Data processing systems

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TERMS:

1. Data
2. Information
3. Knowledge
4. Processing
5. Data processing

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1. **Data** – Data are any facts, numbers, or text that can be processed by a computer. *E.g. operational or transactional data such as, sales, cost, inventory, payroll, and accounting*
2. **Information** – Information, thus can be defined as "data that has been transformed into a meaningful and useful form for specific purposes". In some cases data may not require any processing before constituting information. However, generally, data is not useful unless it is subjected to a process through which it is manipulated and organised, its contents analyzed and evaluated. Only then data becomes information. E.g. *analysis of retail point of sale transaction data can yield information on which products are selling and when.*
3. **Knowledge** – is information that is *appropriate*, *relevant*, and *actionable*.

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4. Processing

The program contains instructions about what to do with the input. During the processing stage the compute follows these instructions using the data which has just been input. What the computer produces at the end of this stage, the output, will only be as good as the instructions given in the program.

In other words if garbage has been put in to the program, garbage is what will come out of the computer. This is known as GIGO, or Garbage In Garbage Out.

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5. DATA PROCESSING SYSTEM

- Data processing is the act of handling or manipulating data in some fashion.
- Regardless of the activities involved in it, processing tries to assign meaning to data. Thus, the ultimate goal of processing is to transform data into information.
- Data processing is the process through which facts and figures are collected, assigned meaning, communicated to others and retained for future use.
- **Hence** we can define **data processing as a series of actions or operations that converts data into useful information.**
- We use the term 'data processing system' to include the resources that are used to accomplish the processing of data.

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- The activity of data processing can be viewed as a "system".
- A system can be defined as "a group of interrelated components that seeks the attainment of a common goal by accepting inputs and producing outputs in an organised process".
- For example, a production system accepts raw material as input and produces finished goods as output.
- Similarly, a data processing system can be viewed as a system that uses data as input and processes this data to produce information as output.

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- There are many kinds of data processing systems. A manual data processing system is one that utilizes tools like pens, and filing cabinets.
- A mechanical data processing system uses devices such as typewriters, calculating machines and book-keeping machines.
- However, an electronic data processing uses computers to automatically process data.

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A data processing system may involve some combination of:

1. Conversion converting data to another form or Language.
2. Validation – Ensuring that supplied data is "clean, correct and useful."
3. Sorting – "arranging items in some sequence and/or in different sets."
4. Summarization – reducing detail data to its main points.
5. Aggregation – combining multiple pieces of data.
6. Analysis – the "collection, organization, analysis, interpretation and presentation of data.".
7. Reporting – list detail or summary data or computed information.

The first machines used for data processing were punched card machines, now computers are used.

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Types of data processing systems

1. Batch processing
2. Real-time processing
3. Transaction processing
4. Online Real-time data processing
5. Interactive data processing

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1. Batch Processing

This is one of the widely used type of data processing which is also known as serial/sequential of offline processing.

The fundamental of this type of processing is the that different jobs of different users are processed in the order received. Once the stacking or batching of jobs/transactions is complete they are provided/sent for processing while maintaining the same order.

This processing of a large volume of data helps in reducing the processing cost thus making it data processing economical. However, the results of each transaction are not immediately available when the transaction is being entered; there is a time delay.

Examples include: Examination, payroll and billing system.

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2. Real time processing

As the name suggests this method is used for carrying out real-time processing. This is required where the results are displayed immediately or in lowest time possible.

The data fed to the software is used almost instantaneously for processing purpose. The nature of processing of this type of data processing requires use of internet connection and data is stored/used online.

No lag is expected/acceptable in this type and receiving and processing of transaction is carried out simultaneously.

This method is costly than batch processing as the hardware and software capabilities are better.

Example includes banking system, tickets booking for flights, trains, movie tickets, rental agencies etc.

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4. Online data processing

This processing method is a part of automatic processing method. This method at times known as direct or random access processing.

Under this method the job received by the system is processed at same time of receiving. This can be considered and often mixed with real-time processing.

This system features random and rapid input of transaction and user defied/ demanded direct access to data bases/content when needed.

The advantage of online processing is the ***fast response times*** that a user can expect **unlike** batch processing. **This *supports quick decision-making*** in response to inputs, outputs and system actions or events.

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3. Transaction processing

A Transaction Processing System (TPS) is a type of information system that collects, stores, modifies and retrieves the data transactions of an enterprise.

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.

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5. Interactive or Transactional processing

Inputs are noted by the computer, but it deals with them after a short delay. It spends that delay handling other inputs and managing data movements.
The delay may be so brief that it looks to you as if it has happened straight away. But in terms of 'computer time', where each computer cycle is far less than a millionth of a second, it will have spent many cycles doing other things.

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For example:

- Booking pop concert tickets
- Ordering books online
- Handling bank accounts
- Booking a holiday

Interactive processing takes place one transaction at a time.

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Once the transaction is accepted, the database will be updated. For example, if you use an online system to book a hotel room, you will fill in a web form, submit it and it will come back to inform you of the room you have booked.

The user interface is very important with interactive processing. It must be clear, intuitive, easy to use and responsive. Usually a fair bit of data validation also takes place to ensure the correct input data is present. For instance the form may check that you have entered an address or telephone number.

A graphical user interface is the most common type of interface for transactional or interactive processing.

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