

**R.G. KEDIA COLLEGE OF COMMERCE  
DEPARTMENT OF BUSINESS MANAGEMENT**

**SUBJECT SYNOPSIS**

**Subject: IT Applications For Management  
Year /Semester: I/I**

**Paper Code: MB-106**

**Academic Year: 2023-24  
SYLLABUS**

**Course Objectives:**

1. To provide real-time insights into the fundamentals of computers as business tools.
2. To study the role and Value addition of Information Technology in business
3. To enable students to develop proficiency in using certain components of the package includes MS Excel, MS Access

**Unit – I: Information Systems and Management:**

Computers – Definition, Characteristics, Components of Computers, Hardware, Software; Application and System Software, Programming Languages and their Classification, Role of IT in Business, Opportunities and Challenges in IT, Importance of IT in Business

**Unit – II: Emerging Trends in IT:**

Categories of IS, Management Information System (MIS), Decision Support System (DSS) - Types and architecture of DSS, Data Warehouse and Data Mining, Artificial Intelligence, Intelligent Systems, Cloud Computing, Mobile Apps and Computing, Big Data, Robotics, Virtual Reality, Internet of Things (IoT), 5G,

**Unit – III: Communications and Networks:**

Definition, Introduction to Networks, Overview of Networks, Types of Networks, Network Topologies, Components of Networks, Computer Network Models, Applications of Communications: Definition, Internet - Overview of Internet, Architecture and Functioning of Internet, WWW, FTP, Telnet, Gopher, Browsers and Search Engines, Teleconference, Web Conferencing platforms.

**Unit – IV: Functional Areas of Information Systems:**

Management Levels and Functional Systems, Manufacturing, Production, Sales and Marketing Systems, Accounting, Finance and HR Systems, **Enterprise Systems and Applications:** Concepts of ERP, SCM, CRM, CPFR, Knowledge Management Systems, System Development Life Cycle (SDLC), Electronic Fund Transfer (EFT)

**Unit – V: Security and Ethical challenges in IT:**

Need for Security - Security Threats and Attacks, Malicious Software, Hacking, Security Services - Security Mechanisms - Cryptography, Digital signature, Firewall - Types of Firewalls - Identification & Authentication - Biometric Techniques - Security policies - Need

for legislation, cyber laws, cyber security issues, salient features of IT Act.

**Suggested Books:**

1. Lucas, Henry C. Jr. (2017), “.Information Technology for Management”, 7th Ed, McGraw Hill Education.
2. Efraim Turban, Linda Volonino, Gregory R. Wood, “Information Technology for Management - Advancing Sustainable, Profitable Business Growth”, 9th ed., Wiley
3. Anita Goel, “Computer Fundamentals”, Pearson Publishing
4. B. Muthukumaran, “Information Technology for Management”, 2010, Oxford
5. Westerman, George, et al. (2014),” Leading Digital: Turning Technology into Business Transformation”, Harvard Business Publishing.
6. Williams, B. K., & Sawyer, S. C. (2014), “Using information technology: A practical Introduction to Computers & Communications”, 11th ed., McGraw Hill Education.

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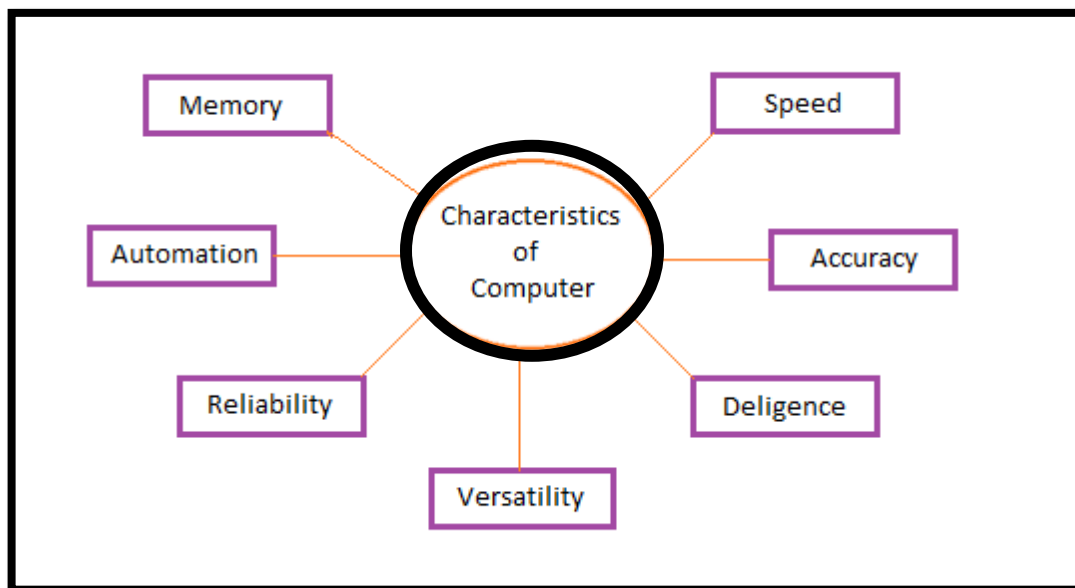
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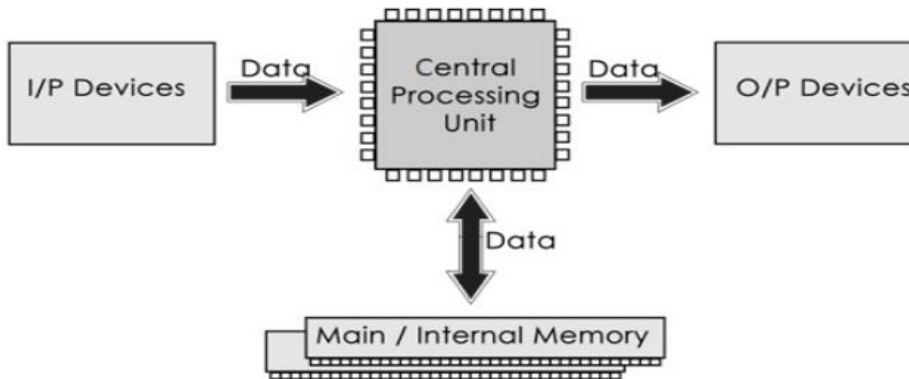
**DEFINITIONS:** INFORMATION SYSTEMS AND MANAGEMENT: A management information system is an information system used for decision-making, and for the coordination, control, analysis, and visualization of information in an organization. The study of the management information systems involves people, processes and technology in an organizational context.

A COMPUTER is a machine that can be programmed to carry out sequences of arithmetic or logical operations automatically. Modern computers can perform generic sets of operations known as programs. These programs enable computers to perform a wide range of tasks.



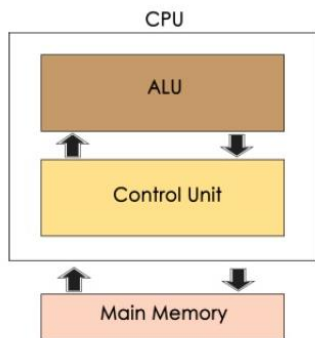
## Components of Computer System

Computer systems consist of three components as shown in below image: **Central Processing Unit, Input devices and Output devices**. Input devices provide data input to processor, which processes data and generates useful information that's displayed to the user through output devices. This is stored in computer's memory.



### Central Processing Unit

The Central Processing Unit (CPU) is called "the brain of computer" as it controls operation of all parts of computer. It consists of two components: Arithmetic Logic Unit (ALU), and Control Unit.



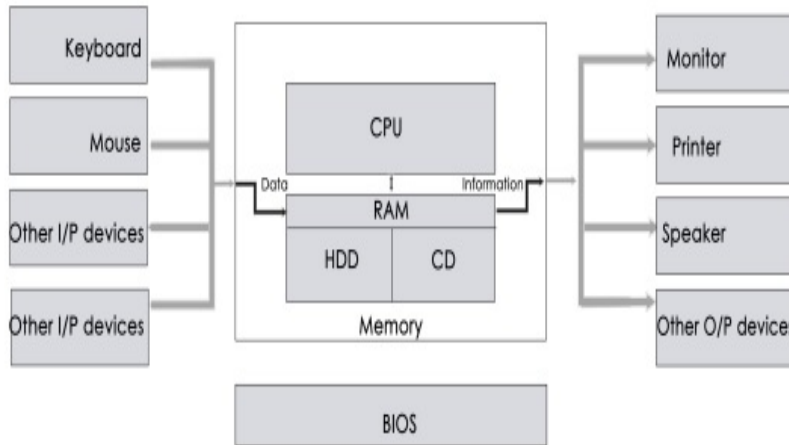
### Arithmetic Logic Unit (ALU)

Data entered into computer is sent to RAM, from where it is then sent to ALU, where rest of data processing takes place. All types of processing, such as comparisons, decision-making and processing of non-numeric information takes place here and once again data is moved to RAM.

### Control Unit

As name indicates, this part of CPU extracts instructions, performs execution, maintains and directs operations of entire system.

COMPUTER HARDWARE includes the physical parts of a computer, such as the case, central processing unit, monitor, mouse, keyboard, computer data storage, graphics card, sound card, speakers and motherboard. By contrast, software is the set of instructions that can be stored and run by hardware

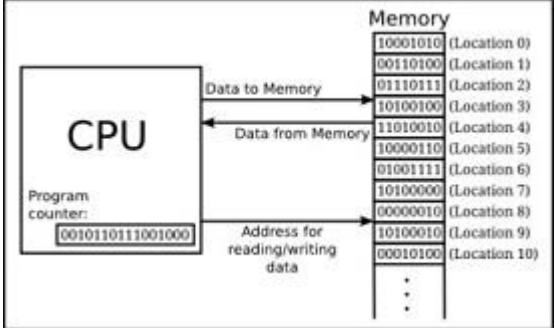


SOFTWARE- software, instructions that tell a computer what to do. Software comprises the entire set of programs, procedures, and routines associated with the operation of a computer system. ... A set of instructions that directs a computer's hardware to perform a task is called a program, or software program.

APPLICATION SOFTWARE - application (app), application program or application software is a computer program designed to help people perform an activity. Depending on the activity for which it was designed, an application can manipulate text, numbers, audio, graphics, and a combination of these elements.

SYSTEM SOFTWARE is software designed to provide a platform for other software. Examples of system software include operating systems like macOS, Linux, Android and Microsoft Windows, computational science software, game engines, search engines, industrial automation, and software as a service applications.

Sr.No.	Software	Hardware
1	It is a collection of programs to bring computer hardware system into operation.	It includes physical components of computer system.

