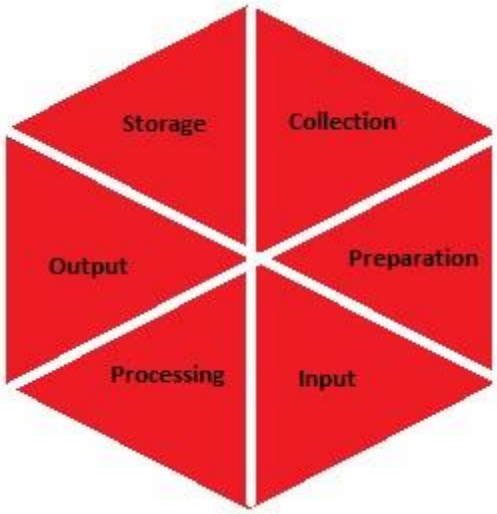
Data processing

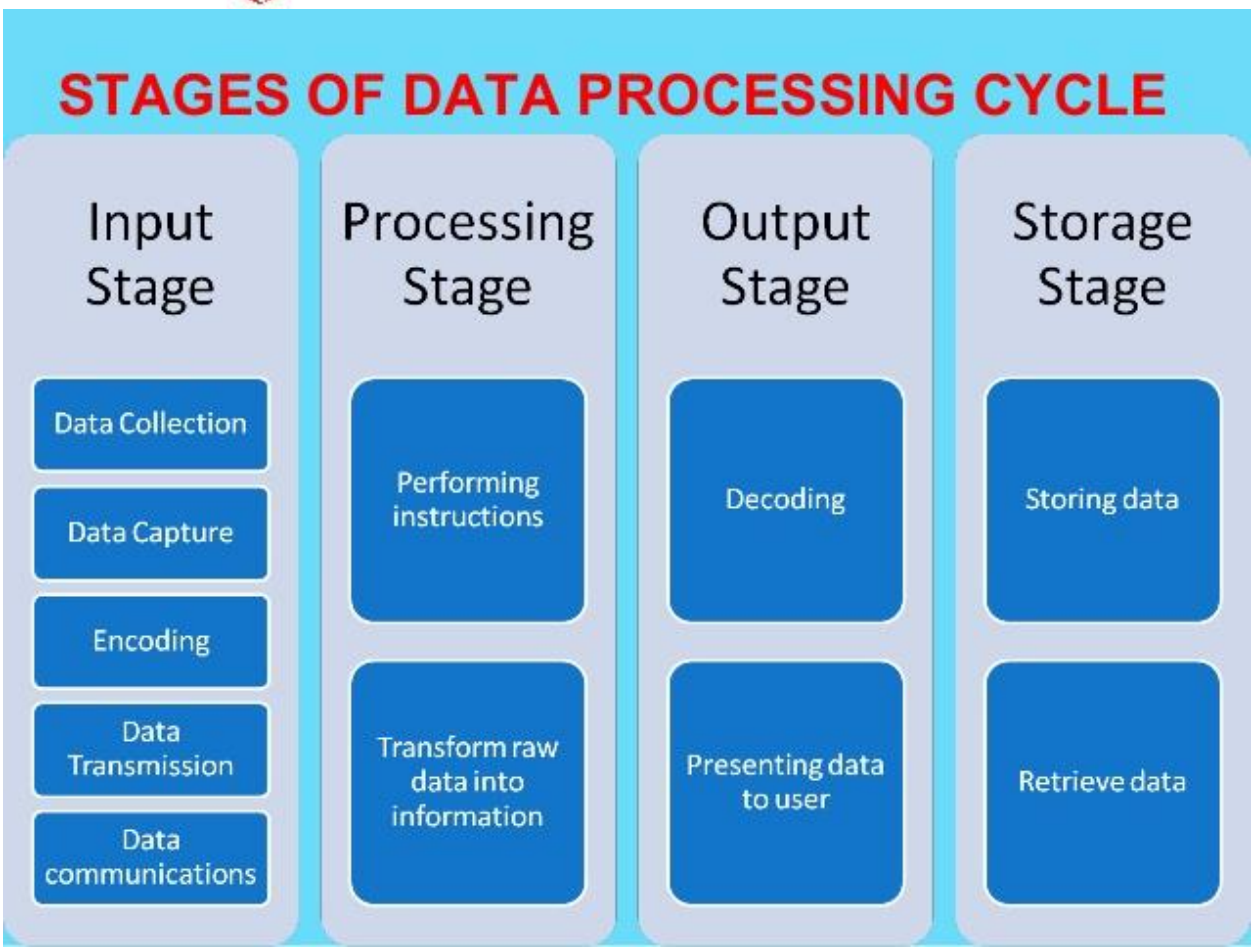
Data processing is a process of converting raw facts or data into a meaningful information.

