IS1203
Foundations of Information Systems

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About the Course

- This course aims at providing participants with knowledge on basic concepts of information systems, components, functions and roles of computer-based information systems in organisations, major concerns for acquiring IS and issues they can create.

- **Duration:** 15 weeks - Two hours per week

- **Evaluation**
  - Continuous Assessment: 20%
  - Final (Semester-end) Examination: 80%

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Topics

1. Introduction to Information Systems
2. Information Systems in Organizations
3. Different Types of Business Information Systems
4. Acquiring IT/IS Infrastructure Capabilities and Performance Evaluation
5. Social and Ethical Issues Related to Information Systems

Recommended Text:

- Stair, R., Reynolds, G. "Principles of Information Systems" 9th Edition, Thomson Course Technology
- Laudon K., Laudon J. "Management Information Systems" 13th Edition, Pearson Education Limited

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Course-Level Learning Outcomes

Upon completion of this course, you will be able to,

- Identify the information system requirements.
- Identify the components, characteristics, value-added processes, and the role of an organizational information system.
- Analyze functions, components and important characteristics of different information systems in an organisation.
- Evaluate information technology/system acquisition options and performance.
- Describe how to acquire IT infrastructure, IS resources and capabilities.
- Describe how to mitigate the issues related to information systems usage, operation and development.

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Topic 1:

Introduction to Information Systems

1. Data Vs. Information
2. Quality of Data and Information
3. Components of an Information System (IS) and a Computer Based Information System (CBIS)
4. Information System Careers and Challenges Faced

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Learning Outcomes

- At the end of the topic, you will be able to;
  - Identify the difference between data and information
  - Identify basic characteristics of information
  - Identify basic functions of a system
  - Describe components of IS
  - Identify major types of information systems in an organization
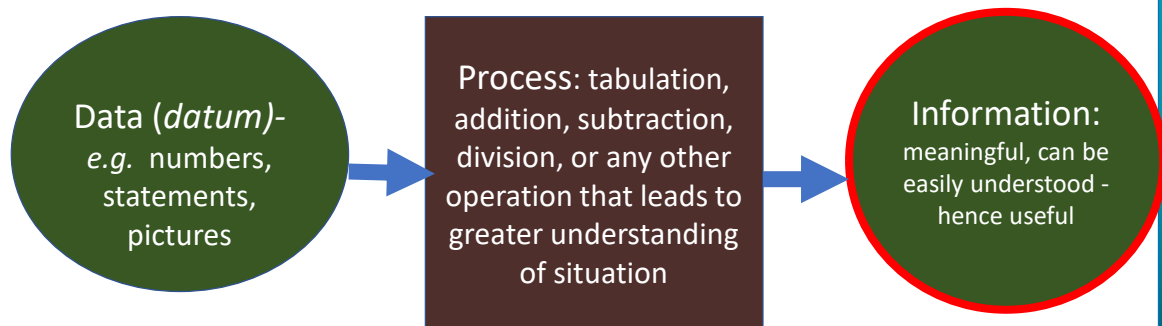 - Analyse IS careers and challenges faced

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Data & Information

• Information is the result/product of processing data.

Data (*datum)-*
e.g. numbers, statements, pictures

→

Process: tabulation, addition, subtraction, division, or any other operation that leads to greater understanding of situation

→

Information: meaningful, can be easily understood - hence useful

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Data

An Example:

Information

331 Brite Dish Soap 1.29
863 BL Hill Coffee 4.69
173 Meow Cat .79
331 Brite Dish Soap 1.29
663 Country Ham 3.29
524 Fiery Mustard 1.49
113 Ginger Root .85
331 Brite Dish Soap 1.29
.
.
.

Information System

Sales Region: Northwest
Store: Superstore #122

ITEM NO.	DESCRIPTION	UNITS SOLD
331	Brite Dish Soap	7,156

YTD SALES
$9,231.24

Can find total unit sales of an item or the total sales revenue from an item at a specific store.