2	It includes numbers, alphabets, alphanumeric symbols, identifiers, keywords, etc.	It consists of electronic components like ICs, diodes, registers, crystals, boards, insulators, etc.
3	Software products evolve by adding new features to existing programs to support hardware.	Hardware design is based on architectural decisions to make it work over a range of environmental conditions and time.
4	It will vary as per computer and its built-in functions and programming language.	It is mostly constructed for all types of computer systems.
5	It is designed and developed by experienced programmers in high-level language.	The hardware can understand only low-level language or machine language.
6	It is represented in any high-level language such as BASIC, COBOL, C, C++, JAVA, etc.	<p>The hardware works only on binary codes 1's and 0's.</p> 
7	The software is categorized as operating system, utilities, language processor, application software, etc.	The hardware consists of input devices, output devices, memory, etc.

**PROGRAMMING LANGUAGE** is a formal language comprising a set of strings that produce various kinds of machine code output. Programming languages are one kind of computer language, and are used in computer programming to implement algorithms. Most programming languages consist of instructions for computers.

### **CLASSIFICATION OF LANGUAGES**

❖ **LOW-LEVEL LANGUAGE** - The low-level language is a programming language that provides no abstraction from the hardware, and it is represented in 0 or 1 forms, which are the machine instructions. The languages that come under this category are the Machine level language and Assembly language.

- **MACHINE-LEVEL LANGUAGE** - The machine-level language is a language that consists of a set of instructions that are in the binary form 0 or 1. Computers can understand only machine instructions, which are in binary digits, i.e., 0 and 1, so the instructions given to the computer can be only in binary codes. Creating a program in a machine-level language is a very difficult task as it is not easy for the programmers to write the program in machine instructions. It is error-prone as it is not easy to understand, and its maintenance is also very high. A machine-level language is not portable as each computer has its machine instructions, so if we write a program in one computer will no longer be valid in another computer.
- **ASSEMBLY LANGUAGE** - The assembly language contains some human-readable commands such as mov, add, sub, etc. The problems which we were facing in machine-level language are reduced to some extent by using an extended form of machine-level language known as assembly language. Since assembly language instructions are written in English words like mov, add, sub, so it is easier to write and understand.

❖ **HIGH-LEVEL LANGUAGE** - The high-level language is a programming language that allows a programmer to write the programs which are independent of a particular type of computer. The high-level languages are considered as high-level because they are closer to human languages than machine-level languages.

#### Differences between Machine-Level language and Assembly language

The following are the differences between machine-level language and assembly language:

Machine-level language	Assembly language
The machine-level language comes at the lowest level in the hierarchy, so it has zero abstraction level from the hardware.	The assembly language comes above the machine language means that it has less abstraction level from the hardware.
It cannot be easily understood by humans.	It is easy to read, write, and maintain.

The machine-level language is written in binary digits, i.e., 0 and 1.	The assembly language is written in simple English language, so it is easily understandable by the users.
It does not require any translator as the machine code is directly executed by the computer.	In assembly language, the assembler is used to convert the assembly code into machine code.
It is a first-generation programming language.	It is a second-generation programming language.

JAVA- Is Java an island of Indonesia archipelago? Yes, that's correct. However, Java is very well known as a software platform, a computer programming language, and a fast growing and widely used technology worldwide. The Java programming language was invented by JAMES GOSLING in 1995 and became a core component of the Java platform which is developed by Sun Microsystems Inc. (and now by Oracle Inc.). Today, Java is one of the most popular computer programming languages and computing platforms. Java is everywhere: on personal computers, enterprise servers, super computers, mobile phones, embedded devices... and even on Mars exploring robots. Java can do everything you can imagine: allows playing games on mobile phones, chatting via webcam, rendering 3D models, processing banking transactions, controlling robots.

C# (see sharp) is a general-purpose, multi-paradigm programming language. C# encompasses static typing, strong typing, lexically scoped, imperative, declarative, functional, generic, object-oriented (class-based), and component-oriented programming disciplines. C# was designed by ANDERS HEJLSBERG from Microsoft in 2000 and was later approved as an international standard by Ecma (ECMA-334) in 2002 and ISO (ISO/IEC 23270) in 2003. Microsoft introduced C# along with .NET Framework and Visual Studio, both of which were closed-source. At the time, Microsoft had no open-source products. Four years later, in 2004, a free and open-source project called Mono began, providing a cross-platform compiler and runtime environment for the C# programming language. A decade later, Microsoft released Visual Studio Code (code editor), Roslyn (compiler), and the unified .NET platform (software framework), all of which support C# and are free, open-source, and cross-platform. Mono also joined Microsoft but was not merged into .NET. As of 2021, the most recent version of the language is C# 10.0, which was released in 2021 in .NET 6.0

PYTHON is an interpreted high-level general-purpose programming language. Its design philosophy emphasizes code readability with its use of significant indentation. Its language



constructs as well as its object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects

R is a programming language and free software environment for statistical computing and graphics. It is supported by the R Core Team and the R Foundation for Statistical Computing. It is widely used among statisticians and data miners for developing statistical software and data analysis.

MATLAB (an abbreviation of "MATrix LABoratory") is a proprietary multi-paradigm programming language and numeric computing environment developed by MathWorks. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages. Although MATLAB is intended primarily for numeric computing, an optional toolbox uses the MuPAD symbolic engine allowing access to symbolic computing abilities. An additional package, Simulink, adds graphical multi-domain simulation and model-based design for dynamic and embedded systems. As of 2020, MATLAB has more than 4 million users worldwide. MATLAB users come from various backgrounds of engineering, science, and economics.

PROCEDURAL LANGUAGE is a type of computer programming language that specifies a series of well-structured steps and procedures within its programming context to compose a program. It contains a systematic order of statements, functions and commands to complete a computational task or program.

FUNCTIONAL PROGRAMMING LANGUAGES are specially designed to handle symbolic computation and list processing applications. Functional programming is based on mathematical functions. Some of the popular functional programming languages include: Lisp, Python, Erlang, Haskell, Clojure, etc. ...

OBJECT-ORIENTED PROGRAMMING is a programming paradigm built on the concept of objects that contain both data and code to modify the data. Object-oriented programming mimics a lot of the real-world attributes of objects. Some of the most widely used object-oriented programming languages are Java, C++, and Ruby

Visual Programming Language (VPL) is any programming language that lets users create programs by manipulating program elements graphically rather than by specifying them textually.

LOGIC PROGRAMMING is a programming paradigm that is based on logic. This means that a logic programming language has sentences that follow logic, so that they express facts and rules. Computation using logic programming is done by making logical inferences based on all available data. E.g. virtusa

What is difference between scripting and programming language?

SCRIPTING LANGUAGES is a subset of programming languages. The basic difference between both is that programming languages are compiled whereas scripting languages are interpreted, and the programming languages run independently but scripts do not.

The main difference between SERVER-SIDE SCRIPTING AND CLIENT-SIDE SCRIPTING is that the server side scripting involves server for its processing. ... The client-side script executes the code to the client side which is visible to the users while a server-side script is executed in the server end which users cannot see.

QUERY LANGUAGE is a specialized programming language for searching and changing the contents of a database. ... There are also graphical query languages, such as Query-By-Example (QBE), where the queries are expressed graphically and then translated into textual queries interpreted by the DBMS.

MARKUP LANGUAGE is metadata for annotating a document, which is visually distinguishable from how the user typically sees the document. It is used only for formatting the text, thus when the document is rendered for display, the markup language doesn't appear.

#### PROGRAMMING LANGUAGES FOR ANDROID APP DEVELOPMENT

1. Java. Firstly Java was the official language for Android App Development (but now it was replaced by Kotlin) and consequently, it is the most used language as well. ...
2. Kotlin. ...
3. C++ ...
4. C# ...
5. Python. ...
6. HTML, CSS, JavaScript. ...
7. Dart.

#### **ROLE OF IT IN BUSINESS, OPPORTUNITIES AND CHALLENGES IN IT, IMPORTANCE OF IT IN BUSINESS**

From your company's online store to the enterprise software your business uses to record transactions and gather information, information technology has an essential role in your small business's daily operations and success. The role of IT in business is seen in how it can help your company become more productive, increase performance, save money, improve the customer experience, streamline communications and enhance managerial decision-making. It also plays a

role in helping companies expand globally and in providing staff access to company information wherever and whenever they need it.

### **Improved Organizational Communication**

An important use of technology in business is for communication through platforms such as conferencing software, email, video chat, company intranets and the internet in general. IT allows businesses to easily hold virtual meetings with staff and clients around the world without having to spend time and money on travel. At the same time, employees can access and share information and collaborate on their work regardless of location; employees can even work remotely so that the company can save on costs. Companies can also use platforms such as social media to address customer concerns more efficiently.

### **More Efficient Daily Operations**

Another role of IT in business is to improve the efficiency of operations so that the company can complete tasks quicker and cheaper. This often happens with the help of enterprise software and a centralized company database.

Rather than having to get workers to count and monitor inventory, companies can use inventory management software that checks real-time levels, provides helpful reports to managers and can even trigger orders when the supply is low. Customer relationship management software has automated common sales and marketing tasks such as generating leads, sending promotions and tracking metrics. Companies can also take advantage of fully featured enterprise resource planning software to make it easier to do accounting tasks, manage human resources, monitor the supply chain, generate invoices and make supply purchases.

### **Better Customer Experience**

IT also makes it easier to provide a good customer experience through improved customer service, easier customized marketing and e-commerce. Rather than only being able to reach the company during business hours, customers can conveniently interact with the company on its website and through social media, email and custom instant messaging services. Through tracking customers' previous purchases with marketing software, companies can send customized promotions that better meet customers' needs and result in more likely sales. Customers also benefit from being able to purchase products and services from the company's website, and this also increases the potential for more revenue and growth for the company.

### **Information Technology and Business Decision-Making**

The role of information technology in management decision-making is seen in tools such as ERP software and decision support systems that help managers see company performance data in real time so that they can make more informed decisions. Such software presents an online dashboard

with information about the company's finances, customers, sales and marketing trends and inventory levels. Managers can use the data to decide which products to promote or stop selling, where to cut expenses, which customers need support and when to place supply and materials orders.

#### Other Business Roles of IT

Other examples of IT's role in business include the following:

Internet-enabled systems, such as secure entry systems and wireless cameras, help improve business security and reduce risks of theft and loss of confidential information.

IT allows companies to store important company data in a database in the cloud to reduce paper waste, increase security and allow for easy backups.

IT allows companies to expand internationally as easily as setting up a multi-language website that markets to global customers and allows purchases in multiple currencies.

Companies can use online recruitment to find more qualified job candidates and handle most of the hiring process online.

From enabling telecommuting to reducing energy use through modern systems, IT has a role in company sustainability that can save money and improve the company's reputation.

Thanks to IT, getting the latest information about your competitors and the market is as easy as searching Google on your computer or smartphone.

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**INFORMATION SYSTEMS**

"classic" view - a pyramid of systems that reflected the hierarchy of the organization, transaction processing systems at the bottom, management information systems, decision support systems, and executive information systems at the top. New categories of information systems have emerged which no longer fit easily into the original pyramid model.

Some examples of such systems are:

Data warehouses

Enterprise resource planning

Enterprise systems

Expert systems

Search engines

Geographic information system

Global information system

Office automation.

