Year 11 IPT Notes

CHAPTER 1: INTRODUCTION TO INFORMATION SYSTEMS

What is a system?

A system is a collection of resources and processes that operate together to achieve some common purpose and hence fulfill some need. For example, the braking system in a car fulfils the need to slow down the car. Its purpose, or reason for existence, is to slow down the car. To achieve this purpose requires resources or components such as the brake pedal, brake pads, brake disks, together with tyres and many other components. The ways in which they interact are known as the processes of the system.

Processes: are actions that when systematically followed will cause the resources to achieve the specified purpose.

System: Any organised assembly of resources and processes united and regulated by interaction or interdependence to accomplish a common purpose.

Almost all systems are themselves made up of smaller sub-systems and similarly almost all systems are part of larger systems. Everything that influences or is influenced by the system is said to be in the environment.

Most of these other sub-systems affect or are affected by the braking system and hence are in its environment. For example, the braking system interfaces with the electrical system via a switch that turns the brake lights on or off as the brakes are activated or deactivated.

Diagrammatic Representation of a System

System engineers from all fields use diagrams and models to describe systems. Different types of diagrams are used to describe different aspects of the system. Describes an overview of the resources and processes of a system, together with its purpose and environment.

There are many different methods for representing systems diagrammatically, including context diagrams, data flow diagrams, flowcharts and IPO charts. Context diagrams are used to model the data movements to and from the system and its environment. Data flow diagrams model the data movements within the system. Flowcharts describe the logic of the system's processes. IPO charts identify how specific inputs are transformed into outputs.

What is Information?
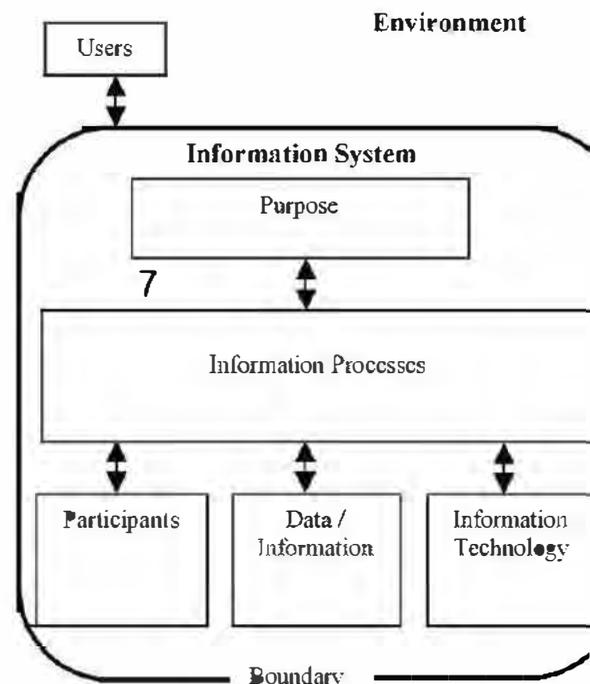
We may have access to a large store of facts or data but it is not until these facts are understood and their meaning derived that we have information. This is really the primary aim of this course, to examine the processes and technologies used to turn raw facts or data into meaningful information.

Information is therefore the output displayed by an information system that we, as human users, use to acquire knowledge. When we receive information concerning some fact or circumstance we interpret the information to acquire knowledge.

Information: Information is the output displayed by an information system. Knowledge is acquired when information is received.

INFORMATION SYSTEMS IN CONTEXT

An information system is a system whose primary purpose is to process data into information.

General nature of information of systems:
➔ the environment
➔ the boundary
➔ the purpose
➔ information processes
➔ resources

Environment

The environment in which an information system operates is everything that influences, and is influenced by, the information system, but, is not part of the information system. It encompasses all the conditions, components and circumstances that surround the system.

Environment: Everything that influences or is influenced by the system but is not part of the system.

Boundary

The boundary defines what is part of the information system and what is part of the environment. It is the delineation between the system and its environment.

When developing new information systems it is critical to define the boundaries of the system as clearly as possible so that all parties understand what a new system will do and often more importantly what it will not do. An ATM is an information system, its primary purpose is to process data into information. Account details, PINs and transaction details are entered by the user and result in a combination of outputs in the form of cash, receipts and information displayed on the monitor.

Let us consider some aspects of the environment that could potentially cause disruptions to the ATM information system achieving its purpose:
➔ Power Failure
➔ Problems with network connection

➔ Incorrect output of cash
➔ Insufficient receipt paper, receipt ink or cash
➔ Fraudulent use

Boundary: The boundary defines what is part of the system and what is part of the environment.