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Importance of Information

Data into decision →
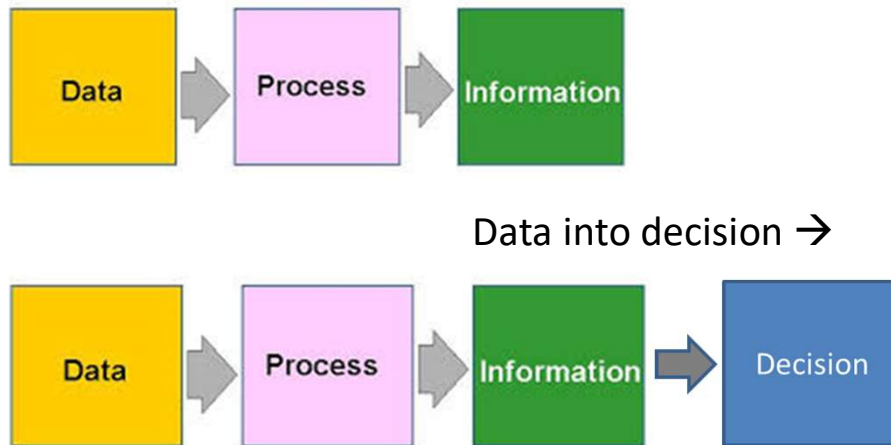
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Information for Taking Decisions

- Organizational decisions can be categorized as
  - **Strategic Level decisions**
    - Taken by the most senior management. Deal with broad issues concerning an organization's development over the long term
  - **Management Level decisions**
    - Normally associated with the middle level of management
  - **Operational level decisions**
    - Decisions made in the normal, day to day operations within a business.

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Characteristics of Quality Information

1. **Accessible**: Can be easily accessed

2. **Accurate:** Error free

3. **Complete**: Contains all required

4. **Economical:** Cost effective

5. **Flexible:** Can be used for different purposes

6. **Relevant**

7. **Reliable:** Can trust by the users

8. **Secure:** Protected

9. **Simple:** Only necessarily details

10. **Timely:** Receive it on time

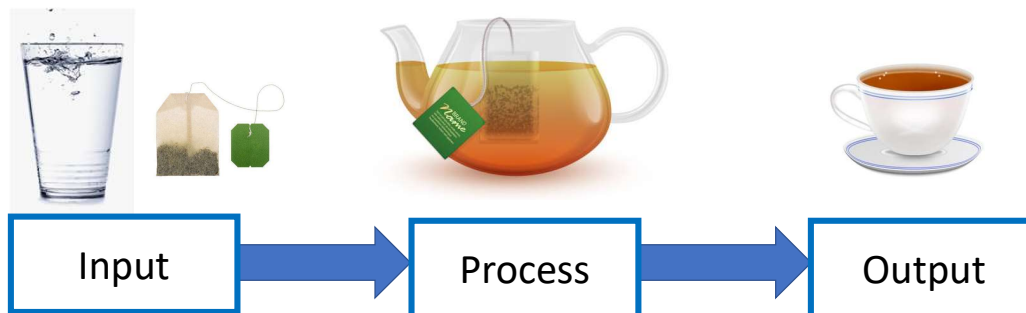11. **Verifiable:** Can check its accuracy

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What is a System?

- A system is a *set of interrelated components, with a clearly defined boundary, working together to achieve a common set of objectives*
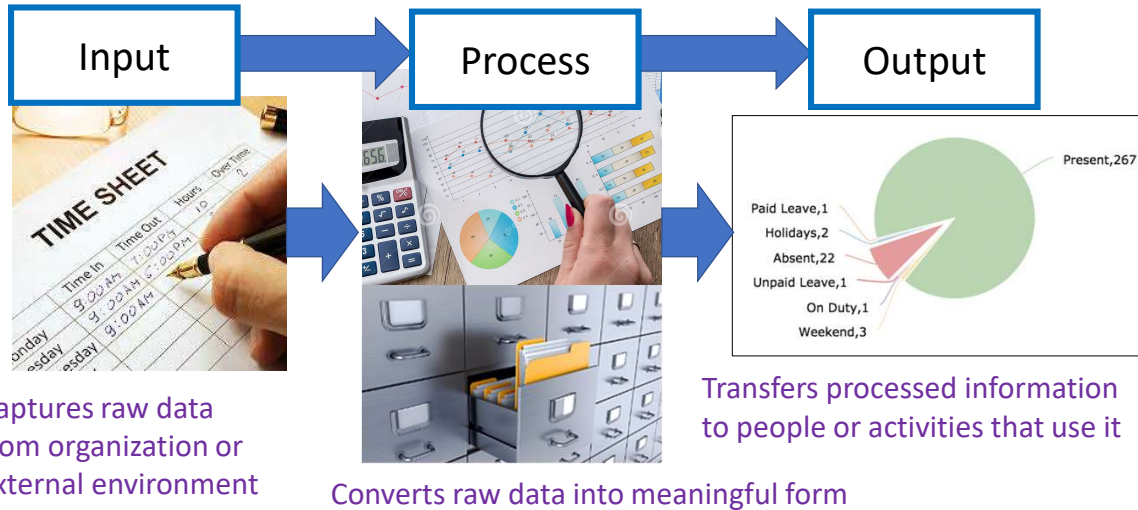