MANAGEMENT INFORMATION SYSTEM (MIS) provides information that organizations require to manage themselves efficiently and effectively. Management information systems are typically computer systems used for managing. Management information systems (MIS),

produce FIXED, REGULARLY SCHEDULED REPORTS based on DATA EXTRACTED AND SUMMARIZED from the firm's underlying TRANSACTION PROCESSING SYSTEMS to MIDDLE AND OPERATIONAL LEVEL MANAGERS to identify and inform STRUCTURED and SEMI-STRUCTURED DECISION problems. EXCEPTION REPORTS are produced only when exceptional conditions occur. Exception reporting reduces information overload instead of overwhelming decision makers with periodic detailed reports of business activity. DEMAND REPORTS AND RESPONSES are available when the managers require immediate access to vital information. WEB BROWSERS, DBMS QUERY LANGUAGES, AND REPORT GENERATORS enable managers to get this information and not force them to wait for periodic detailed reports of business activity. PUSH REPORTING is information that is pushed directly to the manager's respective networked workstation. WEBCASTING software is being more frequently utilized to broadcast selective reports and other vital information.

The FIVE PRIMARY COMPONENTS: 1.) Hardware, 2.) Software, 3.) Data (information for decision making), 4.) Procedures (design, development and documentation), and 5.) People (individuals, groups, or organizations).

Kenneth C. Laudon and Jane Laudon identify FIVE ERAS of MIS EVOLUTION corresponding to the FIVE PHASES IN THE DEVELOPMENT of computing technology: 1) mainframe and minicomputer computing, 2) personal computers, 3) client/server networks, 4) enterprise computing, and 5) cloud computing. This, along with high speed cellphone and Wi-Fi networks, led to new levels of mobility in which managers access the MIS remotely with laptop and tablet computers, plus smartphones.

Advantages-

Companies are able to highlight their STRENGTHS AND WEAKNESSES due to the presence of revenue reports, employees' performance record etc. The identification of these aspects can help the company improve their business processes and operations.

Giving an overall picture of the company and acting as a COMMUNICATION AND PLANNING TOOL.

The availability of the customer data and feedback can help the company to align their business processes according to the needs of the customers. The effective management of customer data can help the company to perform DIRECT MARKETING AND PROMOTION activities.

Management Information Systems can help a company gain a COMPETITIVE ADVANTAGE. Competitive advantage is a firm's ability to do something better, faster, cheaper, or uniquely, when compared with rival firms in the market.

DECISION SUPPORT SYSTEM (DSS)

A DSS is a computer-based information system that 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 to make decisions, which may be rapidly changing and not easily specified in advance (UNSTRUCTURED AND SEMI-STRUCTURED DECISION problems). Decision support systems can be either fully computerized, human or a combination of both.

DSS tends to be aimed at the less well structured, underspecified problem that upper level managers typically face;

DSS attempts to COMBINE THE USE OF MODELS OR ANALYTIC TECHNIQUES with traditional DATA ACCESS AND RETRIEVAL FUNCTIONS;

DSS specifically focuses on features which make them easy to use by non-computer people in an INTERACTIVE MODE; and

DSS emphasizes FLEXIBILITY AND ADAPTABILITY to accommodate changes in the environment and the decision making approach of the user.

DSS compiles useful information from a COMBINATION OF RAW DATA, DOCUMENTS, AND PERSONAL KNOWLEDGE, OR BUSINESS MODELS to identify and solve problems and make decisions.

Developed by Carnegie Institute of Technology- Executive Information Systems (EIS), Group Decision Support Systems (GDSS), and Organizational Decision Support Systems (ODSS) evolved from DSS. DATA WAREHOUSING AND ON-LINE ANALYTICAL PROCESSING (OLAP) began broadening the realm of DSS. As the turn of the millennium approached, new Web-based analytical applications were introduced.

DSS also have a weak connection to the USER INTERFACE PARADIGM OF HYPERTEXT. Both the University of Vermont PROMIS system (for medical decision making) and the Carnegie Mellon ZOG/KMS system (for military and business decision making) were decision support systems which also were major breakthroughs in user interface research.

Executive dashboard and other business performance software allow faster decision making, identification of negative trends, and better allocation of business resources. Due to DSS all the information from any organization is represented in the form of charts, graphs i.e. in a summarized way, which helps the management to take strategic decision.

## TAXONOMIES

Using the RELATIONSHIP WITH THE USER as the criterion, Haettenschwiler differentiates passive, active, and cooperative DSS. A PASSIVE DSS is a system that aids the process of

decision making, but that cannot bring out explicit decision suggestions or solutions. An ACTIVE DSS can bring out such decision suggestions or solutions. A COOPERATIVE DSS allows the decision maker (or its advisor) to modify, complete, or refine the decision suggestions provided by the system, before sending them back to the system for validation. The system again improves, completes, and refines the suggestions of the decision maker and sends them back to him for validation. The whole process then starts again, until a consolidated solution is generated.

Using the MODE OF ASSISTANCE as the criterion, Daniel Power differentiates COMMUNICATION-DRIVEN DSS, DATA-DRIVEN DSS, DOCUMENT-DRIVEN DSS, KNOWLEDGE-DRIVEN DSS, AND MODEL-DRIVEN DSS.

A communication-driven DSS supports more than one person working on a shared task; examples include integrated tools like GOOGLE DOCS or GROOVE

A data-driven DSS or data-oriented DSS emphasizes access to and manipulation of a TIME SERIES of internal company data and, sometimes, external data.

A document-driven DSS manages, retrieves, and manipulates unstructured information in a variety of electronic formats.

A knowledge-driven DSS provides specialized problem-solving expertise stored as FACTS, RULES, PROCEDURES, OR IN SIMILAR STRUCTURES.

A model-driven DSS emphasizes access to and manipulation of a STATISTICAL, FINANCIAL, OPTIMIZATION, OR SIMULATION MODEL. Model-driven DSS use data and parameters provided by users to assist decision makers in analyzing a situation; they are not necessarily data-intensive.

Using SCOPE as the criterion, Power differentiates ENTERPRISE-WIDE DSS and DESKTOP DSS. An enterprise-wide DSS is linked to large data warehouses and serves many managers in the company. A desktop, single-user DSS is a small system that runs on an individual manager's PC.

Holsapple and Whinston classify DSS into the following six frameworks: TEXT-ORIENTED DSS, DATABASE-ORIENTED DSS, SPREADSHEET-ORIENTED DSS, SOLVER-ORIENTED DSS, RULE-ORIENTED DSS, AND COMPOUND DSS.

The support given by DSS can be separated into three distinct, interrelated categories: PERSONAL SUPPORT, GROUP SUPPORT, and ORGANIZATIONAL SUPPORT.



DSSs which perform selected cognitive decision-making functions and are based on artificial intelligence or intelligent agents technologies are called INTELLIGENT DECISION SUPPORT SYSTEMS (IDSS)

The nascent field of DECISION ENGINEERING treats the decision itself as an engineered object, and applies engineering principles such as Design and Quality assurance to an explicit representation of the elements that make up a decision.

**COMPONENTS of a DSS architecture are:**

- The database (or knowledge base),
- The model (i.e., the decision context and user criteria), and
- The user interface.

Inputs: Factors, numbers, and characteristics to analyze

User Knowledge and Expertise: Inputs requiring manual analysis by the user

Outputs: Transformed data from which DSS "decisions" are generated

Decisions: Results generated by the DSS based on user criteria

**DEVELOPMENT FRAMEWORKS**

Intelligence Searching for conditions that call for decision.

Design Inventing, developing and analyzing possible alternative actions of solution.

Choice Selecting a course of action among those.

Implementation Adopting the selected course of action in decision situation.

**DSS TECHNOLOGY LEVELS** (of hardware and software) may include:

The ACTUAL APPLICATION that will be used by the user. This is the part of the application that allows the decision maker to make decisions in a particular problem area. The user can act upon that particular problem.

GENERATOR contains Hardware/software environment that allows people to easily develop specific DSS applications. This level makes use of CASE TOOLS or systems such as Crystal, Analytica and iThink.

TOOLS include lower level hardware/software. DSS generators including special languages, function libraries and linking modules

## **APPLICATIONS**

Inventories of information assets (including legacy and relational data sources, cubes, data warehouses, and data marts),

Comparative sales figures between one period and the next,

Projected revenue figures based on product sales assumptions.

Medical Diagnosis.

Bank Loan - verifying the credit of a loan applicant

Agricultural production, marketing for sustainable development (example, DSSAT4 package, developed through financial support of USAID to facilitate decision-making at the farm and policy levels)

Forest management - log transportation, harvest scheduling to sustainability and ecosystem protection

Canadian National Railway system tests its rails on a regular basis to detect worn-out ones

## **BENEFITS**

- Improves personal efficiency
- Speed up the process of decision making
- Increases organizational control
- Encourages exploration and discovery on the part of the decision maker
- Speeds up problem solving in an organization
- Facilitates interpersonal communication
- Promotes learning or training
- Generates new evidence in support of a decision
- Creates a competitive advantage over competition
- Reveals new approaches to thinking about the problem space
- Helps automate managerial processes
- Create Innovative ideas to speed up the performance

## **DSS CHARACTERISTICS AND CAPABILITIES**

- Solve semi-structured and unstructured problems
- Support managers at all levels

- Support individuals and groups
- Interdependence and sequence of decisions
- Support Intelligence, Design, Choice
- Adaptable and flexible
- Interactive and ease of use
- Interactive and efficiency
- Human control of the process
- Ease of development by end user
- Modeling and analysis
- Data access
- Standalone and web-based integration
- Support varieties of decision processes
- Support varieties of decision trees
- Quick response

GROUP DECISION SUPPORT SYSTEMS (GDSS)- A class of ELECTRONIC MEETING SYSTEMS, a COLLABORATION TECHNOLOGY designed to support MEETINGS and GROUP WORK focused on TASK SUPPORT They support SYNCHRONOUS VS ASYNCHRONOUS communication, as well as LOCAL vs DISTANT support, facilitating INTERDISCIPLINARY COLLABORATION, and promoting effective ORGANIZATIONAL LEARNING, SYNERGY, members are empowered TO BUILD ON IDEAS of others, more OBJECTIVE EVALUATION OF IDEAS, stimulation of individuals to INCREASE PARTICIPATION, group members imitate and learn from SUCCESSFUL BEHAVIORS of others, LESS ATTENTION BLOCKING, LESS CONFORMANCE PRESSURE, LESS AIRTIME FRAGMENTATION, LESS ATTENUATION BLOCKING, LESS SOCIALIZING, LESS INDIVIDUAL DOMINATION- distinct from Computer Supported Cooperative Work (CSCW) that provide general communication support .

### RESEARCH

1980s- a joint venture between IBM and US Department of Defense created a software solution to improve the decision alignment between various branches of the armed forces.

This first commercial (DOS-based) technology was developed by behavioral scientist Dr. Jerry Wagner and was called VisionQuest.

