Data compression process of reducing the size of data so that it occupies less storage space & requires less data transmission to.

1- Lossless compression

technique in which the original data can be perfectly reconstructed from compressed data. no info lost.

→ working principle
- Reduces statistical redundancy
- uses encoding techniques like RLE, shannon coding etc.

→ characteristics
- Exact restoration of original data
- lower compression ratio. compared to lossy
- suitable for text, medical data

→ Real world example
1. winzip : compress files into zip format without using data
2. PNG used for images where quality must be preserved.

Advantages
- No loss of information
- Safe for sensitive data

Disadvantages
- compression ratio limited. File size reduction

2. Lossy compression

technique where some info permanently removed.

reconstructed data not exactly same as original.

⇒ working principle

- Removes perceptually less imp information
- Ex: techniques like DCT

⇒ characteristics

- high compression ratio
- suitable for multimedia files.

⇒ Real world examples

1. JPEG : used for photographs in camera and internet.
2. MP3 : Removes inaudible frequency to reduce file size.

Advantages

1. very high compression ratio
2. saves storage space significantly

Disadvantages

1. Quality degradation
2. not suitable for text or virtual data