| Input | Process | Output |

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An Information System

| Input | Process | Output |

Captures raw data from organization or external environment

Converts raw data into meaningful form

Transfers processed information to people or activities that use it
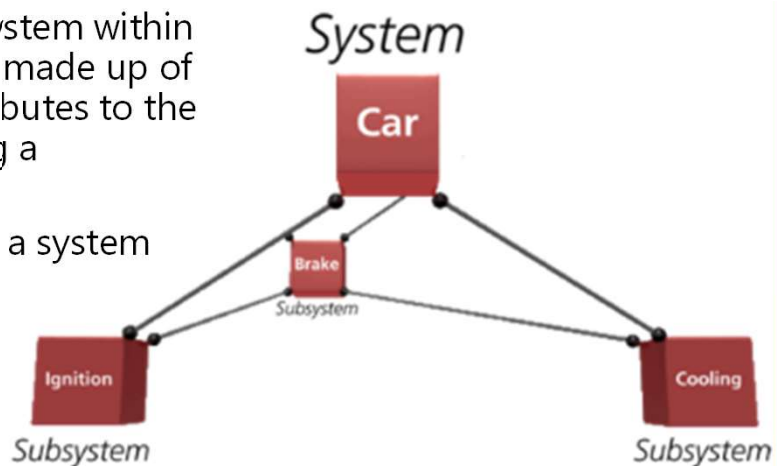
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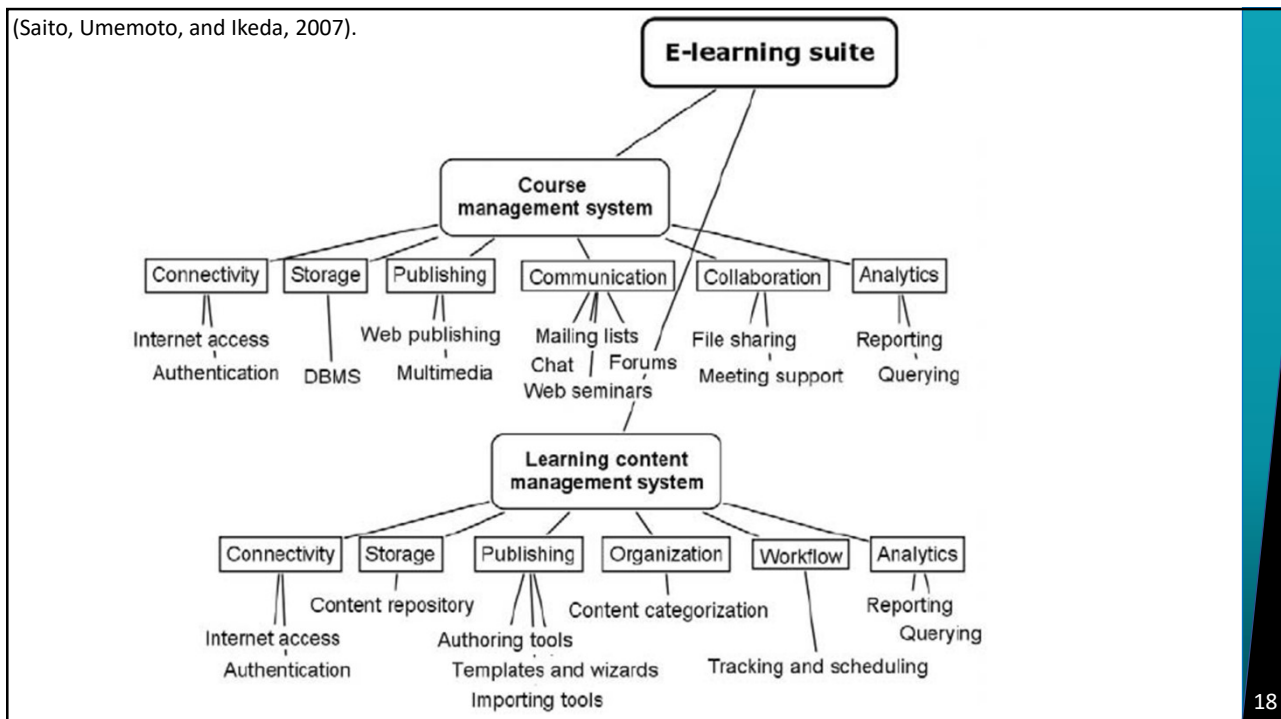
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Sub-system & sub-subsystem

- **A sub-system** is a system within a system. A system is made up of sub-systems. It contributes to the system by performing a specialized function
- **A Sub-subsystem** is a system within a sub-system.