1990s- at the University of Texas, Austin campus, Dr. Wagner secured venture capital funding to develop new GDSS software, this time with the end goal of leveraging the Internet -WebIQ and is now called WIQ (by ynSyte).

1990s - University of Minnesota (the SAMM System) and the University of Arizona (PLEXSYS, later renamed GroupSystems). The Arizona research software was spun off as Ventana Corporation (now known as GroupSystems Inc.).

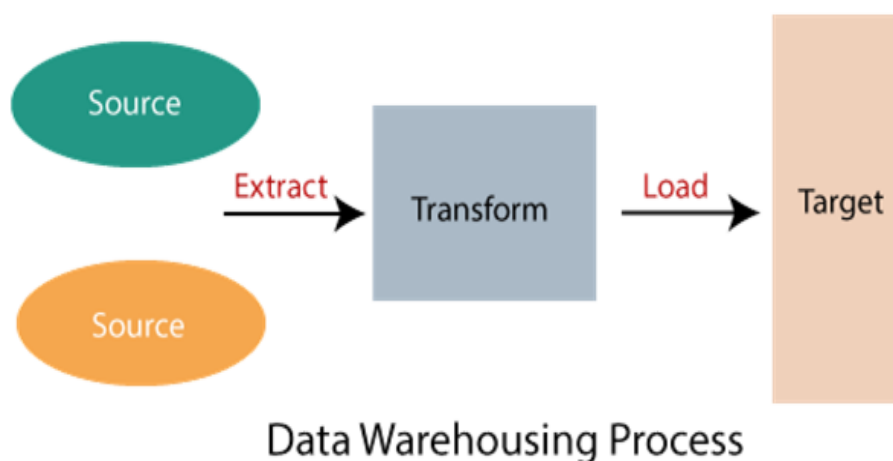
**COSTS, OR PROCESS LOSSES-** more free riding, more information overload, more flaming, slower feedback, fewer information cues, incomplete use of information.

**COMMERCIAL SOFTWARE PRODUCTS-** ynSyte's WIQ, spilter.nl, facilitate.com, MeetingSphere (formerly smartSpeed), Pownoodle, ThinkTank, Teamsupport.net, RiskID.nl.

There is also an initiative to create open-source software that can support similar group processes in education, where this category of software has been called a Discussion Support System.

### **DATA WAREHOUSING & BIG DATA**

**Data warehouse** refers to the process of compiling and organizing data into one common database, whereas **data mining** refers to the process of extracting useful data from the databases. The data mining process depends on the data compiled in the data warehousing phase to recognize meaningful patterns. A data warehousing is created to support management systems.



1. Data Warehouse is an architecture of data storing or data repository. Whereas Big Data is a technology to handle huge data and prepare the repository.
2. Any kind of DBMS data accepted by Data warehouse, whereas Big Data accept all kind of data including TRANSNATIONAL data, SOCIAL MEDIA data, MACHINERY data or any DBMS data.

3. Data warehouse only handles structured data (relational or not relational), but big data can handle structure, NON-STRUCTURE, SEMI-STRUCTURED data.
4. Big data normally used a DISTRIBUTED FILE SYSTEM to load huge data in a distributed way, but data warehouse doesn't have that kind of concept.
5. From a business point of view, as big data has a lot of data, analytics on that will be very fruitful, and the result will be more meaningful which help to take proper decision for that organization. Whereas Data warehouse mainly helps to analytic on informed information.
6. Data warehouse means the relational database, so storing, fetching data will be similar with normal SQL query. And big data is not following proper database structure, we need to use HIVE or SPARK SQL to see the data by using hive specific query.
7. 100% data loaded into data warehousing are using for analytics reports. But whatever data loaded by Hadoop, maximum 0.5% used on analytics reports till now. Others data are loaded into the system, but in not use status.
8. Data Warehousing never able to handle humongous data (totally unstructured data). Big data (Apache Hadoop) is the only option to handle humongous data.
9. The timing of fetching increasing simultaneously in data warehouse based on data volume. Means, it will take small time for low volume data and big time for a huge volume of data just like DBMS. But in case of big data, it will take a small period of time to fetching huge data (as it specially designed for handling huge data), but taken huge time if we somehow try to load or fetch small data in HDFS by using map reduce.

### Important Features of Data Warehouse

The Important features of Data Warehouse are given below:

#### **1. Subject Oriented**

A data warehouse is subject-oriented. It provides useful data about a subject instead of the company's ongoing operations, and these subjects can be customers, suppliers, marketing, product, promotion, etc. A data warehouse usually focuses on modeling and analysis of data that helps the business organization to make data-driven decisions.

#### **2. Time-Variant:**

The different data present in the data warehouse provides information for a specific period.

#### **3. Integrated**

A data warehouse is built by joining data from heterogeneous sources, such as social databases, level documents, etc.

**4. Non- Volatile**It means, once data entered into the warehouse cannot be change.

Advantages of Data Warehouse:

- More accurate data access
- Improved productivity and performance
- Cost-efficient
- Consistent and quality data

## **DATA MINING**

Data mining is the process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems. It is an essential process where intelligent methods are applied to extract data patterns. It is an interdisciplinary subfield of computer science. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use. Aside from the raw analysis step, it involves database and data management aspects, data pre-processing, model and inference considerations, interestingness metrics, complexity considerations, post-processing of discovered structures, visualization, and online updating. Data mining is the analysis step of the "knowledge discovery in databases" process, or KDD



The term is a misnomer, because the goal is the extraction of patterns and knowledge from large amounts of data, not the extraction (mining) of data itself. It also is a buzzword and is frequently

applied to any form of large-scale data or information processing (collection, extraction, warehousing, analysis, and statistics) as well as any application of computer decision support system, including artificial intelligence, machine learning, and business intelligence. The book Data mining: Practical machine learning tools and techniques with Java (which covers mostly machine learning material) was originally to be named just Practical machine learning, and the term data mining was only added for marketing reasons. Often the more general terms (large scale) data analysis and analytics – or, when referring to actual methods, artificial intelligence and machine learning – are more appropriate.

Important features of Data Mining:

The important features of Data Mining are given below:

- It utilizes the Automated discovery of patterns.
- It predicts the expected results.
- It focuses on large data sets and databases
- It creates actionable information.

### **Advantages of Data Mining:**

#### **i. Market Analysis:**

Data Mining can predict the market that helps the business to make the decision. For example, it predicts who is keen to purchase what type of products.

#### **ii. Fraud detection:**

Data Mining methods can help to find which cellular phone calls, insurance claims, credit, or debit card purchases are going to be fraudulent.

#### **iii. Financial Market Analysis:**

Data Mining techniques are widely used to help **Model Financial Market**

#### **iv. Trend Analysis:**

Analyzing the current existing trend in the marketplace is a strategic benefit because it helps in cost reduction and manufacturing process as per market demand.

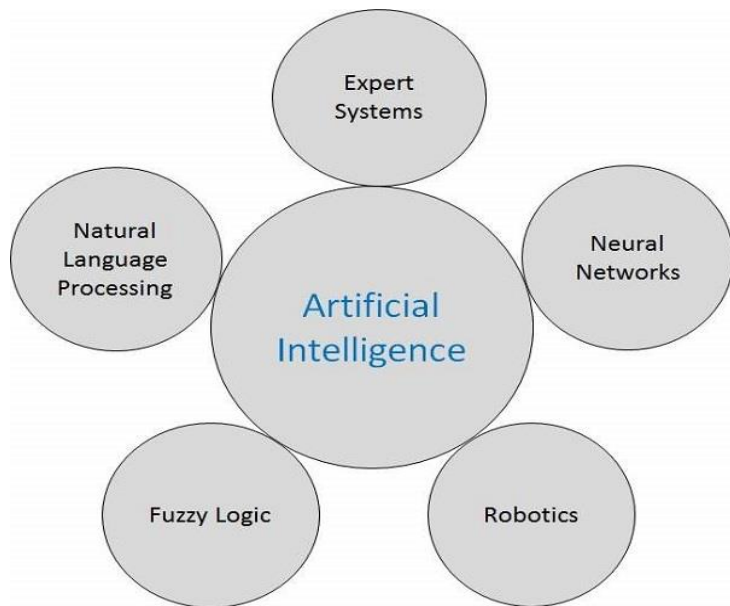
Differences between Data Mining and Data Warehousing:

<b>Data Mining</b>	<b>Data Warehousing</b>
Data mining is the process of determining data patterns.	A data warehouse is a database system designed for analytics.
Data mining is generally considered as the process of extracting useful data from a large set of data.	Data warehousing is the process of combining all the relevant data.
Business entrepreneurs carry data mining with the help of engineers.	Data warehousing is entirely carried out by the engineers.
In data mining, data is analyzed repeatedly.	In data warehousing, data is stored periodically.
Data mining uses pattern recognition techniques to identify patterns.	Data warehousing is the process of extracting and storing data that allow easier reporting.
One of the most amazing data mining technique is the detection and identification of the unwanted errors that occur in the system.	One of the advantages of the data warehouse is its ability to update frequently. That is the reason why it is ideal for business entrepreneurs who want up to date with the latest stuff.
The data mining techniques are cost-efficient as compared to other statistical data applications.	The responsibility of the data warehouse is to simplify every type of business data.
The data mining techniques are not 100 percent accurate. It may lead to serious consequences in a certain condition.	In the data warehouse, there is a high possibility that the data required for analysis by the company may not be integrated into the warehouse. It can simply lead to loss of data.
Companies can benefit from this analytical tool by equipping suitable and accessible knowledge-based data.	Data warehouse stores a huge amount of historical data that helps users to analyze different periods and trends to make future predictions.

## **ARTIFICIAL INTELLIGENCE**

Ai - intelligence exhibited by machines or software, study and design of intelligent agents (a system that perceives its environment and takes actions that maximize its chances of success - john mccarthy, coined 1955). Problems (or goals) - machine perception, vision, hearing, object recognition, facial recognition, speaker recognition, voice recognition, speech processing, natural language processing, tactile sensors, machine learning, applying knowledge, planning, logic, ability to move and manipulate objects, robotics, speech synthesis, optimization etc.



