with your data and layout, and there are a lot of factors that go into that. On top of being relevant, it has to be high quality, with enough white space to write on, and not too busy to distract fromthe information. We know, it is quite a list of demands!

The end results, though, are worth it. If you pull it off, you' ve got an awesome and engaging slide with a clever visual cue sitting in the background. It' s really one of the best ways to present data in PowerPoint.

Conclusion

Presenting data in PowerPoint is fun stuff, right?

Hopefully, after reading this list of some of the best ways to present data in PowerPoint, you agree with us that it can be!

There are definitely a lot of things to keep in mind when you are putting data into your slide, but it is all in the spirit of creating a great presentation: make it beautiful, clear, and interesting.
Data is a part of that, and it is always worth it to put in some time into making sure it fits those criteria.

LECTURE:07

SPREADSHEET:

A **spreadsheet** is an interactive computer application for organization, analysis and storage of data in tabular form Spreadsheets are developed as computerized simulations of paper accounting worksheets. The programoperates on data entered in cells of a table. Each cell may contain either numeric or text data, or the results of formulas that automatically calculate and display a value based on the contents of other cells. A spreadsheet may also refer to one such electronic document.

Besides performing basic arithmetic and mathematical functions, modern spreadsheets provide built-in functions for common financial and statistical operations. Such calculations as net present value or standard deviation can be applied to tabular data with a pre-programmed function in a formula. Spreadsheet programs also provide conditional expressions, functions to convert between text and numbers, and functions that operate on strings of text.

LANPAR, available in 1969, was the first electronic spreadsheet on mainframe and time sharing computers.

LANPAR was an acronym LANguage for Programming Arrays at Random VisiCalc was the first electronic spreadsheet on a microcomputer and it helped turn the Apple II computer into a popular and widely used system Lotus 1-2-3 was the leading spreadsheet when DOS was the dominant operating systemExcel now has the largest market share on the Windows and Macintosh platforms. A spreadsheet programis a standard feature of an office productivity suite; since the advent of web apps, office suites now also exist in web app form Web based spreadsheets are a relatively new category.

A spreadsheet consists of a table of *cells* arranged into rows and columns and referred to by the X and Y locations. X locations, the columns, are normally represented by letters, "A", "B", "C", etc., while rows are normally represented by numbers, 1, 2, 3, etc. A single cell can be referred to by addressing its row and column, "C10" for instance.

TYPES OF SPREADSHEETS

1.Paper spreadsheets

2.LANPAR spreadsheet compiler

3. Lotus 1-2-3 and other MS-DOS spreadsheets

4.Microsoft Excel

5. Web based spreadsheets

Other spreadsheets

Notable current spreadsheet software:

- Calligra Sheets (formerly KCalc)
- Corel Quattro Pro (WordPerfect Office)
- Kingsoft Spreadsheets
- NeoOffice
- Numbers is Apple Inc.'s spreadsheet software, part of iWork.
- Pyspread

Discontinued spreadsheet software:

- 3D-Calc for Atari ST computers
- Framework by Forefront Corporation/Ashton-Tate (1983/84)
- GNU Oleo – A traditional terminal mode spreadsheet for UNIX/UNIX-like systems
- IBM Lotus Symphony (2007)
- Javelin Software
- KCells
- Lotus Improv[29]
- Lotus Jazz for Macintosh
- Lotus Symphony (1984)
- MultiPlan
- Claris' Resolve (Macintosh)
- Resolver One
- Borland's Quattro Pro
- SIAG
- SuperCalc

- T/Maker
- Target Planner Calc for CP/M and TRS-DOS[30][31]
- Trapeze for Macintosh[32]
- Wingz for Macintosh

USE OF SPREADSHEET FOR STATISTICAL ANALYSIS,EVALUTING MATHEMATICAL AND &LOGICAL EXPRESSIONS

Math functions

ABS(Y) Returns the absolute value of a number.

EXP(Y) Returns *e* to the *y*th power. This is the inverse of LN, meaning that "=EXP(LN(Y))" equals *Y*.

LN(Y) Returns the natural logarithm (logarithm to the base *e*) of *Y*.

LOG10(Y) Returns the base-10 logarithm of *Y*. The inverse of LOG is raising 10 to the Yth power, meaning "=10^(LOG10(Y))" returns *Y*.

RAND() Returns a pseudorandom number, equal to or greater than zero and less than one. You must use empty parentheses so the spreadsheet knows that RAND is a function. For a pseudorandom number in some other range, just multiply; thus "=RAND()*79" would give you a number greater than or equal to 0 and less than 79. The value will change every time you enter something in any cell. One use of randomnumbers is for randomly assigning individuals to different treatments; you could enter "=RAND()" next to each individual, Copy and Paste Special the randomnumbers, Sort the individuals based on the column of randomnumbers, then assign the first 10 individuals to the placebo, the next 10 individuals to 10 mg of the trial drug, etc.

A "pseudorandom" number is generated by a mathematical function; if you started with the same starting number (the "seed"), you'd get the same series of numbers. Excel's pseudorandomnumber generator bases its seed on the time given by the computer's internal clock, so you won't get the same seed twice. There are problems with Excel's pseudorandom number generator that make it inappropriate for serious Monte Carlo simulations, but the numbers it produces are random enough for anything you're likely to do as an experimental biologist.

ROUND(Y,digits) Returns *Y* rounded to the specified number of digits. For example, if cell A1 contains the number 37.38, "=ROUND(A1, 1)" returns 37.4, "=ROUND(A1, 0)" returns 37, and "=ROUND(A1, -1)" returns 40. Numbers ending in 5 are rounded up (away fromzero), so "=ROUND(37.35,1)" returns 37.4 and "=ROUND(-37.35)" returns -37.4.

SQRT(Y) Returns the square root of *Y*.

SUM(Ys) Returns the sumof a set of numbers.

Logical functions

ND(logical_test1, logical_test2,...) Returns TRUE if logical_test1, logical_test2... are all true, otherwise returns FALSE. As an example, let's say that cells A1, B1 and C1 all contain numbers, and you want to know whether they're all greater than 100. One way to find out would be with the statement "=AND(A1>100, B1>100, C1>100)", which would return TRUE if all three were greater than 100 and FALSE if any one were not greater than

100.

IF(logical_test, A, B) Returns *A* if the logical test is true, *B* if it is false. As an example, let's say you have 1000 rows of data in columns A through E, with a unique ID number in column A, and you want to check for duplicates. Sort the data by column A, so if there are any duplicate ID numbers, they'll be adjacent. Then in cell F1, enter "=IF(A1=A2, "duplicate","ok"). This will enter the word "duplicate" if the number in A1 equals the number in A2; otherwise, it will enter the word "ok". Then copy this into cells F2 through F999. Now you can quickly scan through the rows and see where the duplicates are.

ISNUMBER(Y) Returns TRUE if *Y* is a number, otherwise returns FALSE. This can be useful for identifying cells with missing values. If you want to check the values in cells A1 to A1000 for missing data, you could enter "=IF(ISNUMBER(A1), "OK", "MISSING")" into cell B1, copy it into cells B2 to B1000, and then every cell in A1 that didn't contain a number would have "MISSING" next to it in column B.

