

Data Processing

- This course is designed to equip the students with knowledge of the data processing and Information Systems

WHAT YOU WILL LEARN

- You will learn the components of data processing, hardware and software components
- Information Systems, basic components of Information Systems.

COURSE OBJECTIVES

- The course objectives are meant to enable you achieve/acquire the following: 1) Gain in-depth knowledge of data processing and its functions in business organizations

DATA

- Symbols or signals that are input, stored, and processed by a computer, for output as usable information.
- are a collection of facts represented of facts represented in the form
- of numbers, letters of words.

DATA

- Data are any facts, numbers, or text that can be processed by a computer.
- Today, organizations are accumulating vast and growing amounts of data in different formats and different databases. This includes:
 - i. operational or transactional data such as, sales, cost, inventory, payroll, and accounting
 - ii. non-operational data, such as industry sales, forecast data, and macro economic data
 - iii. meta data - data about the data itself, such as logical database design or data dictionary definitions

Data Processing

- Data are a collection of facts — unorganized but able to be organized into useful information.
- Processing is a series of actions or operations that convert inputs into outputs.
- When we speak of data processing, the input is data, and the output is useful information.
- What then is data processing? So, we can define data processing as a series of actions or operations that converts data into useful information.

- Data processing is, generally, "the collection and manipulation of items of data to produce meaningful information." In this sense it can be considered a subset of information processing, "the change (processing) of information in any manner detectable by an observer.
- The processing of converting data into useful information

Data Processing

- Data processing includes the analysis of various data (numerical and non-numerical) , sorting, calculating, editing, processing and handling data.
- The increasing popularity of computers in the field of computer applications, a small proportion of numerical calculation by computer data processing for information management has become a major application.
- Such as the side of the draw chart management, school management, warehouse management, accounting management, transportation management, IT management, office automation.

- For instance, Geographical data in a large number of existing data in the natural environment (land, water, climate, biological and other resource data), there are a large number of socio-economic data (population, transport, industry and agriculture, etc.) . These data often require comprehensive data processing.
- Therefore, the need to establish geographic database, the system to collate and store geographic data to reduce redundancy, the development of data processing software, full use of database technology for data management and processing.

Example of Data processing

- A very simple example of a data processing system is the process of maintaining a check register. Transactions— withdrawals and deposits— are recorded as they occur and the transactions are summarized to determine a current balance.
- Monthly the data recorded in the register is reconciled with a hopefully identical list of transactions processed by the bank.
- A more sophisticated record keeping system might further identify the transactions— for example deposits by source or withdrawal by type, such as charitable contributions. This information might be used to obtain information like the total of all contributions for the year.

- The important thing about this example is that it is a system, in which, all transactions are recorded consistently, and the same method of bank reconciliation is used each time

Data Processing System

- The term Data processing system is used to include the resources that are used to accomplish the processing of data. There are four types of resources:

- i. People,
- ii. Materials,
- iii. Facilities,
- iv. Equipments.

People provide input to computers, operate them, and use their output. Materials, such as boxes of paper and printer ribbons, are consumed in great quantity.

Facilities are required to house the computer equipment, People and materials.

Types of Data

- Think about any collected data that you have experience of; for example, Matric number, age, weight, sex, ethnicity, job grade, and consider their different attributes. These variables can be described as categorical or quantitative.
- Type of data Level of measurement Examples:
 - i. Nominal = (no inherent order in categories), eye color, ethnicity, diagnosis
 - ii. Ordinal - (categories have inherent order). E.g. Job grade, age groups
 - iii. Categorical - Binary Gender (2 categories – Male / Female)
 - iv. Discrete - (usually whole numbers) e.g. size of household (ratio)
 - v. Quantitative (Interval/Ratio)
 - vi. Continuous - Can, in theory, take any value in a range, although necessarily recorded to a predetermined degree of precision)
 - vii. Temperature °C/°F (no absolute zero) (interval)

Data processing functions

- Data processing may involve various processes, including:
 - i. Validation – It ensures that supplied data is clean, correct and useful
 - ii. Sorting – It arranges items in some sequence and/or in different sets.
 - iii. Summarization – It reduces detail data to its main points.
 - iv. Aggregation – It combines multiple pieces of data.
 - v. Analysis – It involves collection, organization, analysis, interpretation and presentation of data.
 - vi. Reporting – It lists detail or summary data or computed information.
 - vii. Classification – It separates data into various categories

Components of Data Processing

- 1. Basic data processing operations : Five basic operations are characteristic of all data processing systems: inputting, storing, processing, outputting, and controlling. They are defined as follows. Inputting is the process of entering data, which are collected facts, into a data processing system. Storing is saving data or information so that they are available for initial or for additional processing. Processing represents performing arithmetic or logical operations on data in order to convert them into useful information. Outputting is the process of producing useful information, such as a printed report or visual display. Controlling is directing the manner and sequence in which all of the above operations are performed

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Data storage hierarchy

- It is known that data, once entered, are organized and stored in successively more comprehensive groupings. Generally, these groupings are called a data storage hierarchy. The general groupings of any data storage hierarchy are as follows:
 - 1) Characters, which are all written language symbols: letters, numbers, and special symbols.
 - 2) Data elements, which are meaningful collections of related characters. Data elements are also called data items or fields.
 - 3) Records, which are collections of related data elements.
 - 4) Files, which are collections of related records. A set of related files is called a data base or a data bank. You also need to familiarize yourself with these data processing terms that you will come across often during study of this course.

INFORMATION

- The patterns, associations, or relationships among all this data can provide information.
- For example, analysis of students' data can yield information on which Students are doing well, and not.., analysis of retail point of sale transaction data can yield information on which products are selling and when.
- The need for converting facts into useful information is not a phenomenon of modern life. Throughout history, and even prehistory, people have found it necessary to sort data into forms that were easier to understand. For example, the ancient Egyptians recorded the ebb and flow of the Nile River and used this information to predict yearly crop yields.
- Today computers convert data about land and water into recommendations to farmers on crop planting. Mechanical aids to computation were developed and improved upon in Europe, Asia, and America throughout the seventeenth, eighteenth, and nineteenth centuries. Modern computers are marvels of an electronics technology that continues to produce smaller, cheaper, and more powerful components.

Information

- The processed data organized in a meaningful way which are useful to people who receive them. Thus, data are sometimes referred to as the raw materials from which information is generated.

Characteristics of Information

- Form - This is described in terms of qualitative and quantitative, numerical and graphic, summary and detailed.
- Frequency - This is a measure of how often information is needed, collected or produced.
- Breadth - This defines the scope of information
- Origin - Information may origin from sources inside the organization or outside.
- Time horizon - Information may be oriented toward the past, toward current event or toward future activities and events.
- Relevance - Information is relevant if it is needed for a practical situation.
- Completeness - Complete information provides the user with all that needs to be known about a particular situation.
- Timeliness - Timely information is something that is available when it is needed. Further it has not become outdated through delay.