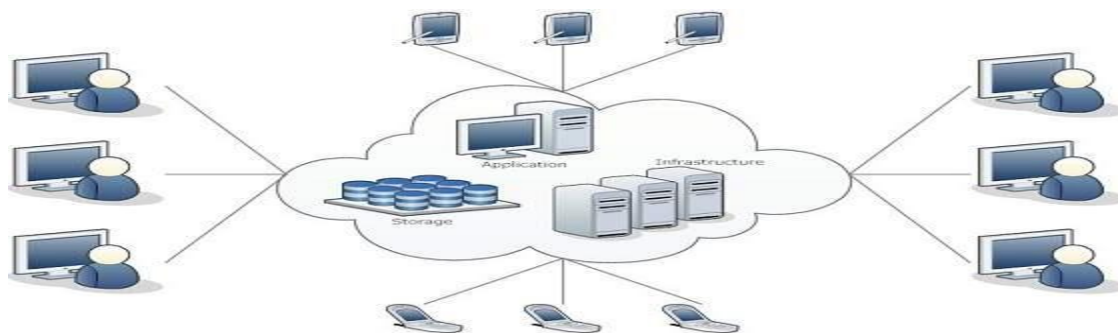


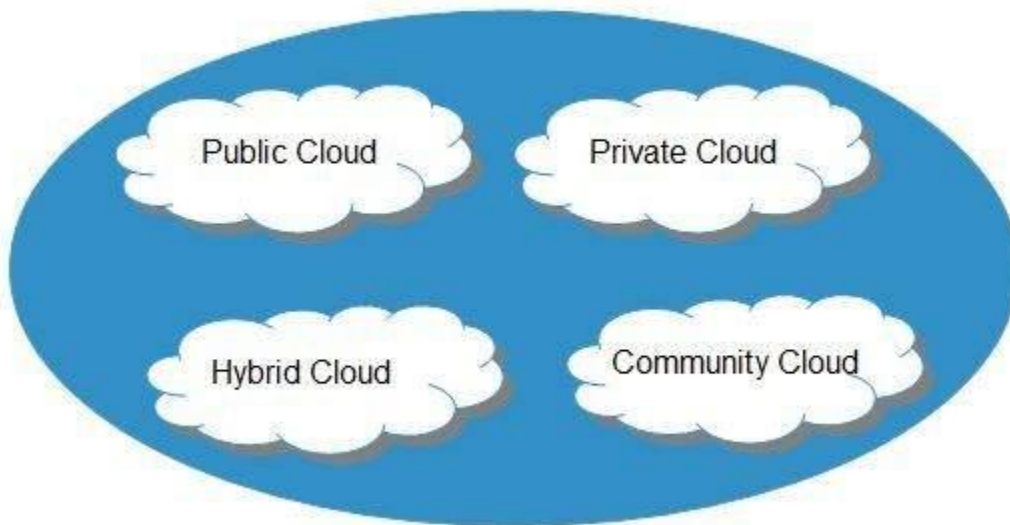
## **CLOUD COMPUTING**

Cloud computing is the on-demand delivery of IT resources through the internet with pay-to-use charges. Instead of buying and maintaining computer products and services, you can pay to use a cloud computing service. It saves you the time, effort, and cost of doing it all by yourself! The Three Major Cloud Service Models.

Cloud computing services can be broken down into three models that stack on top of one another:

- Software as a Service (SaaS)
- Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS)





### *Public Cloud*

The **public cloud** allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness.

### *Private Cloud*

The **private cloud** allows systems and services to be accessible within an organization. It is more secured because of its private nature.

### *Community Cloud*

The **community cloud** allows systems and services to be accessible by a group of organizations.

### *Hybrid Cloud*

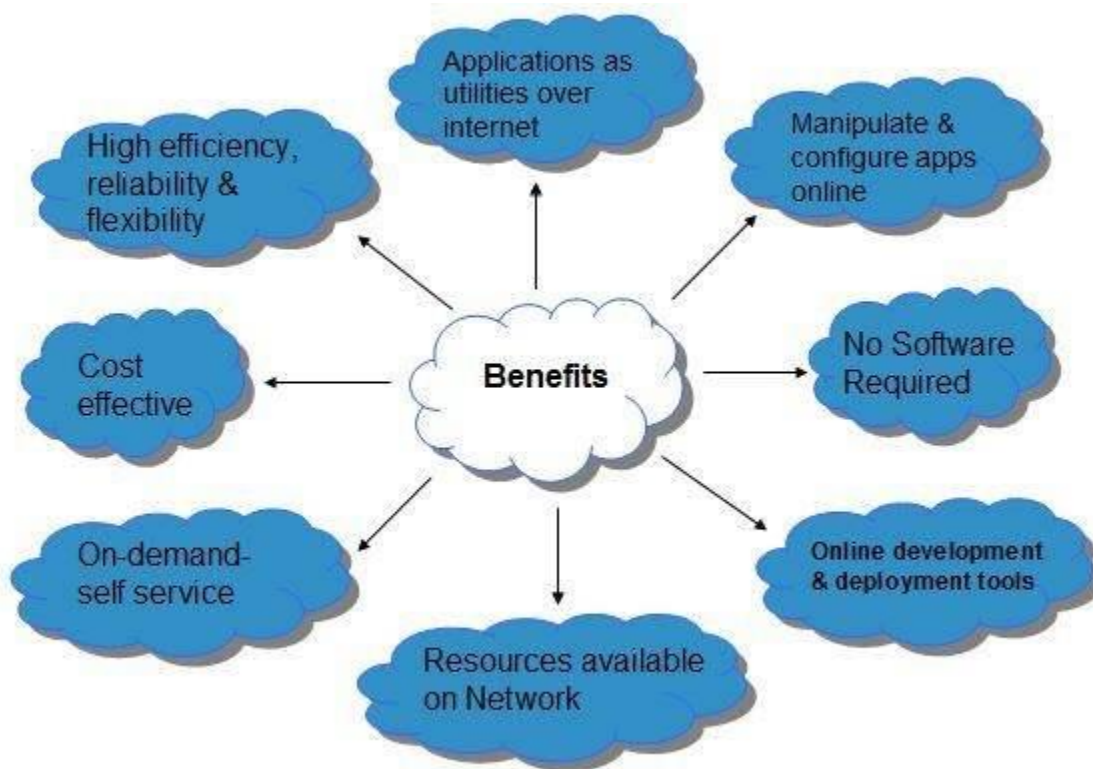
The **hybrid cloud** is a mixture of public and private cloud, in which the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.

## Benefits

Cloud Computing has numerous advantages. Some of them are listed below -

- One can access applications as utilities, over the Internet.
- One can manipulate and configure the applications online at any time.
- It does not require to install a software to access or manipulate cloud application.
- Cloud Computing offers online development and deployment tools, programming runtime environment through **PaaS model**.

- Cloud resources are available over the network in a manner that provide platform independent access to any type of clients.
- Cloud Computing offers **on-demand self-service**. The resources can be used without interaction with cloud service provider.
- Cloud Computing is highly cost effective because it operates at high efficiency with optimum utilization. It just requires an Internet connection
- Cloud Computing offers load balancing that makes it more reliable.



## ROBOTICS

ROBOTICS- OBJECT MANIPULATION AND NAVIGATION, with sub-problems of localization (knowing where you are, or finding out where other things are), mapping (learning what is around you, building a map of the environment), and motion planning (figuring out how to get there) or path planning (going from one point in space to another point, which may involve compliant motion – where the robot moves while maintaining physical contact with an object).

AI is INTERDISCIPLINARY, in which a number of sciences and professions converge, including computer science, mathematics, psychology, linguistics, philosophy and neuroscience,

as well as other specialized fields such as artificial psychology, neurology, information theory and cybernetics.

## **VIRTUAL REALITY**

VIRTUAL REALITY (aka “IMMERSIVE VIRTUAL REALITY”) You’re completely inside a virtual world, completely immersed. You put on a headset, like Oculus, Vive or GearVR and you lose completely contact from the real world around you, but you’re completely dedicated to a computer-generated world. You can be inside a 3D video or a 3D generated world (like in a video game). You should know what this technology is because it is the one used inside this website! I’d just like to add two more things about VR:

NON-IMMERSIVE VR: e.g. playing Doom on your PC, you’re playing a virtual reality experience, because you’re playing with a completely virtual world.

## **INTERNET OF THINGS**

The Internet of things (IoT) describes physical objects (or groups of such objects) with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks. Internet of things has been considered a misnomer because devices do not need to be connected to the public internet, they only need to be connected to a network and be individually addressable.

5G - Fifth Generation - 5G is a generation currently under development , that's intended to improve on 4G. 5G promises significantly faster data rates, higher connection density, much lower latency, among other improvements. Some of the plans for 5G include device-to-device communication, better battery consumption, and improved overall wireless coverage. The max speed of 5G is aimed at being as fast as 35.46 Gbps , which is over 35 times faster than 4G.

Key technologies to look out for: Massive MIMO , Millimeter Wave Mobile Communications etc. Massive MIMO, millimetre wave, small cells, Li-Fi all the new technologies from the previous decade could be used to give 10Gb/s to a user, with an unseen low latency, and allow connections for at least 100 billion devices . Different estimations have been made for the date of commercial introduction of 5G networks. Next Generation Mobile Networks Alliance feel that 5G should be rolled out by 2020 to meet business and consumer demands.

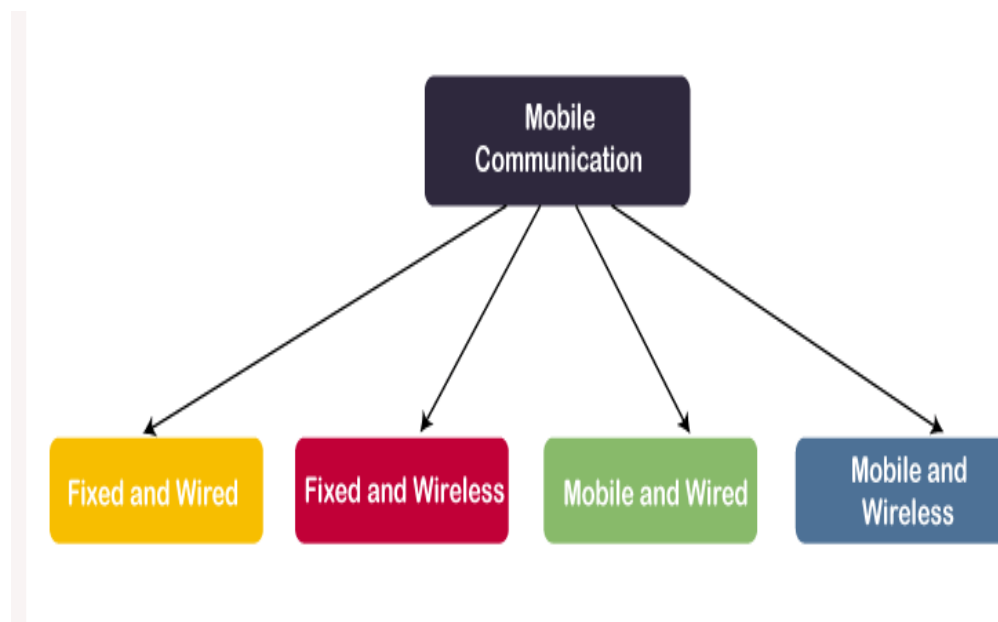
## Mobile Communication

Mobile Communication specifies a framework that is responsible for the working of mobile computing technology. In this case, mobile communication refers to an infrastructure that ensures seamless and reliable communication among wireless devices. This framework ensures

the consistency and reliability of communication between wireless devices. The mobile communication framework consists of communication devices such as protocols, services, bandwidth, and portals necessary to facilitate and support the stated services. These devices are responsible for delivering a smooth communication process.