OR(logical_test1, logical_test2,...) Returns TRUE if one or more of logical_test1, logical_test2... are true, otherwise returns FALSE. As an example, let's say that cells A1, B1 and C1 all contain numbers, and you want to know whether any is greater than 100. One way to find out would be with the statement "=OR(A1>100, B1>100, C1>100)", which would return TRUE if one or more were greater than 100 and FALSE if all three were not greater than 100.

LECTURE:09

DATABASE:

A database is basically a structured collection of data. In general, the data are organized to represent significant parts of reality in such a way that it supports processes needing this information. Ex. representation of the availability of rooms in hotels in such a way that it supports people in finding a hotel with vacancies.

tabase management systems are specifically built software applications that can interrelate with the user, other applications, and the database itself to capture and study data.

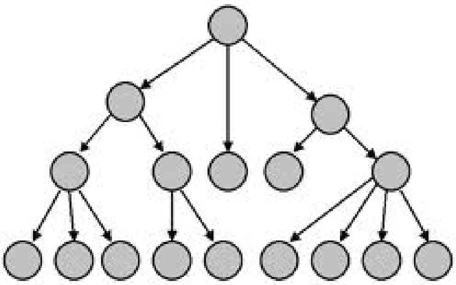
Types of Database Management Systems

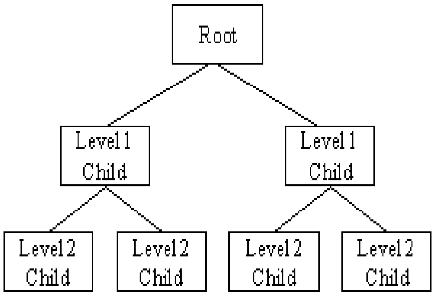
There are four structural types of database management systems:

- Hierarchical databases.
- Network databases.
- Relational databases.
- Object-oriented databases

Hierarchical Databases (DBMS)

In the Hierarchical Database Model we have to learn about the databases. It is very fast and simple. In a hierarchical database, records contain information about there groups of parent/child relationships, just like as a tree structure. The structure implies that a record can have also a repeating information. In this structure Data follows a series of records, It is a set of field values attached to it. It collects all records together as a record type. These record types are the equivalent of tables in the relational model, and with the individual records being the equivalent of rows. To create links between these record types, the hierarchical model uses these type Relationships.





Advantage

Hierarchical database can be accessed and updated rapidly because in this model structure is like as a tree and the relationships between records are defined in advance. This feature is a two-edged.

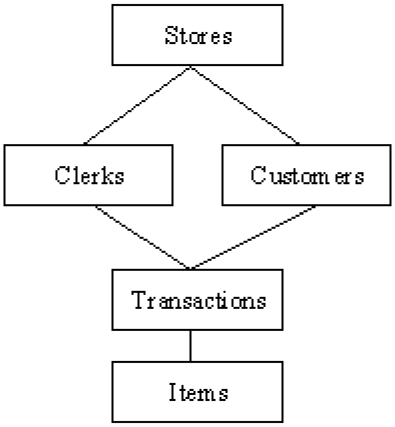
Disadvantage

This type of database structure is that each child in the tree may have only one parent, and relationships or linkages between children are not permitted, even if they make sense froma logical standpoint. Hierarchical databases are so in their design. it can adding a new field or record requires that the entire database be redefined.

Network Database

A network databases are mainly used on a large digital computers. It more connections can be made between different types of data, network databases are considered more efficiency It contains limitations must be considered when we have to use this kind of database. It is Similar to the hierarchical databases, network databases .Network databases are similar to hierarchical databases by also having a hierarchical structure. A network database looks more like a cobweb or interconnected network of records.

In network databases, children are called members and parents are called occupier. The difference between each child or member can have more than one parent.



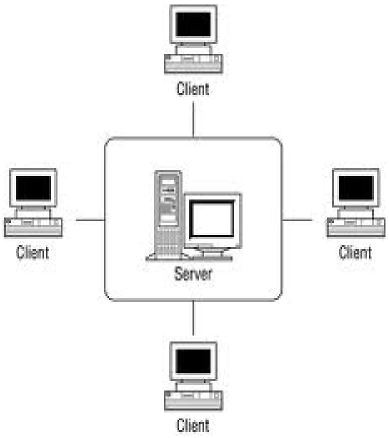
The Approval of the network data model similar with the esteemof the hierarchical data model. Some data were more naturally modeled with more than one parent per child. The network model authorized the modeling of many-to-many relationships in data.

The network model is very similar to the hierarchical model really. Actually the hierarchical model is a subset of the network model. However, instead of using a single-parent tree hierarchy, the network model uses set theory to provide a tree-like hierarchy with the exception that child tables were allowed to have more than one parent. It supports many-to-many relationships.

Relational Databases

In relational databases, the relationship between data files is relational. Hierarchical and network databases require the user to pass a hierarchy in order to access needed data. These databases connect to the data in different files by using common data numbers or a key field. Data in relational databases is stored in different access control tables, each having a key field that mainly identifies each row. In the relational databases are more reliable than either the hierarchical or network database structures. In relational databases, tables or files filled up with data are called relations (tuples) designates a row or record, and columns are referred to as attributes or fields.

Relational databases work on each table has a key field that uniquely indicates each row, and that these key fields can be used to connect one table of data to another.



The relational database has two major reasons

1. Relational databases can be used with little or no training.
2. Database entries can be modified without specify the entire body.

Properties of Relational Tables

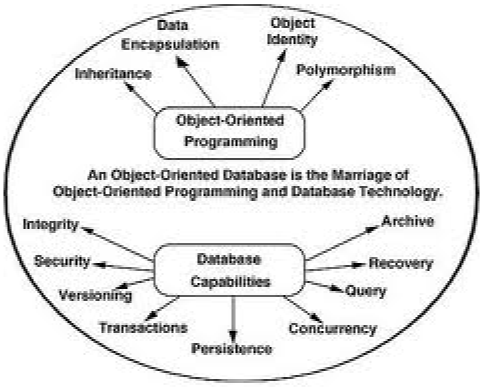
In the relational database we have to follow some properties which are given below.

- It's Values are Atomic
- In Each Row is alone.
- Column Values are of the Same thing.
- Columns is undistinguished.
- Sequence of Rows is Insignificant.
- Each Column has a common Name.

Object-Oriented Model

In this Model we have to discuss the functionality of the object oriented Programming .It takes more than storage of programming language objects. Object DBMS's increase the semantics of the C++ and Java .It provides full-featured database programming capability, while containing native language compatibility. It adds the database functionality to object programming languages.This approach is the analogical of the application and database development into a constant data model and language environment. Applications require less code, use more natural data modeling, and code bases are easier to maintain. Object developers can write complete database applications with a decent amount of additional effort.

