**What Is Data Processing: Types, Methods, Steps and Examples for Data Processing Cycle**

https://www.simplilearn.com/what-is-data-processing-article?source=frs\_category

Whether you use the internet to learn about a certain topic, complete financial transactions online, order food, etc., data is being generated every single second. The use of social media, online shopping and video streaming services have all added to the increase in the amount of data. A study by [Domo](https://www.domo.com/assets/downloads/18_domo_data-never-sleeps-6+verticals.pdf) estimates that 1.7MB data is created every second for every human being on the planet in 2020. And in order to utilize and get insights from such a huge amount of data - data processing comes into play.

**What Is Data Processing?**

[Data](https://www.simplilearn.com/what-is-data-article) in its raw form is not useful to any organization. Data processing is the method of collecting raw data and translating it into usable information. It is usually performed in a step-by-step process by a team of [data scientists](https://www.simplilearn.com/why-get-certified-as-a-data-scientist-article) and [data engineers](https://www.simplilearn.com/how-to-become-a-data-engineer-article) in an organization. The raw data is collected, filtered, sorted, processed, analyzed, stored and then presented in a readable format.

Data processing is crucial for organizations to create better business strategies and increase their competitive edge. By converting the data into a readable format like graphs, charts and documents, employees throughout the organization can understand and use the data.

**Data Processing Cycle**

The data processing cycle consists of a series of steps where raw data (input) is fed into a process (CPU) to produce actionable insights (output). Each step is taken in a specific order, but the entire process is repeated in a cyclic manner. The first data processing cycle's output can be stored and fed as the input for the next cycle.

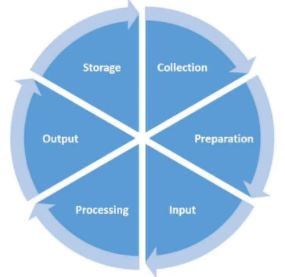


Fig: Data processing cycle ([source](https://planningtank.com/computer-applications/data-processing-cycle))

Generally, there are six main steps in the data processing cycle:

**Step 1: Collection**

The collection of raw data is the first step of the data processing cycle. The type of raw data collected has a huge impact on the output produced. Hence, raw data should be gathered from defined and accurate sources so that the subsequent findings are valid and usable. Raw data can include monetary figures, website cookies, profit/loss statements of a company, user behavior, etc.

**Step 2: Preparation**

Data preparation or data cleaning is the process of sorting and filtering the raw data to remove unnecessary and inaccurate data. Raw data is checked for errors, duplication, miscalculations or missing data, and transformed into a suitable form for further analysis and processing. This is done to ensure that only the highest quality data is fed into the processing unit.

**Step 3: Input**

In this step, the raw data is converted into machine readable form and fed into the processing unit. This can be in the form of data entry through a keyboard, scanner or any other input source.

**Step 4: Data Processing**

In this step, the raw data is subjected to various data processing methods using machine learning and artificial intelligence algorithms to generate a desirable output. This step may vary slightly from process to process depending on the source of data being processed (data lakes, online databases, connected devices, etc.) and the intended use of the output.

**Step 5: Output**

The data is finally transmitted and displayed to the user in a readable form like graphs, tables, vector files, audio, video, documents, etc. This output can be stored and further processed in the next data processing cycle.

**Step 6: Storage**

The last step of the data processing cycle is storage, where data and metadata is stored for further use. This allows for quick access and retrieval of information whenever needed, and also allows it to be used as input in the next data processing cycle directly.

**Types of Data Processing and their Uses**

There are different types of data processing based on the source of data and the steps taken by the processing unit to generate an output. There is no one-size-fits-all method that can be used for processing raw data.

1. Batch Processing – Data is collected and processed in batches. Used for large amounts of data. Example: payroll system.

2. Real-Time Processing – Data is processed within seconds when the input is given. Used for small amounts of data. Example: withdrawing money from ATM

3. Online Processing – Data is automatically fed into the CPU as soon as it becomes available. Used for continuous processing of data. Example: barcode scanning.

4. Multiprocessing – Data is broken down into frames and processed using two or more CPUs within a single computer system. Also known as parallel processing.

5. Time-Sharing – Allocates computer resources and data in time slots to several users simultaneously.

**Data Processing Methods**

There are three main data processing methods - manual, mechanical and electronic.

**Manual Data Processing**

In this data processing method, data is processed manually. The entire process of data collection, filtering, sorting, calculation and other logical operations are all done with human intervention without the use of any other electronic device or automation software. It is a low-cost method and requires little to no tools, but produces high errors, high labor costs and lots of time.

**Mechanical Data Processing**

Data is processed mechanically through the use of devices and machines. These can include simple devices such as calculators, typewriters, printing press, etc. Simple data processing operations can be achieved with this method. It has much lesser errors than manual data processing, but the increase of data has made this method more complex and difficult.

**Electronic Data Processing**

Data is processed with modern technologies using data processing software and programs. A set of instructions is given to the software to process the data and yield output. This method is the most expensive but provides the fastest processing speeds with the highest reliability and accuracy of output.

**Examples of Data Processing**

Data processing occurs in our daily lives whether we may be aware of it or not. Here are some real-life examples of data processing:

* A stock trading software that converts millions of stock data into a simple graph
* An e-commerce company uses the search history of customers to recommend similar products
* A digital marketing company uses demographic data of people to strategize location-specific campaigns
* A self-driving car uses real-time data from sensors to detect if there are pedestrians and other cars on the road