System

Car

Brake
Subsystem

Ignition
Subsystem

Cooling
Subsystem

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(Saito, Umemoto, and Ikeda, 2007).

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Closed Systems versus Open Systems

- Systems can be considered;
  - Closed or
  - Open
- Open systems exchange information, energy, or material with their environments.
  - Biological and social systems are inherently open systems;
  - Mechanical systems may be open or closed.
- Closed mechanical system exchanges energy but not matter.
- The concepts of open and closed systems are difficult to defend in the absolute, as it is a relative factor.

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Closed versus Open Computer-based Systems

Open System	Closed System
Allows unrestricted access to its data and features	Allows limited access to its data and features
Provides users control over the tools and data they access	Has complete control over who is allowed to view, access, or manipulate the data
Any user can interact with different types of data, applications, and devices	Protects its data from unauthorized access or manipulation
Free to modify or customize the system to meet user requirements –no need permission	Cannot modify or customize as with no permission.

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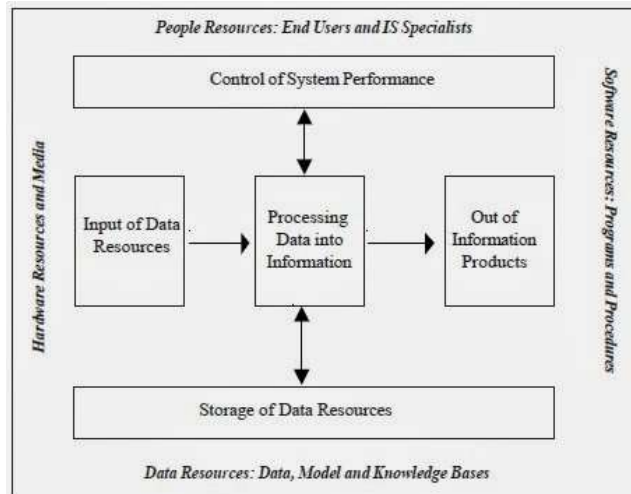
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Functions of an Information System
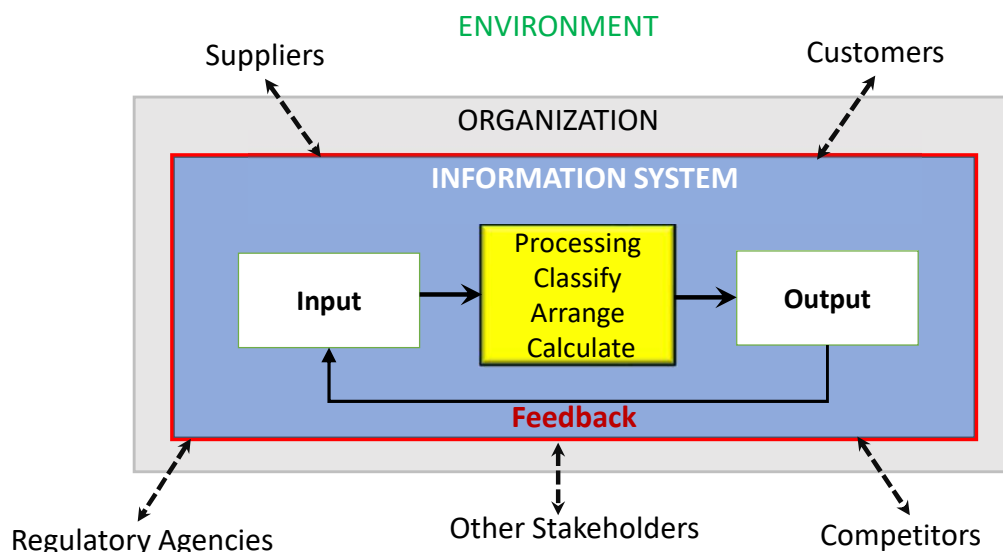
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Computer-Based Information System

A CBIS can be any organized combination of people, hardware, software, communications networks, data resources, and policies and procedures that stores, retrieves, transforms, and disseminates information in an organization.