The object-oriented database derivation is the integrity of object-oriented programming language systems and consistent systems. The power of the object-oriented databases comes from the cyclical treatment of both consistent data, as found in databases, and transient data, as found in executing programs.



Object-oriented databases use small, recyclable separated of software called objects. The objects themselves are stored in the object-oriented database. Each object contains of two elements:

1. Piece of data (e.g., sound, video, text, or graphics).
2. Instructions, or software programs called methods, for what to do with the data.

Disadvantage of Object-oriented databases

1. Object-oriented databases have these disadvantages.
2. Object-oriented database are more expensive to develop.
3. In the Most organizations are unwilling to abandon and convert from those databases.

They have already invested money in developing and implementing.

The benefits to object-oriented databases are compelling. The ability to mix and match reusable objects provides incredible multimedia capability.

Uses of Database Management System(DBMS):

abase management system(DBMS).

Also See: Advantages Of Database Management System

Application and Uses of Database Management System(DBMS)

Database design

Database design is the organisation of data according to a database model. The designer determines what data must be stored and how the data elements interrelate. With this information, they can begin to fit the data to the database model.

A design process suggestion for Microsoft Access

1. **Determine the purpose of the database** - This helps prepare for the remaining steps.

2. **Find and organize the information required** - Gather all of the types of information to record in the database, such as product name and order number.

3. **Divide the information into tables** - Divide information items into major entities or subjects, such as Products or Orders. Each subject then becomes a table.

4. **Turn information items into columns** - Decide what information needs to be stored in each table. Each item becomes a field, and is displayed as a column in the table. For example, an Employees table might include fields such as Last Name and Hire Date.

5. **Specify primary keys** - Choose each table' s primary key. The primary key is a column, or a set of columns, that is used to uniquely identify each row. An example might be Product ID or Order ID.

6. **Set up the table relationships** - Look at each table and decide how the data in one table is related to the data in other tables. Add fields to tables or create new tables to clarify the relationships, as necessary.

7. **Refine the design** - Analyze the design for errors. Create tables and add a few records of sample data. Check if results come from the tables as expected. Make adjustments to the design, as needed.

8. **Apply the normalization rules** - Apply the data normalization rules to see if tables are structured correctly. Make adjustments to the tables, as needed.

The database design process

A well-structured database:

- Saves disk space by eliminating redundant data.

- Maintains data accuracy and integrity.

- Provides access to the data in useful ways.

Designing an efficient, useful database is a matter of following the proper process, including these phases:

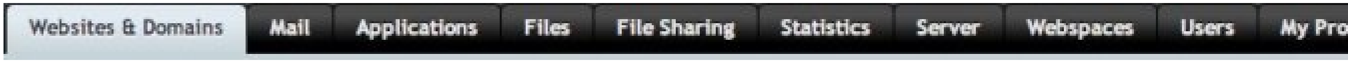
1. Requirements analysis, or identifying the purpose of your database
2. Organizing data into tables
3. Specifying primary keys and analyzing relationships
4. Normalizing to standardize the tables

HOW TO CREATE A DATABASE

1. Log into the Plesk Control Panel for your domain.

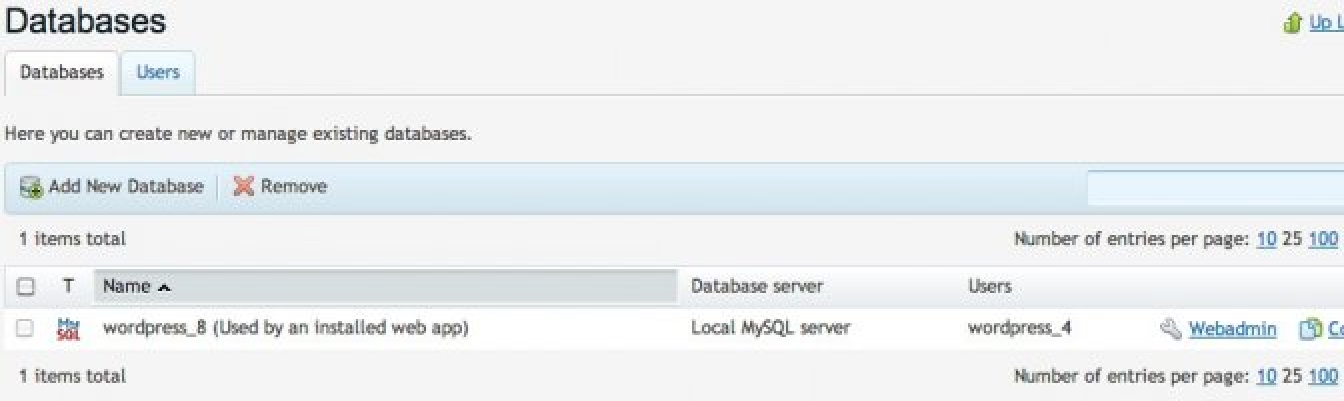
   If you log into Plesk with the admin user, you will be in the Server Administration Panel by default. To get to the Control Panel, click on Domains, then on the Control Panel link next to your domain.
   You can also create a user that will log into the Control Panel by default, which will save you a few clicks on day-to-day webmaster tasks. See Control Panel user.

2. From the Home page, click on Websites & Domains.

3.
4. Click on Databases.

5. Click on the Add New Database icon.



Here you can create new or manage existing databases.

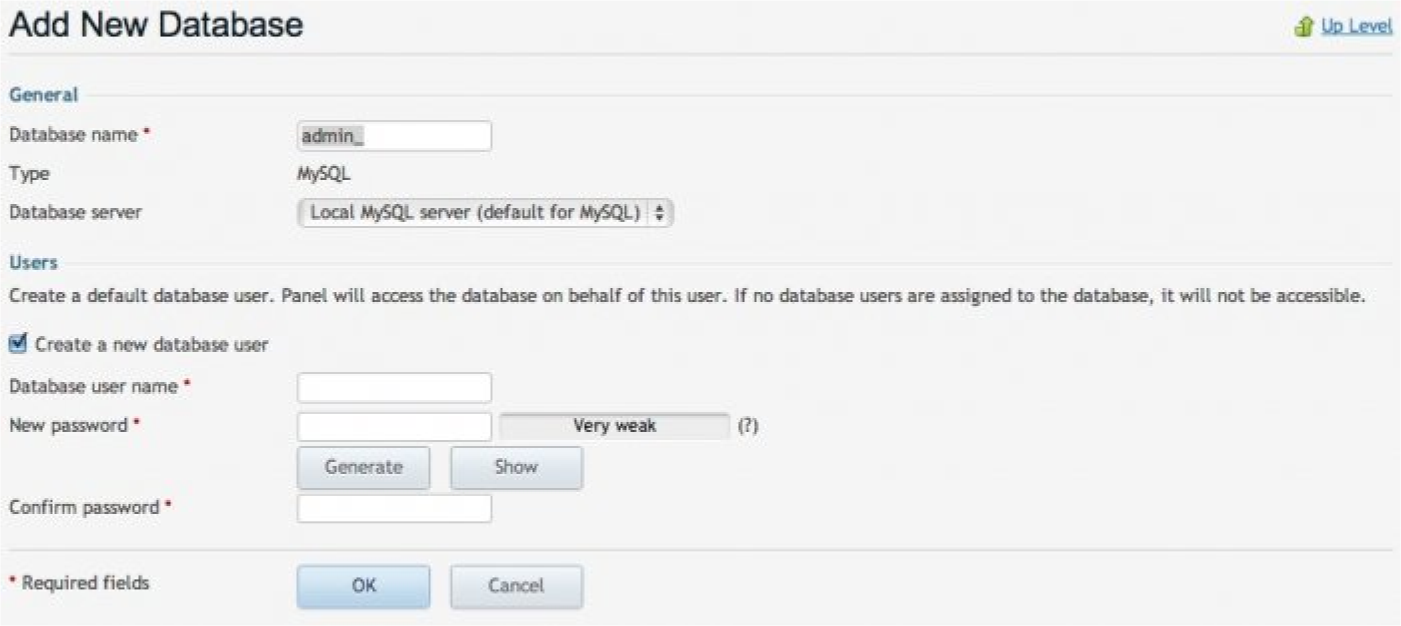
1 items total — Number of entries per page: 10 25 100