Data can be done manually using a pen and paper, mechanically using simple devices eg typewritter or electronically using modern dat processing toolseg computers

Stages/Cycle of Data Processing

Data processing consists of following 6 stages −





Collection

Collection of data refers to gathering of data. The data gathered should be defined and accurate.

Preparation

Preparation is a process of constructing a dataset of data from different sources for future use in processing step of cycle.

Input

Input refers to supply of data for processing. It can be fed into computer through any of input devices like keyboard, scanner, mouse, etc.

Processing

The process refers to concept of an actual execution of instructions. In this stage, raw facts or data is converted to meaningful information.

Output and Interpretation

In this process, output will be displayed to user in form of text, audio, video, etc. Interpretation of output provides meaningful information to user.

Storage

In this process, we can store data, instruction and information in permanent memory for future reference.

The difference between data collection and data capture.

Data capture is the process of obtaining data in a computer-sensible form for at the point of origin (the source document itself is prepared in a machine-sensible form for input)

Data collection involves getting the original data to the 'processing centre', transcribing it, converting it from one medium to another, and finally getting it into the computer.

Methods of Data Processing

1**. Manual Data Processing**

In manual data processing, data is processed manually without using any machine or tool to get required results. In manual data processing, all the calculations and logical operations are performed manually on the data. Similarly, data is transferred manually from one place to another. This method of data processing is very slow and errors may occur in the output. Mostly, is processed manually in many small business firms as well as government offices & institutions.

In an educational institute, for example, marks sheets, fee receipts, and other financial calculations (or transactions) are performed by hand. This method is avoided as far as possible because of the very high probability of error, labor intensive and very time consuming. This type of data processing forms the very primitive stage when technology was not available or it was not affordable. With the advancement in technology the dependency on manual methods has drastically decreased.

2. Mechanical Data Processing

In mechanical data processing method, data is processed by using different devices like typewriters, mechanical printers or other mechanical devices. This method of data processing is faster and more accurate than manual data processing. These are faster than the manual mode but still forms the early stages of data processing. With invention and evolution of more complex machines with better computing power this type of processing also started fading away. Examination boards and printing press use mechanical data processing devices frequently.

3. Electronic Data Processing

Electronic data processing or EDP is the modern technique to process data. The data is processed through computer; Data and set of instructions are given to the computer as input and the computer automatically processes the data according to the given set of instructions. The computer is also known as electronic data processing machine.

This method of processing data is very fast and accurate. For example, in a computerized education environment results of students are prepared through computer; in banks, accounts of customers are maintained (or processed) through computers etc.

a. Batch Processing

Batch Processing is a method where the information to be organized is sorted into groups to allow for efficient and sequential processing. Online Processing is a method that utilizes Internet connections and equipment directly attached to a computer. It is used mainly for information

recording and research. Real-Time Processing is a technique that has the ability to respond almost immediately to various signals in order to acquire and process information. Distributed Processing is commonly utilized by remote workstations connected to one big central workstation or server. ATMs are good examples of this data processing method.

Batch processing has these benefits:=

- It can shift the time of job processing to when the computing resources are less busy.
- It avoids idling the computing resources with minute-by-minute manual intervention and supervision.
- By keeping high overall rate of utilization, it amortizes the computer, especially an expensive one.
- It allows the system to use different priorities for interactive and non-interactive work.
- Rather than running one program multiple times to process one transaction each time, batch processes will run the program only once for many transactions, reducing system overhead.

Disadvantages

- Users are unable to terminate a process during execution, and have to wait until execution completes.

b. Online Processing

This is a method that utilizes Internet connections and equipment directly attached to a computer. This allows for the data stored in one place and being used at altogether different place. Cloud computing can be considered as a example which uses this type of processing. It is used mainly for information recording and research.

c. Real-Time Processing

This technique has the ability to respond almost immediately to various signals in order to acquire and process information. These involve high maintainance andupfront cost attributed to very advanced technology and computing power. Time saved is maximum in this case as the output is seen in real time. For example in banking transactions

Example of real time processing

- Airline reservation systems
- Theatre (cinema) booking
- Hotel reservations
- Banking systems
- Police enquiry systems
- Chemical processing plants
- Hospitals to monitor the progress of a patient
- Missile control systems

Advantages

- Provides up-to-date information
- The information is readily available for instant decision-making
- Provides better services to users/customers.
- Fast &reliable
- Reduces circulation of hardcopies.

Disadvantages

- Require complex Os & are very expensive
- Not easy to develop
- Real time systems usually use 2 or more processors to share the workloads, which is expensive.
- Require large communication equipment.

d. Distributed Processing

This method is commonly utilized by remote workstations connected to one big central workstation or server. ATMs are good examples of this data processing method. All the end machines run on a fixed software located at a particular place and makes use of exactly same information and sets of instruction. Examples of industries and business organizations that extensively use distributed processing systems.

- Banks
- Computerized retails stores, e.g. supermarkets
- Learning institutions with many departmental offices

- Bureaus or communication cyber cafes
- Airline reservation systems