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Perspectives on CBIS

- Using information systems effectively requires an ==understanding of the organization, management, and information technology== shaping the systems.

- An information system ==represents an organizational and management solution== based on information technology ==to a challenge or problem posed by the environment.==

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Role of Management in an IS

The information will be used for **control purposes** and as **input for future operations**
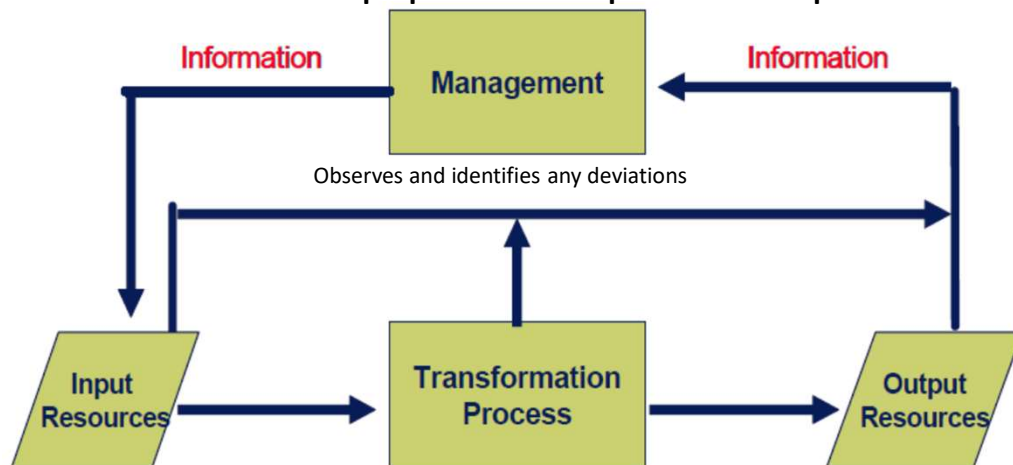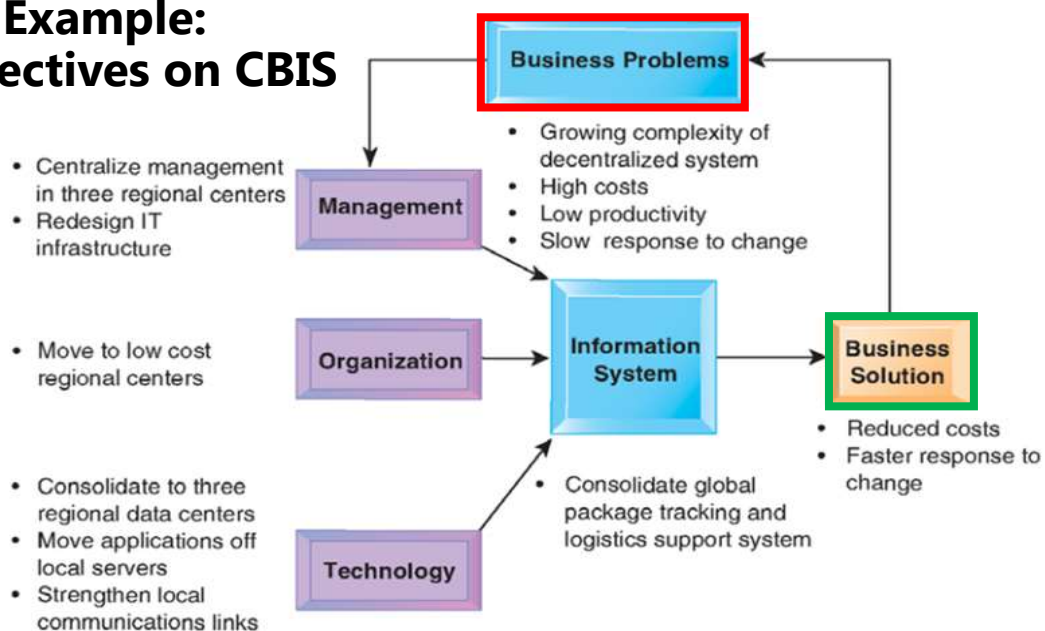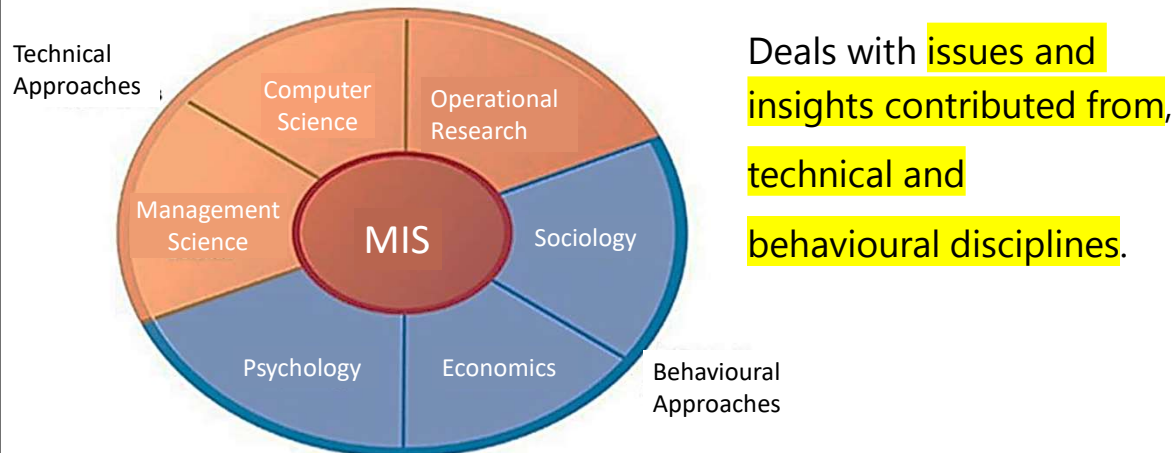