□	T	Name ▲	Database server	Users		
□	MySQL	wordpress_8 (Used by an installed web app)	Local MySQL server	wordpress_4	Webadmin	Co

1 items total — Number of entries per page: 10 25 100

6. Complete the form by entering your desired database name and then click the OK button.

7.
8.



General

Database name *	admin_
Type	MySQL
Database server	Local MySQL server (default for MySQL)

Users

Create a default database user. Panel will access the database on behalf of this user. If no database users are assigned to the database, it will not be accessible.

☑ Create a new database user

Database user name *	
New password *	Very weak (?)
Confirm password *	

* Required fields

LECTURE:13

Planning Your Presentation

Preparing a presentation can be an overwhelming experience if you allow it to be one. The strategies and steps below are provided to help you break down what you might view as a large job into smaller, more manageable tasks.

Step 1: Analyze your audience

The first step in preparing a presentation is to learn more about the audience to whom you'll be speaking. It's a good idea to obtain some information on the backgrounds, values, and interests of your audience so that you understand what the audience members might expect from your presentation.

Step 2: Select a topic

Next, if possible select a topic that is of interest to the audience and to you. It will be much easier to deliver a presentation that the audience finds relevant, and more enjoyable to research a topic that is of interest to you.

Step 3: Define the objective of the presentation

Once you have selected a topic, write the objective of the presentation in a single concise statement. The objective needs to specify exactly what you want your audience to learn fromyour presentation. Base the objective and the level of the content on the amount of time you have for the presentation and the background knowledge of the audience. Use this statement to help keep you focused as you research and develop the presentation.

Preparing the Content of Your Presentation

Step 4: Prepare the body of the presentation

After defining the objective of your presentation, determine how much information you can present in the amount of time allowed. Also, use your knowledge about the audience to prepare a presentation with the right level of detail. You don't want to plan a presentation that is too basic or too advanced.

The **body** of the presentation is where you present your ideas. To present your ideas convincingly, you will need to illustrate and support them Strategies to help you do this include the following:

- Present data and facts
- Read quotes fromexperts
- Relate personal experiences
- Provide vivid descriptions

And remember, as you plan the body of your presentation it's important to provide variety. Listeners may quickly become bored by lots of facts or they may tire of hearing story after story.

Step 5: Prepare the introduction and conclusion

Once you've prepared the body of the presentation, decide how you will begin and end the talk. Make sure the introduction captures the attention of your audience and the conclusion summarizes and reiterates your important points. In other words, "Tell themwhat you're going to tell them Tell them Then, tell themwhat you told them"

During the **opening** of your presentation, it's important to attract the audience's attention and build their interest. If you don't, listeners will turn their attention elsewhere and you'll have a difficult time getting it back. Strategies that you can use include the following:

- Make the introduction relevant to the listeners' goals, values, and needs
- Ask questions to stimulate thinking
- Share a personal experience
- Begin with a joke or humorous story
- Project a cartoon or colorful visual
- Make a stimulating or inspirational statement
- Give a unique demonstration

Step 6: Practice delivering the presentation

Most people spend hours preparing a presentation but very little time practicing it. When you practice your presentation, you can reduce the number of times you utter words and phrases like, "um," "well," and "you know." These habits can easily diminish a speaker's credibility. You can also fine-tune your content to be sure you make your most important points in the time alloted.

IMPORT AND EXPORT OF DATA

The **import and export of data** is the automated or semi-automated input and output of data sets between different software applications. It involves "translating" fromthe format used in one application into that used by another, where such translation is accomplished automatically via machine processes, such as transcoding, data transformation, and others. True exports of data often contain data in raw formats otherwise unreadable to end-users without the user interface that was designed to render it.[1]

Import and export of data shares semantic analogy with copying and pasting, in that sets of data are copied fromone application and pasted into another. In fact, the software development behind operating systemclipboards (and clipboard extender apps) greatly concerns the many details and challenges of data transformation and transcoding, in order to present the end user with the illusion of effortless copy and paste between any two apps, no matter how internally different. The "Save As" command in many applications requires much of the same engineering, when files are saved as another file format.

The ability to import and export data (or lack of such ability) has large economic implications, because it can be resource-intensive to input data in non-automated ways (such as manual rekeying), and because lack of interoperability between systems unable to import or export data between each other causes stovepiping and lack of opportunity and efficiencies such as those seen in, for example, mash-ups.

Exporting/Importing Graphs and Data

In this topic:

Clipboard Operations

Overview

SIMetrix offers facilities to copy both graph data and the graph's graphical image to the systemclipboard. This provides the ability to export simulation results to other applications. The data - for example - may be exported to a spreadsheet application for customprocessing, while the graphical image may be exported to a word processor for the preparation of documents.

SIMetrix may also import data in a tabulated ASCII format. This feature may be used to display data froma spreadsheet allowing, for example, a comparison between measured and simulated data.

Copy Data to the Clipboard

1. Select the graphs you wish to export

2. Select the menu **Edit** > **Copy ASCII Data**

The data will be copied in a tabulated ASCII format. The first line will contain the names of the curves, while the remaining lines will contain the curves' data arranged in columns

Copying Graphics to the Clipboard

There are three different ways a graph can be copied to the clipboard. Use the menus under **Edit** > **Copy Graphics**. These are detailed below:

Colour Copies graph to clipboard in full colour. The curve legends identify the curves using coloured squares similar to how the graph is displayed on the screen.

Monochrome Copies graph to clipboard in monochrome. Curves are distinguished using varying markers and line styles. Curve legends distinguish curves with a straight line example

Colour with markers Copies graph to clipboard in full colour but also differentiates curves using markers and line styles. Curve legends distinguished curves with a straight line example.