**Mobile communication can be divided in the following four types:**

1. Fixed and Wired
2. Fixed and Wireless
3. Mobile and Wired
4. Mobile and Wireless



**Fixed and Wired:** In Fixed and Wired configuration, the devices are fixed at a position, and they are connected through a physical link to communicate with other devices.

**For Example,** Desktop Computer.

**Fixed and Wireless:** In Fixed and Wireless configuration, the devices are fixed at a position, and they are connected through a wireless link to make communication with other devices.

**For Example,** Communication Towers, WiFi router

**Mobile and Wired:** In Mobile and Wired configuration, some devices are wired, and some are mobile. They altogether make communication with other devices.

**For Example,** Laptops.

**Mobile and Wireless:** In Mobile and Wireless configuration, the devices can communicate with each other irrespective of their position. They can also connect to any network without the use of any wired device.

**For Example,** WiFi Dongle.

### Mobile Hardware

Mobile hardware consists of mobile devices or device components that can be used to receive or access the service of mobility. Examples of mobile hardware can be smartphones, laptops, portable PCs, tablet PCs, Personal Digital Assistants, etc.

These devices are inbuilt with a receptor medium that can send and receive signals. These devices are capable of operating in full-duplex. It means they can send and receive signals at the same time. They don't have to wait until one device has finished communicating for the other device to initiate communications.

### Mobile Software

Mobile software is a program that runs on mobile hardware. This is designed to deal capably with the characteristics and requirements of mobile applications. This is the operating system for the appliance of mobile devices. In other words, you can say it the heart of the mobile systems. This is an essential component that operates the mobile device.

This provides portability to mobile devices, which ensures wireless communication.

### Applications of Mobile Computing

Following is a list of some significant fields in which mobile computing is generally applied:

- Web or Internet access.

Global Position System (GPS). The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather, anywhere on or near the Earth, where there is an unobstructed line of sight to four or more GPS satellites. The GPS program provides critical capabilities to military, civil and commercial users around the world. In addition, GPS is the backbone for modernizing the global air traffic system, weather, and location services.

- Emergency services. To play vital role in medical sector can hire an ambulance with great quality wireless connection and help of this can carry significant information about injured persons. The useful step can prepare for particular accident and doctor can consulted for

diagnosis. Only Wireless networks work of communication in nature disaster<sup>2</sup> such as earthquakes, tsunami, flood and fire .In worst conditions only decentralized, wireless ad-hoc networks survive.Means that can handle Emergencies situation by mobile computing easily.

Entertainment services. Wireless networks are capable to deliver latest information at any suitable regions and can download knowledge about concert at morning through wireless network that concert is conducting in any region as well as Another growing field of wireless network applications lies in entertainment and games to enable, e.g., ad-hoc gaming networks as soon as people meet to play together. So Infotainment by wireless computing is more easy.

Mobile computing has changed the complete landscape of our day-to-day life. Following are the major advantages of Mobile Computing –

➤ Location Flexibility

This has enabled users to work from anywhere as long as there is a connection established. A user can work without being in a fixed position. Their mobility ensures that they are able to carry out numerous tasks at the same time and perform their stated jobs.

➤ Saves Time

The time consumed or wasted while travelling from different locations or to the office and back, has been slashed. One can now access all the important documents and files over a secure channel or portal and work as if they were on their computer. It has enhanced telecommuting in many companies. It has also reduced unnecessary incurred expenses.

➤ Enhanced Productivity

Users can work efficiently and effectively from whichever location they find comfortable. This in turn enhances their productivity level.

➤ Ease of Research

Research has been made easier, since users earlier were required to go to the field and search for facts and feed them back into the system. It has also made it easier for field officers and researchers to collect and feed data from wherever they are without making unnecessary trips to and from the office to the field.

➤ Entertainment

Video and audio recordings can now be streamed on-the-go using mobile computing. It's easy to access a wide variety of movies, educational and informative material. With the improvement and availability of high speed data connections at considerable cost, one is able to get all the entertainment they want as they browse the internet for streamed data. One is able to watch news, movies, and documentaries among other entertainment offers over the internet. This was not possible before mobile computing dawned on the computing world.



**R.G. KEDIA COLLEGE OF COMMERCE  
DEPARTMENT OF BUSINESS MANAGEMENT**

**SUBJECT SYNOPSIS**

**Subject: IT Applications For Management  
Year /Semester: I/I**

**Paper Code: MB-106**

**Unit – III: Communications and Networks:**

Definition, Introduction to Networks, Overview of Networks, Types of Networks, Network Topologies, Components of Networks, Computer Network Models, Applications of Communications: Definition, Internet - Overview of Internet, Architecture and Functioning of Internet, WWW, FTP, Telnet, Gopher, Browsers and Search Engines, Teleconference, Web Conferencing platforms.

**TYPES OF COMPUTER NETWORKS**

- Personal Area Network (PAN)
- Local Area Network (LAN)
- Wide Area Network (WAN)
- Wireless Local Area Network (WLAN)
- Campus Area Network (CAN)
- Metropolitan Area Network (MAN)
- Storage Area Network (SAN)
- System-Area Network (SAN)

**NETWORK TOPOLOGY** is the arrangement of the elements of a communication network. Network topology can be used to define or describe the arrangement of various types of telecommunication networks, including command and control radio networks, industrial fieldbusses and computer networks.

**COMPONENTS OF NETWORKS** - Some important network components are NIC, switch, cable, hub, router, and modem. Depending on the type of network that we need to install, some network components can also be removed.

**COMPUTER NETWORK MODELS –**

A communication subsystem is a complex piece of Hardware and software. Early attempts for implementing the software for such subsystems were based on a single, complex, unstructured program with many interacting components. The resultant software was very difficult to test and

modify. To overcome such problem, the ISO has developed a layered approach. In a layered approach, networking concept is divided into several layers, and each layer is assigned a particular task. Therefore, we can say that networking tasks depend upon the layers.

### Layered Architecture

The main aim of the layered architecture is to divide the design into small pieces.

Each lower layer adds its services to the higher layer to provide a full set of services to manage communications and run the applications.

It provides modularity and clear interfaces, i.e., provides interaction between subsystems.

It ensures the independence between layers by providing the services from lower to higher layer without defining how the services are implemented. Therefore, any modification in a layer will not affect the other layers.

The number of layers, functions, contents of each layer will vary from network to network. However, the purpose of each layer is to provide the service from lower to a higher layer and hiding the details from the layers of how the services are implemented.

The basic elements of layered architecture are services, protocols, and interfaces.

**Service:** It is a set of actions that a layer provides to the higher layer.

**Protocol:** It defines a set of rules that a layer uses to exchange the information with peer entity. These rules mainly concern about both the contents and order of the messages used.

**Interface:** It is a way through which the message is transferred from one layer to another layer.

In a layer n architecture, layer n on one machine will have a communication with the layer n on another machine and the rules used in a conversation are known as a layer-n protocol.

Let's take an example of the five-layered architecture.

### COMPUTER NETWORK MODELS

In case of layered architecture, no data is transferred from layer n of one machine to layer n of another machine. Instead, each layer passes the data to the layer immediately just below it, until the lowest layer is reached.

Below layer 1 is the physical medium through which the actual communication takes place.

In a layered architecture, unmanageable tasks are divided into several small and manageable tasks.

The data is passed from the upper layer to lower layer through an interface. A Layered architecture provides a clean-cut interface so that minimum information is shared among different layers. It also ensures that the implementation of one layer can be easily replaced by another implementation.



A set of layers and protocols is known as network architecture.

## OVERVIEW OF INTERNET

Internet, a system architecture that has revolutionized communications and methods of commerce by allowing various computer networks around the world to interconnect. Sometimes referred to as a “network of networks,” the Internet emerged in the United States in the 1970s but did not become visible to the general public until the early 1990s. By 2020, approximately 4.5 billion people, or more than half of the world’s population, were estimated to have access to the Internet.

The Internet provides a capability so powerful and general that it can be used for almost any purpose that depends on information, and it is accessible by every individual who connects to

one of its constituent networks. It supports human communication via social media, electronic mail (e-mail), “chat rooms,” newsgroups, and audio and video transmission and allows people to work collaboratively at many different locations. It supports access to digital information by many applications, including the World Wide Web. The Internet has proved to be a spawning ground for a large and growing number of “e-businesses” (including subsidiaries of traditional “brick-and-mortar” companies) that carry out most of their sales and services over the Internet. (See electronic commerce.)

## **ARCHITECTURE AND FUNCTIONING OF INTERNET**

The Internet architecture is based on a simple idea: ask all networks want to be part of carrying a single packet type, a specific format the IP protocol. In addition, this IP packet must carry an address defined with sufficient generality in order to identify each computer and terminals scattered throughout the world

**FTP** - The File Transfer Protocol is a standard communication protocol used for the transfer of computer files from a server to a client on a computer network. FTP is built on a client–server model architecture using separate control and data connections between the client and the server.

-

**GOPHER** - The Gopher protocol is a communication protocol designed for distributing, searching, and retrieving documents in Internet Protocol networks.

**BROWSERS AND SEARCH ENGINES** - A browser is a piece of software that retrieves and displays web pages; a search engine is a website that helps people find web pages from other websites. The confusion arises because, the first time someone launches a browser, the browser displays a search engine's homepage

## **TELECONFERENCE - -**

A teleconference is a live audio or audiovisual meeting with two or more participants. With the ability to teleconference, remote teams in an organization can collaborate and communicate, even when geographically dispersed. The process involves technology more sophisticated than a simple two-way phone connection.

At its simplest, a teleconference can be an interactive audio conference with people at two or more locations communicating over a speakerphone. With more equipment and special arrangements, a teleconference also can be a video conference, in which the participants can see each other.

Telecommunication systems support teleconferences by providing audio, video and data services. Participants communicate with teleconference platforms using devices such as desktop computers, tablets, smartphones and laptops. Teleconferences were initially conducted through

telephone lines and were limited to audio; however, now it is more common for teleconferences to be conducted online or using voice over IP (VoIP).

Web Conferencing platforms.

- Zoom.
- Google Hangouts.
- Dialpad Meetings.
- TrueConf Online.
- Skype.
- FreeConference.
- Lifesize Go.
- Slack Video Calls.