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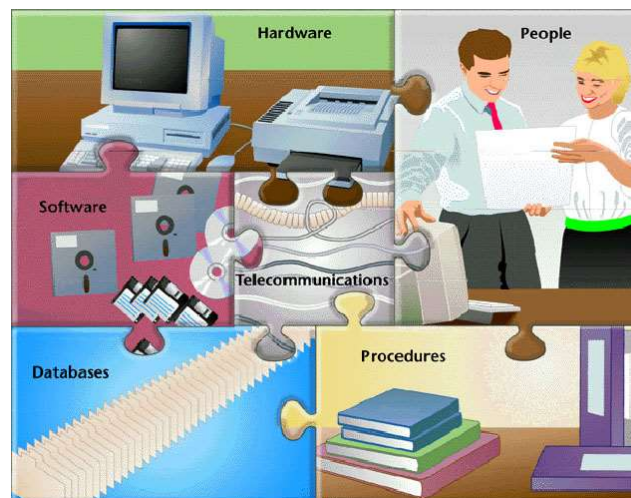
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Example: Perspectives on CBIS

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The Study of Information Systems

Contemporary Approaches to Information Systems

Technical Approaches

Computer Science

Operational Research

Management Science

MIS

Sociology

Psychology

Economics

Behavioural Approaches

Deals with ==issues and insights contributed from==, ==technical and== ==behavioural disciplines==.

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Components of a computer-based Information System

Hardware

People

Software

Telecommunications

Databases

Procedures

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CBIS Components - Hardware

- Includes devices and materials used for information processing.
- Other than the **main computer system unit** (including the CPU and primary memory), all other hardware devices are known as **peripheral devices (input, output, storage)**

Examples: handheld, laptop, desktop microcomputer systems, midrange and mainframe computer systems.

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Hardware - Input Devices

Used to input data that will be processed by the Information System.
E.g.: Keyboard, Mouse, Trackball, Graphics tablet, Webcam, Microphone, Scanner)

Keyboard   Mouse   Trackball   Joystick   Trackpad   Touchscreen

Optical Character Recognition   Optical Mark Reader   Scanner   Bar Code Reader

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Hardware - Output Devices

Devices which facilitate distributing of the output. Based on the requirements of the organization output may take different forms.
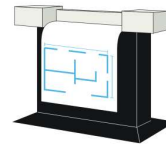
Output Type	Output Device
Printed on a paper	Printers, Plotters
Visual Display	Monitor, Projector
Audio	Speakers
Raised pins on a flat surface	Braille reader

Projector

Braille Reader

Monitor   Printer   Plotter   Speaker

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Hardware - Storage Devices

Facilitates storage of data and information for later use.