Paste Data from the Clipboard

SIMetrix can plot curves using tabulated ASCII data from the clipboard. The format is the same as used for exporting data. See Copy Data to the Clipboard for more details.

Exporting Graphics

You may export schematic graphics to other applications such as word processors or drawing programs. You can do this via the clipboard (see Copying Graphics to the Clipboard) or by writing out to a file. To export waveform graphics to a file, select the graph menu **File** > **Save Picture...** then select the format of your choice using the **Save as type:** drop down box. The choices are:

1. **Windows Meta File (.EMF and .WMF)**. Nearly all windows applications that support graphics import will accept this format. Note that this is a scalable format and therefore suitable for high resolution printing.

2. **Scalable Vector Graphics (.svg)**. Like EMF and WMF, this is a scalable format. It is an open format and supported by programs on all platforms whereas EMF and WMF is only available on Windows.

3. **Bitmap - default image size (.png, .jpg, .bmp)**. These are available on all platforms,

are widely supported by graphics applications but these are not scalable formats and so do not offer good quality when printed using high resolution printers. PNG is the default format if you do not choose a file extension and generally this format works well for schematics and graphs. To choose JPG (JPEG format) or BMP (windows bitmap format) you must explicitly enter .jpg or .bmp file extensions respectively. With this option the image size will match the image size currently displayed on screen. If you wish to specify a different image size, use next option.

4. **Bitmap - specify image size (.png, .jpg, .bmp)**. As 3 above but you must explicitly define the image resolution in pixels. You will be prompted for this when you close the file selection dialog box.

Data Import and Export

SIMetrix provides the capability to export simulation data to a file in text form and also to import data from a file in text form This makes it possible to process simulation data using another application such as a spreadsheet or custom program The operations described in this section handle data independent of the graph system There are also ways to export plotted data from a graph and also directly plot external data. For information on these topics refer to Copying Data to the Clipboard and Paste Data from the Clipboard

SIMetrix may also import data in SPICE3 raw file format and CSDF format. Some other simulation products can output in one or both of these formats.

Importing SPICE3 Raw and CSDF Files

1. Select menu **Simulator** > **Load Simulation Data...**

2. In **Files of type** select **SPICE3 Raw Files** or **CSDF Files** as required.

3. Select file to import.

SIMetrix will read the entire file and write its data out to a temporary .sxdat file in the same way as it does when saving its own simulation data. The data read from the raw file is buffered in RAM in order to maximise the efficiency of the saved data. SIMetrix will use up to 10% of system RAM for this purpose.

Note that this feature is not available with SIMetrix/SIMPLIS Elements.

Importing Tabulated ASCII Data

SIMetrix can import data in a tabulated ASCII format allowing the display of data created by a spreadsheet program There is a no menu for this, but this can be done using the command OpenGroup with the /text switch. E.g. at the command line type:

```
OpenGroup /text data.txt
```

This will read in the file data.txt and create a new group called text*n*. See Data Files

Text Format for details of format.

Note that if you create the file using another program such as a spreadsheet, the above command may fail if the file is still open in the other application. Closing the file in the other application will resolve this.

Exporting SPICE3 Raw Files

SIMetrix can export all simulation data to a SPICE3 raw file. This format may be accepted by third party waveform viewers.

To export a SPICE3 raw file, proceed as follows:

1. Select menu **File** > **Data** > **Save...**
2. Under **Save as type:** choose **SPICE3 Raw Files**.

Note that various applications use slightly different variants of this format. By default, SIMetrix outputs the data in a form that is the same as the standard unmodified SPICE3 program This can be modified using the option setting "ExportRawFormat". Use the Set command to set this value. See Set for details. Set this value to 'spice3', 'spectre' or 'other'.

Exporting Data

To export data, use the command Show (see Show) with the /file switch. E.g:

```
Show /file data.txt vout r1_p q1#c
```

will output to data.txt the vectors vout, r1_p, and q1#c. The values will be output in a form compatible with OpenGroup /text. **Vector Names**\label{umGraphs,ProbesandDataAnalysis:ExportImportGraphsData:DataImportandExport:ExportingData:VectorNames} In the above example the vector names are vout, r1_p and q1#c. If you simulate a schematic, the names used for voltage signals are the same as the node names in the netlist which in turn are assigned by the schematic's netlist generator. To find out what these names are, move the mouse cursor over the node of interest on the schematic. You should see the node name and therefore the vector name in the status box in the form "NET=???". To find the current name, place the mouse cursor on the device pin of interest and press control-P.

Launching Other Applications

Data import and export makes it possible to process simulation data using other applications. SIMetrix has a facility to launch other programs using the Shell command. You could therefore write a script to export data, process it with your own program then read the processed data back in for plotting. To do this you must specify the /wait switch for the Shell command to force SIMetrix to wait until the external application has finished. E.g.

```
Shell /wait procdata.exe
```

will launch the programprocdata.exe and will not return until procdata.exe has closed.

Data Files Text Format

SIMetrix has the ability to read in data in text formusing the OpenGroup command (see OpenGroup). This makes it possible to use SIMetrix to graph data generated by other applications such as a spreadsheet. This can be useful to compare simulated and measured results.

There are two alternative formats. The first is simply a series of values separated by white space. This will be read in as a single vector with a reference equal to its index.

The second format is as follows:

A text data file may contain any number of blocks. Each block has a header followed by a list of datapoints. The header and each datapoint must be on one line.

The header is of the form reference_name ydata1_name [ydata2_name ...]

Each datapoint must be of the form reference_value ydata1_value [ydata2_value ...]

The number of entries in each datapoint must correspond to the number of entries in the header. The reference is the x data (e.g. time or frequency).

Data Files Text Format - Example

```
Time      Voltage1    Voltage2
0        14.5396     14.6916
1e-09      14.5397     14.6917
2e-09      14.5398     14.6917
4e-09      14.54      14.6917
8e-09      14.5408     14.6911
1.6e-08     14.5439     14.688
3.2e-08     14.5555     14.6766
6.4e-08     14.5909     14.641
1e-07      14.6404     14.5905
1.064e-07   14.6483     14.5821
```

If the above was read in as a text file (using OpenGroup /text), a new group called text*n* where *n* is a number would be generated. The group would contain three vectors called time, *Voltage1* and *Voltage2*. The vectors *Voltage1* and *Voltage2* would have

a *reference* of *Time*. *Time* itself would not have a *reference*.
To read in complex values, enclose the real and imaginary parts in parentheses and separate with a comma. E.g:

```
Frequency      :VOUT
1000          (-5.94260997, 0.002837811)
1004.61579     (-5.94260997, 0.00285091)
1009.252886    (-5.94260996, 0.002864069)
1013.911386    (-5.94260995, 0.002877289)
1018.591388    (-5.94260994, 0.00289057)
1023.292992    (-5.94260993, 0.002903912)
1028.016298    (-5.94260992, 0.002917316)
1032.761406    (-5.94260991, 0.002930782)
1037.528416    (-5.9426099, 0.00294431)
1042.317429    (-5.94260989, 0.0029579)
1047.128548    (-5.94260988, 0.002971553)
```

LECTURE :14

SMART PHONE APPS IN AGRICULTURE

Technology has always been an important factor behind development. Even in areas where there is hardly any development, technology seems to have changed some part of it. Telecom has spread efficiently around the world. In a developing country like India, technology shows its trace in the smallest of villages. Today with enhanced operating systems and small processor based phones, the mobile world has now become a Smart phone world.