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**Unit – IV: Functional Areas of Information Systems:**

Management Levels and Functional Systems, Manufacturing, Production, Sales and Marketing Systems, Accounting, Finance and HR Systems, Enterprise Systems and Applications: Concepts of ERP, SCM, CRM, CPFR, Knowledge Management Systems, System Development Life Cycle (SDLC), Electronic Fund Transfer (EFT)

**MANAGEMENT LEVELS AND FUNCTIONAL SYSTEMS**

**ENTERPRISE SYSTEMS**

- ENTERPRISE RESOURCE PLANNING (ERP) systems—provide integrated software modules and a unified database that personnel use to plan, manage, and control core business processes across multiple locations. Modules of ERP systems may include finance, accounting, marketing, human resources, production, inventory management, and distribution. Enterprise Resource Planning (ERP) facilitates the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders.
- SUPPLY CHAIN MANAGEMENT (SCM) systems enable more efficient management of the supply chain by integrating the links in a supply chain. This may include suppliers, manufacturers, wholesalers, retailers, and final customers.
- CUSTOMER RELATIONSHIP MANAGEMENT (CRM) systems help businesses manage relationships with potential and current customers and business partners across marketing, sales, and service.
- KNOWLEDGE MANAGEMENT SYSTEM (KMS) helps organizations facilitate the collection, recording, organization, retrieval, and dissemination of knowledge. This may include documents, accounting records, unrecorded procedures, practices, and skills. Knowledge management (KM) as a system covers the process of knowledge creation and acquisition from internal processes and the external world. The collected knowledge is incorporated in organizational policies and procedures, and then disseminated to the stakeholders.

**MARKETING INFORMATION SYSTEMS (MIS)** are Management Information Systems designed specifically for managing the marketing aspects of the business.

**OFFICE AUTOMATION SYSTEMS (OAS)** support communication and productivity in the enterprise by automating work flow and eliminating bottlenecks. OAS may be implemented at any and all levels of management.

**SCHOOL INFORMATION MANAGEMENT SYSTEMS (SIMS)** cover school administration, and often including teaching and learning materials.

### **ONLINE TRANSACTION PROCESSING SYSTEMS (OLTP)**

EXAMPLES: Airlines ticketing, banking transactions, insurance transactions, hospital admissions and discharge system, Customer Information Control System (CICS) etc.

#### **Processing types**

Batch processing - Several transactions recorded on paper (such as bills and invoices) or when it's being stored on a magnetic tape, called a batch are collected and processed at the same time when it's convenient or economical to process them.

The results of each transaction are not immediately available when the transaction is being entered; there is a time delay.

#### **Updating in batch requires sequential access**

The two stages in batch processing are:

- TRANSACTION FILE – collects and sorts data into sequential order.
- UPDATING THE MASTER FILE involves data additions, updates and deletions

#### **It doesn't need a user interface**

#### **Real-time processing**

Real time systems attempt to guarantee an appropriate response to a stimulus or request quickly enough to affect the conditions that caused the stimulus, and provide instant confirmation of a transaction. A large number of users simultaneously perform transactions, needs SPEED OF DATA TRANSMISSION and LARGER BANDWIDTH. Updating in real-time uses direct access of data.

Transaction data sent to an online database in a MASTER FILE. The person providing information is usually able to help with error correction and receives confirmation of the transaction completion.

The storage device stores data in a particular location on magnetic disk based on a mathematical procedure. This will then be calculated to find an approximate location of the data. (Hashing) If

data are not found at this location, it will search through successive locations until it's found.(chaining)

Time sharing is the sharing of a computer system among multiple users, usually giving each user the illusion that they have exclusive control of the system. The users may be working on the same project or different projects and run arbitrary programs, but there are usually few restrictions on the type of work each user is doing.

Transaction processing systems also attempt to provide predictable response times to requests, although this is not as critical as for real-time systems. Rather than allowing the user to run arbitrary programs as time-sharing, transaction processing allows only predefined, structured transactions. Each transaction is usually short duration and the processing activity for each transaction is programmed in advance.

### **Transaction processing system features**

- Performance: Fast performance with a rapid response time (number of transactions/second)

#### Continuous availability

- Data integrity- without corrupting data. Multiple users must be prevented from attempting to change the same piece of data at the same time, for example two operators cannot sell the same seat on an airplane.
- Ease of use- protect users from data-entry errors as much as possible, and allow them to easily correct their errors.
- Modular growth at incremental costs, rather than requiring a complete replacement. It should be possible to add, replace, or update hardware and software components without shutting down the system.
- Databases and files- A database is an organized collection of data. Databases offer fast retrieval times for non-structured requests as in a typical transaction processing application.

**Hierarchical structure**: organizes data in a series of levels. Its top to bottom like structure consists of nodes and branches; each child node has branches and is only linked to one higher level parent node.

**Network structure**: network structures also organizes data using nodes and branches. But, unlike hierarchical, each child node can be linked to multiple, higher parent nodes.

**Relational structure**: a relational database organizes its data in a series of related tables. This gives flexibility as relationships between the tables are built.



The following features are desirable in a database system used in transaction processing systems:

- Good data placement: The database should be designed to access patterns of data from many simultaneous users.
- Short transactions: Short transactions enables quick processing. This avoids concurrency and paces the systems.
- Real-time backup: Backup should be scheduled between low times of activity to prevent lag of the server.
- High normalization: This lowers redundant information to increase the speed and improve concurrency, this also improves backups.
- Archiving of historical data: Uncommonly used data are moved into other databases or backed up tables. This keeps tables small and also improves backup times.

Hashing and indexing for quick searches.

A TPS may fail for many reasons. These reasons could include a system failure, human errors, hardware failure, incorrect or invalid data, computer viruses, software application errors or natural or man-made disasters. As it's not possible to prevent all TPS failures, a TPS must be able to cope with failures.

**BACKUP PROCEDURES-** It involves the backup, journal, checkpoint, and recovery manager:

- JOURNAL: A journal maintains an audit trail of transactions and database changes. Transaction logs and Database change logs are used, a transaction log records all the essential data for each transactions, including data values, time of transaction and terminal number. A database change log contains before and after copies of records that have been modified by transactions.
- CHECKPOINT: The purpose of checkpointing is to provide a snapshot of the data within the database. A checkpoint, in general, is any identifier or other reference that identifies the state of the database at a point in time. Modifications to database pages are performed in memory and are not necessarily written to disk after every update. Therefore, periodically, the database system must perform a checkpoint to write these updates which are held in-memory to the storage disk. Writing these updates to storage disk creates a point in time in which the database system can apply changes contained in a transaction log during recovery after an unexpected shut down or crash of the database system.

If a checkpoint is interrupted and a recovery is required, then the database system must start recovery from a previous successful checkpoint. CHECKPOINTING can be either TRANSACTION-CONSISTENT OR NON-TRANSACTION-CONSISTENT (called also FUZZY CHECKPOINTING). Transaction-consistent checkpointing produces a persistent database image that is sufficient to recover the database to the state that was externally perceived at the moment of starting the checkpointing. A non-transaction-consistent checkpointing results

in a persistent database image that is insufficient to perform a recovery of the database state. To perform the database recovery, additional information is needed, typically contained in transaction logs. Transaction consistent checkpointing refers to a consistent database, which doesn't necessarily include all the latest committed transactions, but all modifications made by transactions, that were committed at the time checkpoint creation was started, are fully present. A non-consistent transaction refers to a checkpoint which is not necessarily a consistent database, and can't be recovered to one without all log records generated for open transactions included in the checkpoint. Depending on the type of database management system implemented a checkpoint may incorporate indexes or storage pages (user data), indexes and storage pages. If no indexes are incorporated into the checkpoint, indexes must be created when the database is restored from the checkpoint image.

- **RECOVERY MANAGER:** A recovery manager is a program which restores the database to a correct condition which can restart the transaction processing.

### **Types of Recovery:**

- **BACKWARD RECOVERY:** Roll back used to undo unwanted changes to the database. It reverses the changes made by transactions which have been aborted.
- **FORWARD RECOVERY:** it starts with a backup copy of the database. The transaction will then reprocess according to the transaction journal that occurred between the time the backup was made and the present time.

### **Types of back-up procedures**

#### **Grandfather-father-son**

This procedure refers to at least three generations of backup master files. thus, the most recent backup is the son, the oldest backup is the grandfather. It's commonly used for a batch transaction processing system with a magnetic tape. If the system fails during a batch run, the master file is recreated by using the son backup and then restarting the batch. However if the son backup fails, is corrupted or destroyed, then the previous generation of backup (the father) is used. Likewise, if that fails, then the generation of backup previous to the father (i.e. the grandfather) is required. Of course the older the generation, the more the data may be out of date. Organizations can have many generations of backup.

#### **Partial backups**

This only occurs when parts of the master file are backed up. The master file is usually backed up to magnetic tape at regular times, this could be daily, weekly or monthly. Completed

transactions since the last backup are stored separately and are called journals, or journal files. The master file can be recreated from the journal files on the backup tape if the system is to fail.

Collaborative Planning, Forecasting and Replenishment (CPFR) Collaborative Planning, Forecasting and Replenishment (CPFR) describes a set of practices in which trading partners plan key supply chain activities to efficiently meet customer demand at the lowest possible cost. This collaboration typically includes business planning, sales forecasting, and replenishment of raw materials and finished goods.

Meant to reduced silos, CPFR streamlines multiple S&OP processes and supply chain planning activities, reduces inventory and logistics costs, enhances end-to-end supply chain efficiency and optimizes inventory movement.

CPFR establishes common processes and metrics to help supply chain trading partners achieve their common goals. Improved communication, collaboration and information sharing are vital to ensuring the successful implementation of this strategy. Learn more about the supply chain software and supply chain services offered by GEP

### **KNOWLEDGE MANAGEMENT SYSTEMS,**

In customer support, we're often operating on the reactive end of things. And when you're swamped in support tickets, it's hard to be proactive and work on strategic measures to help your customers be successful in the big picture. Plus, you'll almost always notice the same questions and issues come up over and over again.

If you truly you want to help your customers succeed, a robust knowledge management system can be a game-changer.

Building a knowledge management system can help you ...

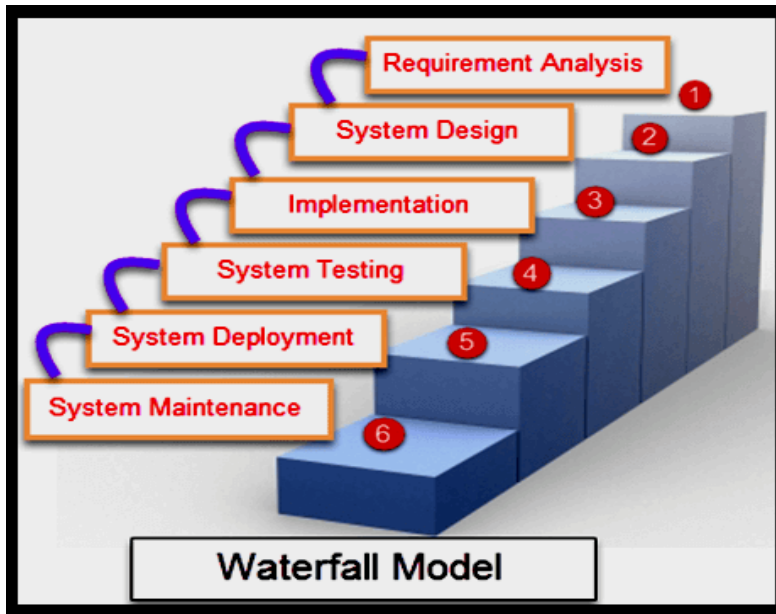
Decrease support costs

Increase customer happiness

Improve the overall customer experience and customer success ROI

How? By answering questions in real time and giving customers the option of DIY customer service, you can empower users to answer their own questions. And by providing these resources so customers can help themselves complete these repetitive and tactical tasks, you can spend more time focusing on higher-leverage activities.