Hard Disk

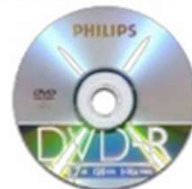Transcend Secure Digital Card 8GB

Pen Drive   Floppy Diskette

CD-R Compact Disc

8GB Memory Card Secure Digital Card

HD DVD 30GB Blu-ray DVD

PHILIPS DVD-R Digital Versatile Disc Or Digital Video Disc
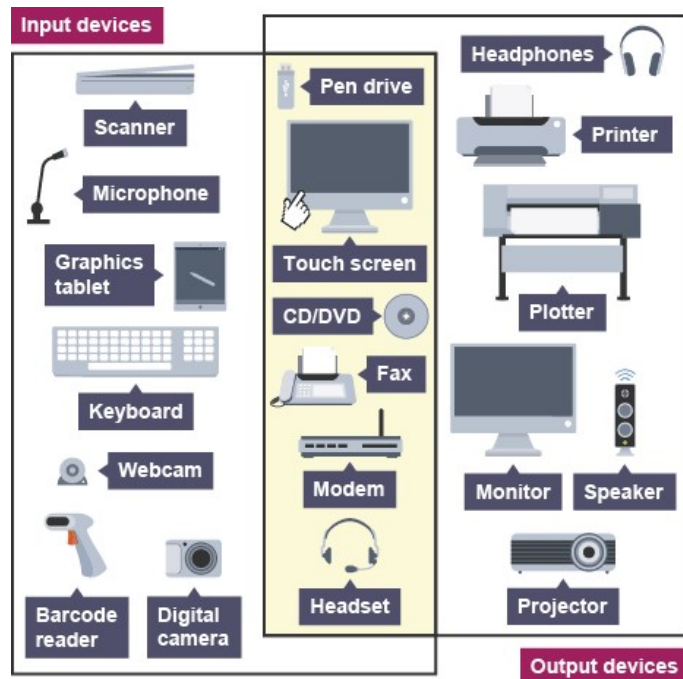
Zip Disk   PC Card

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Hardware -
Peripheral Devices

- **'Non-essential'** hardware components that usually connect to the system **externally**.

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CBIS Components - Software

- Consists of the computer programs that govern the operations of the computer.
- Controls CPU functions and processes the input data
- Gives the computer the power to act as an intelligent machine. Without software, computers are dead hardware
- There are two major types
    - **Application Software and**
    - **System Software**
- What are the other types?

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Activity

- Identify different types of software.
- Briefly describe each type.

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CBIS Components - **Databases**

- Organized collection of data in an organization.
- Organize data in such a way that a computer program can quickly select desired pieces of data
- E.g.: Relational DB, SQL DB, No-SQL DB, Graph DB, Centralized, Distributed, Cloud DB
- Special application known as Database Management Systems (DBMS) is used to create databases.
- E.g.: MS Access, MySQL, Oracle, DynamoDB…etc

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CBIS Components –
## Telecommunications and Networks

- Telecommunications is the electronic transmission of signals (i.e., data, voice, messages) for communications, enabling organizations to link computer systems into effective networks.
- It uses various technologies such as satellite systems, mobile systems, fibre optic networks, radio and television broadcasting systems, and the Internet.
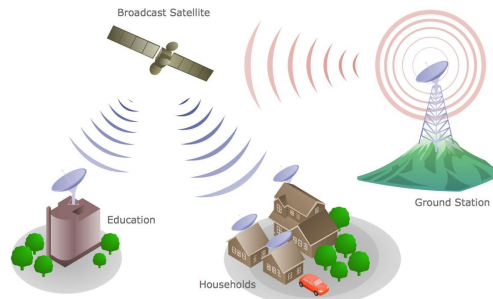
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CBIS Components –
Telecommunications and Networks

- Used to connect computers and computer equipment in a building, around the country, and across the world to enable electronic communications.
- There are many types of computer netwo

 - **local-area networks** (LANs)
  - **wide-area networks** (WANs).
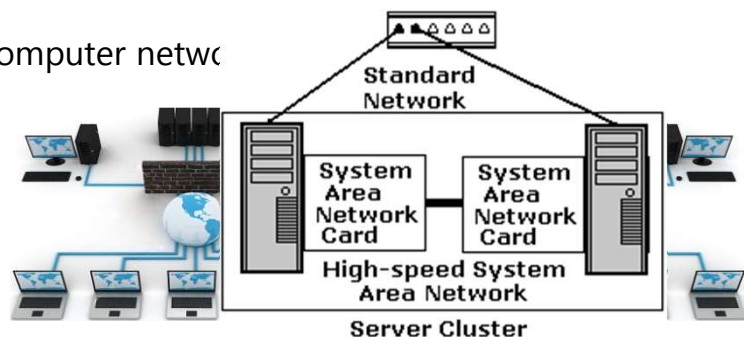
What is a System Area Network (SAN)?