Purpose

The purpose of an information system is to fulfill some need or needs. In fact the purpose of the system is the whole reason for the system's existence. The purpose of an information system should be stated clearly and in achievable terms.

Determining the purpose of an information system involves the following steps:
1. Who is it for?
2. What does it do?

Information Processes

Collecting, organising, analysing, storing and retrieving, processing, transmitting and receiving and displaying are all examples of information processes. Together these
seven basic activities are what needs to be done to transform the data into useful
Information. In general, information processes are computer and non-computer based activities that are carried out using the resources or tools of the information system. Therefore information processes use participants, data and information and information technologies to achieve the system's purpose.

1. ***Collecting*** - the process by which data is entered into or captured by a computer system including:
- Deciding what data is required
- How it is sourced
- How it's encoded for entry into the system

2. ***Organising*** - the process by which data is structured into a form appropriate for the use of other information processes such as the format in which data will be represented.

3. ***Analysing*** - the process by which data is interpreted transforming it into information

4. ***Storing and Retrieving*** - the process by which data and information is saved and accessed later.

5. ***Processing*** - a procedure that manipulates data and information

6. ***Transmitting and Receiving*** - the process that sends and receives data and information within and beyond information systems

7. ***Displaying*** - the process that controls the format of information presented to the participant or user

Participants

Participants are a special class of users who carry out or initiate the information processes. Users are all the people who view or make use of the information output from an information system. Participants are involved in the actual operation of the system and are integral to that operation, in essence they are resources used by the system.

For example, a customer in a shop is a user of the cash register system. They provide data and in turn are provided with receipts but they have no control over the information processes that occur to transform this data into information. The shop assistant, on the other hand is a direct user of the cash register, they carry out the information processes and are therefore a participant in the system.

Development personnel include system analysts, engineers, programmers and testers.
People who are always participants are: Managers, data entry operators and direct users.

Users: People who view or use the information output from an information system.
Participants: A special class of users who carries out (or initiates) the information processes within an information system.

Data and Information

The whole aim of an information system is to process data into information. Thus data is a required resource for all information systems. Most data is itself the information derived from another system or process, and similarly the information output from a system is often used as data for another system or process.

The system must be able to understand the nature of the data if it is to successfully transform it into information.

Data: the raw material used by information processes.
Information: Information is the output displayed by an information system. Knowledge is acquired when information is received.

Information Technology

The hardware being the physical equipment and the software being the instructions that coordinate and direct the operation of the hardware.
Information Technology: The hardware and software used by an information system to carry out its information processes.

SOCIAL AND ETHICAL ISSUES

Social: Friendly companionship. Living together in harmony rather than in isolation.
Ethical: Dealing with morals or the principles of morality. The rules or standards for right conduct or practice.

Social and Ethical issues include:
  ➔ Privacy of the individual
  ➔ Security of data and information
  ➔ Accuracy of data and information
  ➔ Data quality
  ➔ Changing nature of work
  ➔ Appropriate information use
  ➔ Health and safety
  ➔ Copyright laws

PRIVACY OF THE INDIVIDUAL

Privacy is about protecting an individual's personal information. Personal information will not be collected, disclosed or otherwise used without our knowledge or permission.

Personal information is required, quite legitimately by many organisations when carrying out their various functions. This creates a problem, how do we ensure this information is used only for its intended task and how do we know what these intended tasks are? Laws are needed that require organisations to provide individuals with answers to these questions. In this way individuals can protect their privacy.

In Australia, privacy is legally protected under the Privacy Act.

Consequences of the Privacy Act mean that information systems that contain personal information must legally be able to:
  ➔ Explain why personal information is being collected and how it will be used
  ➔ Provide individuals with access to their records
  ➔ Correct inaccurate information
  ➔ Divulge details of other organisations that may be provided with information from the system
  ➔ Describe to individuals the purpose of holding the information
  ➔ Describe the information held and how it is managed

Security of Data and Information

Security of most resources is about guarding against theft or destruction. Possible security issues that all information system designers need to consider include:
  ➔ *Virus attacks* - Viruses are software programs that deliberately produce some undesired or unwanted result. Most viruses are spread via attachments to emails but also by infected media such as flash drives and CDs.
  ➔ *Hackers* - hese are people, often with extensive technical knowledge and skill, who aim to overcome or get around any security mechanisms used by a computer system. This allows them to view, utilize and even edit data and information.
  ➔ *Theft* - Unauthorised copying of data and information onto another system. Also physical theft of hardware, and as a consequence, the data and information it contains.
  ➔ *Unauthorised access by past and present employees* - Past and present employees may