For almost every profession now, an App exists for some sort of help and support. Similarly for agriculture as well there exist many apps that can provide help to the farmers in different ways. We have studied a large number of Apps from around the world giving different kind of assistance in agriculture and we would like to analyze themin this article. We categorize these apps according to the kind of support they provide. Categories as observed in various apps are as the following:

1. Data Logging and management – Apps under this category assist farmers in maintaining data records associated with farmactivities. Generally apps provide selection lists and numerical input boxes where user can insert required information. A prominent feature of such apps is that they generate various views and statistics to review organized data records. Many farmmanagement apps performbasic cost calculations as well. Some relevant apps we have observed in this field are Manure Monitor and Wireless Farmer.

- Manure Monitor – This application assists a farmer in managing and logging data regarding manure. Base of the application depends on the data fed by the user. A simple and comfortable interface provides categorized inputs for farmer. Easy and big sized input buttons are used and the flow among menu moves very smoothly. A farmer can record rainfall, storage, animal mortality, manure transfer, waterline and equipment information. Apart fromthis, the App also provides some tutorials regarding manure. One great feature in the app is to create emergency plans and storing emergency contact information. Another important feature to be learnt fromthis App besides user interface is its self-sufficiency. The app keeps data local and doesn’ t depend on much internet connectivity for its operations. This ensures its utility in areas with poor or no internet access.
- Wireless Monitor – This app is designed entirely for farmmanagement. A standard data entry interface is provided to record information regarding different farmer tasks. For example area coverage, chemical usage, property records etc. are recorded for cost management. Crop monitoring tasks by regular data logging are provided. Information regarding pesticide spray, planting, ground preparation etc. can be stored in the app and then reviewed categorically.

2. Location based apps – These apps use map and location details for their operations. They provide various facilities which rely on location parameters of the user or of the services he is looking for. These apps are essentially used as Market finder apps for farmers to sell their produce. We analyzed few apps like Delaware Fresh and Michigan FarmMarket Finder.

- Delaware Fresh – This is a location based app which provides interface in the formof a map. It is local to Delaware and provides details of a large number of farmer markets in the area. It offers location detection thus enabling the user to search for a market nearby. After location point selection fromthe map, the app provides contact and time details of market with additional options of locating on map, calling the market, sending mail or visiting their website. Such operations accessible directly fromthe map make the use and navigation simple and efficient. If available, the app also shows the available offerings fromthe market.

- Michigan Farm Market Finder – This app also provides farm market information. It gives multiple interface methods – map based and alphabetically sorted list. A large number of farm markets in Michigan State are listed with detailed data. Every location has its address, contact details, hours of operation, operating acres listed along. Also it shows all amenities available in that farm market ranging from fruit and vegetable to presence of recreational area in the market. The app also provides GPS routing to reach to the location.

3. Agriculture specific calculation apps – These are specially designed apps from experts in agriculture. They contain pre-fed data and values according to which calculations are performed regarding agriculture information. For example, apps like MRTN calculator and Feed cost calculator take some numerical input from the user, ask for some value selections from lists, and perform calculations to provide useful results. These apps highlight use of numerical input and not much text information, which helps manage language problems to a certain extent.
4. News and information specific – This is the most common app category for any domain. Apps that provide news and information are highly useful and popular among users. In agriculture also many apps like Farmprogress, Ag Weather tools etc. serve the purpose of delivering information relevant to agriculture stakeholders. From farmers' perspective, there are many apps that provide seed price, equipment price and similar information. Another major section of informative apps are the weather information apps. In some apps, weather forecast is provided with advisory messages as well. As a result, these apps become an additional knowledge tool for the users and help them perform activities in a well informed environment.

Broadly, these four categories cover almost all the apps observed in this area of agriculture. Recently, agriculture apps have been promoted on App stores as well under category of " Gardening Apps" . It is really wonderful to see how App development is touching each and every occupation. Purchase stats on many of these apps are going good as well, signifying their increased usage. This is definitely a great direction for developing support tools for farmers and other agriculture stakeholders and we expect booming app development for farmers all around the world.

LECTURE :15

DEISION SUPPORT SYSTEM(DSS):

A **decision support system**(**DSS**) is an information systemthat supports business or organizational decision-making activities. DSSs serve the management, operations and planning levels of an organization (usually mid and higher management) and help people make decisions about problems that may be rapidly changing and not easily specified in advance—i.e. unstructured and semi-structured decision problems. Decision support systems can be either fully computerized or human-powered, or a combination of both.

COMPONENTS OF DSS

Three fundamental components of a DSS architecture are the database (or knowledge base),

1. the model (i.e., the decision context and user criteria)
2. the user interface.

The users themselves are also important components of the architecture.

DSS characteristics

Without a consensus regarding the DSS definition, it is not easy to find the consensus about DSS characteristics. Often cited, crucial, but still very broad DSS characteristics defined by Alter are:

- DSS are designed specifically to facilitate decision processes.
- DSS should support rather than automate decision making.
- DSS should be able to respond quickly to the changing needs of decision makers.

However, some more characteristics need to be added:

- DSSs incorporate both data and models
- DSSs objective is to improve the effectiveness of the decisions, not the efficiency with which decisions are being made
- DSSs provide support for decision makers mainly in semi-structured and unstructured situations by bringing together human judgment and computerized information
- DSSs must be designed to interact directly with the decision maker in such a way that the user has a flexible choice and a sequence of knowledgemanagement activities .