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CBIS Components - Procedures

- A CBIS must be used according to some procedures to utilize it to achieve an objective.

- These procedures include the <mark>policies and methods</mark> for using a Computer-based information system

  - A policy may describe which group of users have access to a certain database.
  - A method describes the steps to be followed to perform a certain task.
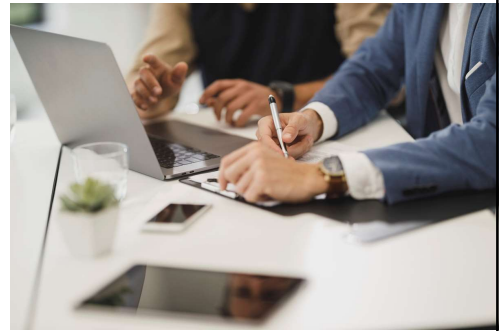
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CBIS Components - People

- **End Users:** People who use an information system or the information produced by a CBIS.

- **IS Specialists:** Develops and operates the IS

- **Systems Analysts:** Designs IS based on user requirements

- **Software Developers:** Creates computer programs based on specifications of Systems Analyst

- **System Operators:** Monitors and operates large computer systems and networks
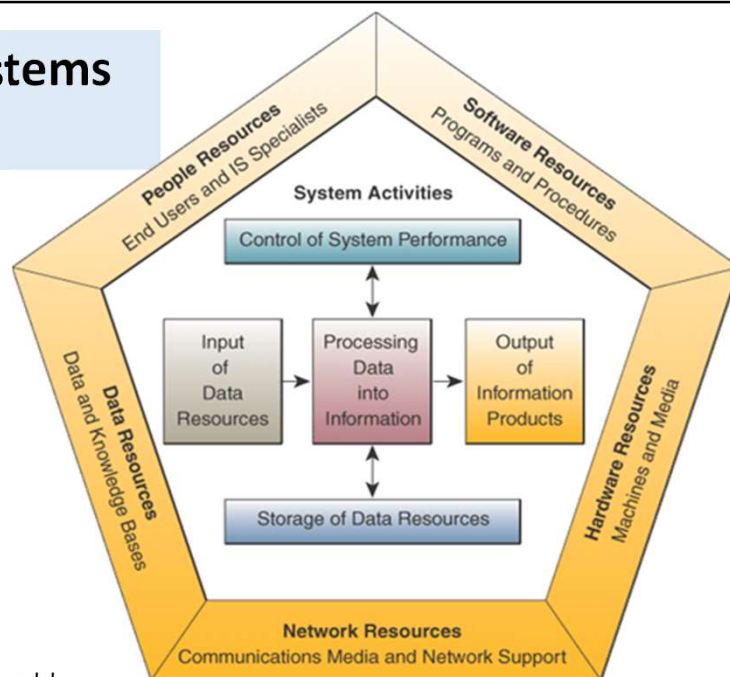
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Information Systems Model

Figure: Information systems model

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Why study information systems?

- An **end-user** perspective:
  - Enhance personal productivity and the productivity of their work groups and the department.
  - Increase your opportunities for success:
    - be aware of the management problems and opportunities presented by information technology.
- An **enterprise perspective**: Information systems play a vital role in the business success of an enterprise.
  - Efficient operations
  - Effective management
  - Competitive advantage

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IS Careers

- System Administrator
- Software Developer
- Systems analyst
- Database Administrator
- Business Intelligence Analyst
- Computer Systems Analyst
- Chief Information Officer
- Web Developer
- Network administrator
- Business Analyst
- Computer and Information Systems Managers
- Project manager
- IT Consultant
- Chief Technology Officer

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Activity

- Write the job descriptions for each of the following IS careers.

- System Administrator
- Software Developer
- Systems Analyst
- Business Analyst
- Database Administrator
- Business Intelligence Analyst
- Computer Systems Analyst

- Chief Information Officer
- Web Developer
- Network Administrator
- Computer and Information Systems Managers
- IT Project Manager
- IT Consultant

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