**SYSTEM DEVELOPMENT LIFE CYCLE (SDLC),**



## **ELECTRONIC FUND TRANSFER (EFT)**

An electronic funds transfer (EFT), or direct deposit, is a digital movement of money from one bank account to another. These transfers take place independently from bank employees. As a digital transaction, there is no need for paper documents. EFT has become a predominant method of money transfer since it is a simple, accessible, and direct method of payment or transfer of funds. As businesses increase their usage of EFT, paper checks become obsolete due to expense, slower expedition, and overall effort.

**R.G. KEDIA COLLEGE OF COMMERCE  
DEPARTMENT OF BUSINESS MANAGEMENT  
SUBJECT SYNOPSIS**

**Subject: IT Applications For Management  
Year /Semester: I/I**

**Paper Code: MB-106**

**Unit – V: Security and Ethical challenges in IT:**

Need for Security - Security Threats and Attacks, Malicious Software, Hacking, Security Services - Security Mechanisms - Cryptography, Digital signature, Firewall - Types of Firewalls - Identification & Authentication - Biometric Techniques - Security policies - Need for legislation, cyber laws, cyber security issues, salient features of IT Act.

**NEED FOR SECURITY –**

Information security ensures good data management. It involves the use of technologies, protocols, systems and administrative measures to protect the confidentiality, integrity and availability of information. Information is the most valuable asset of an organization, and any breach can destroy its reputation and continuity.

Cybersecurity has become a top concern for organizations today. According to Cisco, the number of connected devices could increase to 50 billion by 2020. Since these connected devices contain a huge volume of data that need to be protected, cybercrime could become a major threat to every business in the world.

Although cybersecurity initiatives are being undertaken by national and international governments, ultimately it is organizations that are responsible for protecting their own data. As a result, businesses are now focusing on developing secure systems that enhance information security.

Companies have realized the need and importance of information security and taken steps to be included among organizations known to have the most secure IT infrastructure. As a result, enormous capital is spent every year from companies' budgets to protect the critical information that forms the foundation of their business. Below are a few reasons why information security is critical to the success of any organization.

**SECURITY THREATS AND ATTACKS**

A Threat is a possible security risk that might exploit the vulnerability of a system or asset. An attack, on the other hand, is the actual act of exploiting the information security system's weaknesses. Threats and Attacks that might jeopardize information security can be prevented in a variety of ways.

## **MALICIOUS SOFTWARE**

An attack on the system is one of the potential causes behind data and monetary loss to the computer software and/or hardware. There are different types of attacks, such as –

### **Virus**

In simple terms, a virus is a harmful computer program that when executed, replicates itself and modifies the program of the host computer system by inserting its code. They are typically designed to get transmitted from one system to another for damaging the computer.

### **Spyware**

A collection of malicious programs, that is designed to extract information from computer systems, against its user's legitimate consent is known as Spyware. , Spyware is a collection of programs that secretly record the activities that are carried out on the computer.

### **Phishing**

Mostly phishing is referred to as the fraudulent practice of sending emails pretending to be genuine to extract valuable information from the user. Usually done through emails, their goal is to steal sensitive information and login credentials.

### **Worms**

Computer worms are self-replicating malicious programs designed to spread across the computer network majorly in an organization. Different types of computer worms are internet worms, E-mail worms, File sharing worms, and Instant-messaging worms.

### **Spam**

Refers to irrelevant and unrecognized source messages sent via mail with the objective of advertising, malware insertion, phishing, etc. Spams can be distributed via phone calls, text messages, or social media. Spammers can trick people to reveal secret information, and passcodes, or even draw out money from them. The most commonly used spam types are tech support spams, advance fee spams, etc.

### **Botnets**

Botnets are a group of private computers infected with malware to take control of the systems without the user's knowledge. The 2 words 'robot' and 'network' jointly form the word Botnet. They are programmed to grow, automate and assist the hijacker in carrying out bigger cyber attacks. Botnets can work with limited time and cost, making them an increasingly popular threat.

### **DoS attacks**

DoS stands for Denial of Service. DoS attacks are designed to trigger crashes of the computer system resulting in a complete system shutdown making it inaccessible to its intended users. The intended targets of DoS attacks may include web servers of organizations in Banking, Commerce, Media, or Government and trade.

### **Ransomware**

It refers to the act of encrypting a user's or an organization's data followed by a demand for ransom from the user or organization to provide access to the same. Ransomware uses asymmetric encryption and a private key to encrypt files on the victim's system. A ransom is then demanded to give access to the private key to the victim. For example- Ryuk 2019, 2020.

### **Mobile malware**

They are malicious programs targeting operating systems on mobile phones. Mobile malware tends to specifically collapse the operating systems of smartphones, tablets, and even smartwatches to steal confidential data. For example, SMS phishing cases have been reported to have increased recently.

### **API vulnerabilities**

As APIs are accessible over the internet, they are vulnerable to attacks just like any other URL having sensitive data/files attached to them. Some of the vulnerabilities are the Man-in-the-middle attack, CSRF, XSS attack, SQL injection, DDoS, and many more.

### **Breaches**

Intentional or unintentional release of sensitive/private/confidential data or information in an unrecognized and unprotected environment is termed a Breach. It includes data as well as security breaches. A security breach is when someone breaks into the system, whereas a data breach is when the information also gets stolen after the security breach.

## **HACKING**

A commonly used hacking definition is the act of compromising digital devices and networks through unauthorized access to an account or computer system. Hacking is not always a

malicious act, but it is most commonly associated with illegal activity and data theft by cyber criminals.

Hacking refers to the misuse of devices like computers, smartphones, tablets, and networks to cause damage to or corrupt systems, gather information on users, steal data and documents, or disrupt data-related activity.

A traditional view of hackers is a lone rogue programmer who is highly skilled in coding and modifying computer software and hardware systems. But this narrow view does not cover the true technical nature of hacking. Hackers are increasingly growing in sophistication, using stealthy attack methods designed to go completely unnoticed by cybersecurity software and IT teams. They are also highly skilled in creating attack vectors that trick users into opening malicious attachments or links and freely giving up their sensitive personal data.

As a result, modern-day hacking involves far more than just an angry kid in their bedroom. It is a multibillion-dollar industry with extremely sophisticated and successful techniques.

**SECURITY SERVICES** – a holistic risk driven approach for organizations with our solutions in the areas of identity and access governance, data protection, risk & compliance, threat management and mitigation (application, network & mobile) and cyber security monitoring & management.

**SECURITY MECHANISMS** – Security mechanisms are technical tools and techniques that are used to implement security services. A mechanism might operate by itself, or with others, to provide a particular service. Examples of common security mechanisms are as follows:

- Cryptography
- Message digests and digital signatures
- Digital certificates
- Public Key Infrastructure (PKI)

**CRYPTOGRAPHY**, - There are three general classes of NIST-approved cryptographic algorithms, which are defined by the number or types of cryptographic keys that are used with each.

#### **Hash functions.**

- Symmetric-key algorithms.
- Asymmetric-key algorithms.

Hash Functions.



Symmetric-Key Algorithms for Encryption and Decryption.

**DIGITAL SIGNATURE**, A digital signature is an electronic, encrypted, stamp of authentication on digital information such as email messages, macros, or electronic documents. A signature confirms that the information originated from the signer and has not been altered.

**FIREWALL - TYPES OF FIREWALLS** – Five types of firewall include the following:

- Packet filtering firewall.
- Circuit-level gateway.
- Application-level gateway (aka proxy firewall)
- Stateful inspection firewall.

**IDENTIFICATION & AUTHENTICATION** – Identification is the act of identifying a particular user, often through a username. Authentication is the proof of this user's identity, which is commonly managed by entering a password. Only after a user has been properly identified and authenticated can they then be authorized access to systems or privileges.

**BIOMETRIC TECHNIQUES** – What are the 4 main types of biometrics?

Image result for biometric techniques

The five most common types of biometric identifiers are: fingerprints, facial, voice, iris, and palm or finger vein patterns. As an example, banks need your biometric data in order to provide their various services remotely.

**SECURITY POLICIES** – A: Three types of security policies in common use are program policies, issue-specific policies, and system-specific policies.

**NEED FOR LEGISLATION, CYBER LAWS**, - Information security laws and regulations control how data is stored and used. Learn about information security and breach notification law, information and privacy laws, and business compliance. Updated: 10/06/2022

## **Laws & Regulations**

A law is a rule that is enacted by the judicial system of the country. These rules are created by the lawmakers. A law is enforceable by the country's judicial system, and the lawbreaker can be prosecuted in court.

A regulation is the process, or body, responsible for ensuring that the law is put into effect. A regulation explains the details necessary, whether technical, operational, or legal, to put the law into effect.

Information security laws and regulations govern the acquiring, transmitting, and storing of information (meaningful data). Why all this protection? You see, the rapid advancement of technology and the unprecedented growth of the internet has increased the field of exposure of data as a whole.

The list of electronic crimes is as unlimited as the imaginations of those who use technology in harmful and dangerous ways. Technology has served the world's convenience, everything from the comfort of your home or device (banking, shopping, working, etc.), nicely on a platter! This convenience has exposed businesses and corporations to limitless threats.

Because of this, information has become an extremely valuable asset, which could be deliberately destroyed, stolen, exposed, or illegally sold. Different countries have different laws governing information. With our reference point being United States law, we will examine briefly some of the laws and regulations that protect information.

**CYBER SECURITY ISSUES, SALIENT FEATURES OF IT ACT.** - While the first draft was created by the Ministry of Commerce, Government of India as the ECommerce Act, 1998, it was redrafted as the 'Information Technology Bill, 1999', and passed in May 2000.

### **Objectives of the Act**

The Information Technology Act, 2000 provides legal recognition to the transaction done via electronic exchange of data and other electronic means of communication or electronic commerce transactions.

This also involves the use of alternatives to a paper-based method of communication and information storage to facilitate the electronic filing of documents with the Government agencies.

Further, this act amended the Indian Penal Code 1860, the Indian Evidence Act 1872, the Bankers' Books Evidence Act 1891, and the Reserve Bank of India Act 1934.

## **IT APPLICATIONS FOR MANAGEMENT - ASSIGNMENT**

- Decision Support System (DSS),
- Data Warehouse,
- Data Mining,
- Artificial Intelligence,
- Cloud Computing vs. grid computing
- Big Data,
- Robotics,
- Virtual Reality,
- Internet of Things (IoT),
- Network Topologies,
- ERP,
- SCM,
- CRM,
- System Development Life Cycle (SDLC),
- Electronic Fund Transfer (EFT),
- Malicious Software and Hacking,
- Cryptography and Digital signature,
- Firewalls
- Biometric Techniques
- Cyber laws