Concept of DSS Communications-Driven DSS is a type of DSS that emphasizes communications, collaboration and shared decision making support [8]. It merely serves as an infrastructure that enables messaging, while humans performall decision making. The decisions are mostly "verbal" and generally, the systemdoes not store the results of decisions. Document-Driven DSS is a relatively newfield in Decision Support. Document-Driven DSS is focused on the retrieval and management of unstructured documents [8]. Similar to Communication-driven DSS, it merely serves as an infrastructure. Data-driven DSS originates fromdatabases, where the components, methods (Data Warehousing and Online Analytical Processing) and technologies are well defined and elaborated. The focus of this article further on will be on two other types of DSS: Model-driven and Knowledge-driven DSS. In following sections, a more detailed schematic viewof these two types is presented, trying to give the answer which type of DSS to use when one is faced with a concrete problem 3.1. Model-driven and Knowledge-driven DSS A simplified previewof main objectives and differences between MD-DSS and KDDSS is presented in Figure 1. The Figure consists of five components: 1) User – a person who uses DSS 2) User Interface – part of the systemwhich communicates with the user; described to more details in the next chapter User Interface Model base Inference Engine Knowledge Base User Results Requests Model-driven DSS Knowledge-driven DSS Hybrid DSS Figure 1. Decision Support Systemconceptual schema 3) Model Base – a set of analytical and optimization tools which performthe decision making process 4) Inference Engine – a part of the systemwhich makes conclusions 5) Knowledge Base – information (knowledge) including data and rules stored in a database Links (arrows) between these components contain data, which flowthrough the system 1) Requests – refer to user requirements entered through the user interface; they are more or less adapted – depends on user interface; they are sent to Inference Engine, where they are processed 2) Results – solution to user requests sent from Inference Engine to the User Interface 3) Data – requests for data, or new information fromInference Engine; and data achieved fromthe Knowledge Base component In a Model-driven DSS, the main role plays Model Base, while Knowledge Base is not necessarily present. Data are received either through User Interface and sent to Model Base, either stored to data store by loading a file or have been previously collected. The amount of data used in the model-driven DSS is small. In a Knowledge-driven DSS, the central part is Knowledge Base (i.e. a large amount of data representing knowledge fromspecific domain and relationships between the data). Inference Engine performs the whole decision making process with regard to user requests. A problemarea often necessitates both a mathematical model and a large database to be present and we do not have clear difference whether the systembelongs to a MD-DSS or KD-DSS. In such a hybrid DSS, both the Model Base and the Knowledge Base are present.

AGRICULTURE EXPERT SYSTEM

Objective of this chapter is to present an overview on expert systemand details on proposed expert systemframework development for irrigation scheduling. The first section provides a brief overview on chronological development of the expert systems. This section covers various types of expert systemdevelopment methodologies along with their key features. An important class of expert system- Knowledge Base Systems (KBSs) is discussed with agriculture domain in focus. This section critically presents some of the prominent KBS of agriculture domain. The subsequent section covers the Knowledge Engineering (KE) approach for the development of KBS. Modeling approach in KE is more practical and realistic to build the large KBSs. Comparison between conventional transfer knowledge and modeling approach is also presented. The last sub-section presents the framework development for expert systemof irrigation scheduling in the popular modeling approaches – CommonKADS. Taxonomy of CommonKADS modeling methodologies is presented in this chapter. It also shows that the proposed framework is useful to accomplish the scalability and seamless functionality of the proposed agriculture expert system

1 Overview of Expert Systems Expert Systems (ES):

development is considered as a division of the Artificial Intelligence fraternity. The core idea of ES development is to convert the available human knowledge into the computer. So, this knowledge can be used as and when required. The expert systemprovides the knowledge in the usable form The expert systems proved powerful tool to solve many real worldproblems of technological, social, agricultural and life science spheres. This has been resulted in the ES development as a prominent area of research not only for the Artificial Intelligence branch but also for many interdisciplinary research works. The next section discusses the classifications of ES methodologies. The subsequent section focuses on ES found in the agriculture domain. The proposed systemcomes under Knowledge Based System(KBS) category. This section gives a historical development of KBS and overview on several working KBS in agriculture and other areas. This discussion helps to build up the further topic of the chapter.

Classification of ES Methodologies

The development of the concept of an Expert Systemstarted in early eighties. Early years’ working systems are listed in a report of University of Stanford (Buchanm, 1985). Noticeable implementations of Expert Systems picked up during early 90s. This is mainly due to development of high capacity computers and availability of internet. A comprehensive classification of methodologies and applications of expert systems developed in last couple of decades found in the literature. (Liao, 2004), (Årén, 1992). The classifications of the expert systems are made on the basis of the methods used to develop the ES. The leading types of ES are rule-based systems (Plant & Vayssieres, 2000), (Mahaman, Passam, Sideridis, & Yialouris, 2003), knowledge-based systems (Girard & Hubert, 1999), (Baeza, Ferreira, & Laufuente, 2000), neural network based systems (Wang, Qu, Liu, & Cheng, 2004), fuzzy based systems (Benson & Asgarpoor, 2000) and case-based reasoning (CBR) (Abidi & Manickam, 2002). Apart fromthese, object oriented method, ontology based method, intelligent agent systems and database methodology are also gaining popularity in recent past. It is found that the ES applications are ubiquitous. Expert Systems’ applications found in the areas like - medical science, production.1.1 Classification of ES Methodologies

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applications found in the areas like - medical science, productionRule Based System Subsequent section presents a brief review on research work done to build ES for agriculture.

1.2 Expert Systems in Agriculture

Agriculture is as a complex and semi-structured system Due to its complexity, it emerges as one of the potential subject areas of Expert System(Eom& Kim, 2005). Increased demand of farm productivity and depleted natural resources made the agricultural support systemvery important interdisciplinary research topic in recent past. There are many different levels of expertise and complexity found in expert systems for agriculture. One can considered all these systemunder the umbrella of agricultural support systems. These systems encompass computer based solution to manage one or more spatial and temporal variability aspect associated with agricultural system Its aimis to improve productivity and profitability of the agricultural systemin presence of different variability (Pierce & Nowak, 1999), (Naiqian Zhang, 2002). It also helps to conserve the natural resources by their optimumusage. Thus the purpose of such systemis to make the overall agricultural systemsustainable. In research publication such systems broadly categorized as Decision Support System(DSS), Expert System(ES), Knowledge based (or Intelligent) DSS, and Web based DSS. The detailed taxonomy and classification are presented in (Manos, et. al 2004). Expert Systemaims to achieve better performance of specialized problemwith an involvement of computer program The computer programirrigation scheduling, farmmanagement, disease identification, disease forecasting and nutrition advisory (C.C. Shock, 2010), (Leib, Todd, & Gary, 2001), (Magarey, et. al 2007), (Papadopoulos, Kalivas, & Hatzichristos, 2011). Better accessibility of internet among the farmer communities made it an obvious choice to focus on web based agricultural DSS. In the recent past, several research publications demonstrate growing interest in this type of decision support systems. Field of Agricultural DSS is quite established and offers a wide variety of support system Detailed discussion on various crop specific management systems like – EPIC (Maize and Cowpeas), Glycim(Soybean), FASSET (Wheat), AGDSSP (Sugarcane), HADSS (Wheat), etc. is well presented in (Antonopoulou, et. al 2010). Such type of DSS mainly offers decision support exclusively for the concerned crop. The climate forecast information systemlike ‘AgClimate’ provides the prior information about the weather to mitigate climate variability issue (Fraisse, et al., 2006). Large amount of process specific Agricultural DSS for irrigation scheduling, nutrition management and pest management found in the research literature (Leib, Todd, & Gary, 2001), (Alminana, et. al 2010), (Papadopoulos, Kalivas, & Hatzichristos, 2011), (C.C. Shock, 2010), (Magarey, et. al 2007). It is found that the development approach considered in the majority of the Agricultural DSS is either rule based or knowledge transfer based. It is also found in the exhaustive survey on expert systemthat the model based knowledge engineering is not much popular in the development of Agricultural DSS (Liao, 2004). The core of knowledge modeling is to represent an expert systemas implementation-independent model of competence. It represents the structure of the systemprior to its implementation in a particular tool (Motta, 2001). The modeling approach to construct Knowledge Base Systems (KBS) becomes well accepted among the Knowledge Engineering (KE) communities due to its modular structure and ability to break down the knowledge engineering probleminto smaller tasks. Modeling approachbehaves like an expert person. Decision Support Systemhelps to take decision with the help of available data (or information) and domain knowledge for unstructured and semi-structured problem(Ford F. N., 1985). Although there is no specific depiction for IDSS and Web based DSS, one can interpret themas a hybrid systemof DSS and ES. Role of these systems are diagnostic, advisory, informative and operational. Application areas of these systems encompass wide-ranging activities of agricultural such asfor the development of DSS offers the broad idea of structure and modules of the support systembefore hand. There are many modeling frameworks proposed and subsequently used by the KE communities. The subsequent section presents brief discussion on development of Knowledge Based Systemin Knowledge Engineering perspective.

