

## FUNDAMENTALS OF DATA STRUCTURE

### DATA:

- Data is a raw and unorganized fact that required to be processed to make it meaningful.
- It can be consider as a facts and statistics collected together for reference or analysis.
- Data are individual units of information.
- In analytical processes, data are represented by variables.
- Data is always interpreted by a human or machine, to derive meaning. So, data is meaningless.
- Data contains numbers, statements, and characters in a raw form.

### INFORMATION:

- Information is structured, organized and processed data.
- Information is that the knowledge that is re-modelled and classified into an intelligible type.
- It may be obtained from numerous sources like newspaper, internet, television, people, books etc.

### DATA PROCESING:

- Data processing is the act of handling or manipulating data
- Data processing is the process through which facts and figures are collected, assigned meaning, communicated to others and retained for future use.

- Thus, the ultimate goal of processing is to transform data into information.

### DATA PROCESSING ACTIVITIES:

#### COLLECTION

Originating  
Measuring  
Recording  
Comparing

#### CONVERSION

Coding  
Classifying  
Verifying  
Transforming

#### MANIPULATION

Sorting  
Calculating  
Summarizing  
Comparing

#### STORAGE

Storing  
Retrieving

#### COMMUNICATION AND REPRODUCTION

### DATA PROCESSING CYCLE:

The data processing activities can be grouped in four functional categories.

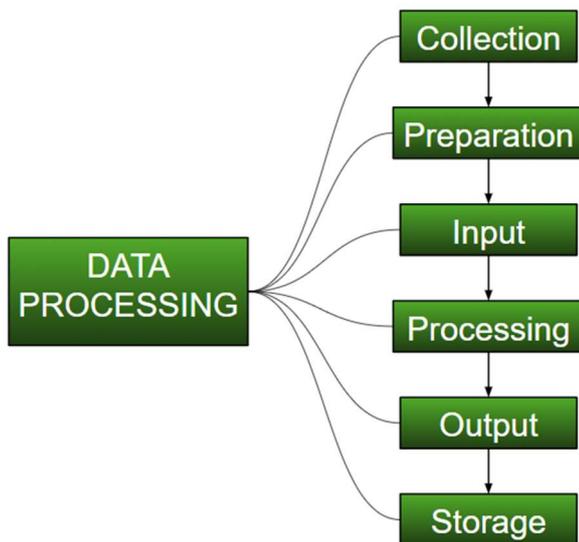
- Data input
- Data processing,
- Data output
- Storage

### DATA INPUT:

- It refers to the activities required to record data and to make it available for processing.
- The input can also include the steps necessary to check, verify and validate data contents.

### PROCESSING:

- It includes techniques such as classifying, sorting, calculating, summarizing, comparing, etc.
- It converts data into information.



### OUTPUT:

- It is a communication function which transmits the information, generated after processing of data.

### STORAGE:

- It involves the filing of data and information for future use.

### COMPUTER OPERATIONS: PROCESSING

- **Input/ Output operations:** A computer can take input from various input devices such as keyboard and processed it and provides the desired output to various

display screens and printers make human-machine communication possible.

- **Calculation and text manipulation Operations:** Computer circuits perform calculations on numbers. They are also capable of manipulating numeric and other symbols used in text with equal efficiency.

- **Logic/Comparison Operations:** A computer also possesses the ability to perform logic operations.  
For Ex:  $A > B$ ,  $A == B$ ,  $A < B$  etc.

- **Storage and Retrieval Operations:** Both data and program instructions are stored internally for future use.

### DATA ORGANIZATION:

- **Data Item:** A data item is the smallest unit of information stored in computer file.

It is a single element used to represent a fact such as an employee's name, item price, etc.

Ex: The employee number 170 is a data item. PANKAJ, the name is a data item.

- **Field:** Data items are physically arranged as fields in a computer file. Their length may be fixed or variable.
- **Record:** A record is a collection of related data items or fields. Each record normally corresponds to a specific unit of information.

**Ex:** The first record contains all the data concerning the employee PANKAJ.

The second record contains all the data concerning the employee REKHA.

- **File:** The collection of records is called a file. A file contains all the related records for an application.
- **Database:** The collection of related files is called as database. A database contains all the related files for a particular application.

#### FIXED LENGTH RECORDS:

- All the records in the file are of same size.
- Leads to memory wastage.
- Access of the records is easier and faster.
- Exact location of the records can be determined: location of  $i$ th record would be  $n*(i-1)$ , where  $n$  is the size of every record.

#### VARIABLE LENGTH RECORDS:

- Different records in the file have different sizes.
- Memory efficient.
- Access of the records is slow.

#### CHECK YOURSELF

1. Information is
  - A. Data
  - B. Processed Data
  - C. Manipulated input
  - D. Computer output
2. Data by itself is not useful unless
  - A. It is massive
  - B. It is processed to obtain information
  - C. It is collected from diverse sources
  - D. It is properly stated
- 3 For taking decisions data must be
  - A. Very accurate
  - B. Massive
  - C. Processed correctly

D. Collected from diverse sources

4. Data processing system:

- A. Data -> Processing -> Output
- B. Data -> Output -> Processing
- C. Processing -> Data -> Output
- D. None of the above

#### STRETCH YOURSELF

1. Briefly explain about data processing cycle?
2. Differentiate between fixed and variable length records?
3. Describe data, information and data processing by giving suitable example?

#### ANSWERS

Answers to Check Yourself:

1. B
2. B
3. A
4. A