LECTURE :16

COMMUNICATION PROCESS

Communication is the process of conveying information between two or more people.

The **communication process** is the steps we take in order to achieve a successful communication

Communication Process

The communication process consists of several components. Let's take a look.

A **sender** is the party that sends a message. Lindsey, of course, will be the sender. She'll also need the **message**, which is the information to be conveyed. Lindsey will also need to **encode** her message, which is transforming her thoughts of the information to be conveyed into a form that can be sent, such as words.

A **channel of communication** must also be selected, which is the manner in which the message is sent. Channels of communication include speaking, writing, video transmission, audio transmission, electronic transmission through emails, text messages and faxes and even nonverbal communication, such as body language. Lindsey also needs to know the target of her communication. This party is called the **receiver**.

The receiver must be able to **decode** the message, which means mentally processing the message into understanding. If you can't decode, the message fails. For example, sending a message in a foreign language that is not understood by the receiver probably will result in decoding failure.

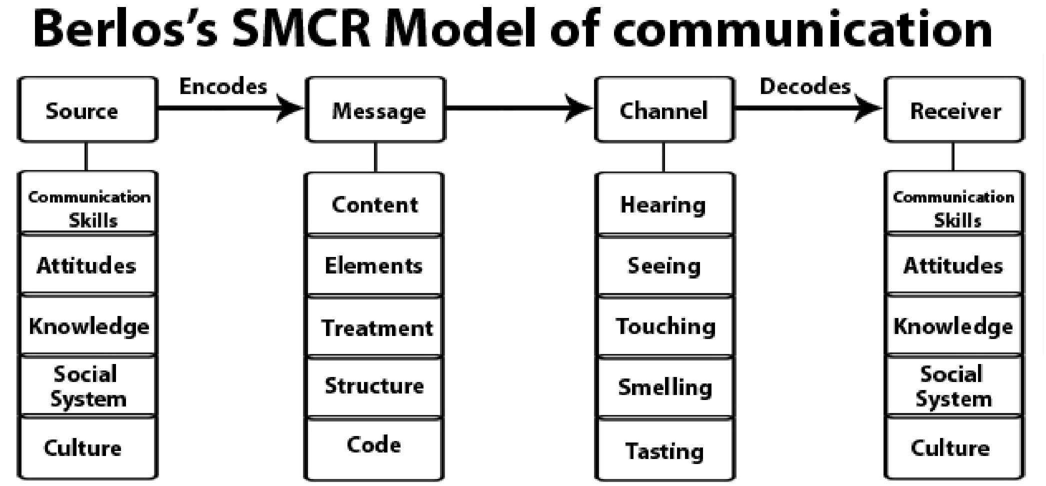
Sometimes, a receiver will give the sender **feedback**, which is a message sent by the receiver back to the sender. For example, a member of Lindsey's team may provide feedback in the form of a question to clarify some information received in Lindsey's message.

Models of communication

There are several types of communication models .. they are

1. **Shannon and Weaver**
2. **David Berlo**
3. **Schramm**
4. **Barnlund**
5. **Linear Model**
6. **Interactive Model etc… .**

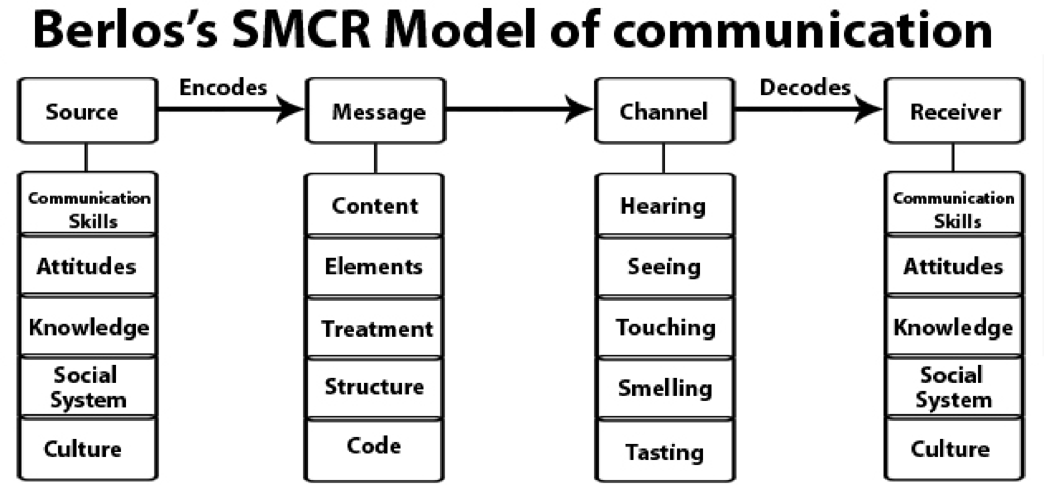
BERLO’S MODEL



The berlo’s model follows the smcr model this model is not specific to any particular communication.

Berlo’s model lives a number of factors under each of the elements :

Source: The source is were the message originates.



The berlo’s model follows the smcr model this model is not specific to any particular communication.

Berlo’s model lives a number of factors under each of the elements :

Source: The source is were the message originates.

Message: the content which carries the information or idea from the source.

Channel: the mediumthrough which the message is transferred fromsource to receiver.

Receiver: the receiver is where the message ultimately received.

Criticismof berlo’ s smcr model of communication:

1. No feedback / don’ t know about the effect
2. Does not mention barriers to communication
3. No roomfor noise
4. Complex model
5. It is a linear model of communication
6. Needs people to be on same level for communication to occur but not true in real life
7. Main drawback of the model is that the model omits the usage of sixth sense as a channel which is actually a gift to the human beings (thinking, understanding, analyzing etc).

FEEDBACK: The effect or response of receiver after receiving message.

BARRIERS OF COMMUNICATION

1. **Physical Barriers**
2. **Perceptual Barriers**
3. **Cultural Barriers**
4. **Emotional Barriers.**
5. **Language Barriers**
6. **Gender Barriers**
7. **Interpersonal Barriers**