SECTION-5 Answer-1

* Data Compression ⇒

↳ In Computer science and information theory, data compression is the process of encoding information using fewer bits than a decoded representation would use through use of specific encoding schemas.

↳ It is the art or science of representing information in a compact form.
This compaction of information is done by identifying the structure that exits in the data.

↳ Compressed data communication only works when both the sender and the receiver of the information understand as characters representing English language.

↳ Similarly, the compressed that can only be understood if the decoding method is known by the receiver.

* Need of data Compression →

↳ Compression is needed because it helps to reduce the consumption of expensive resources such as a hard disk space or transmission bandwidth.

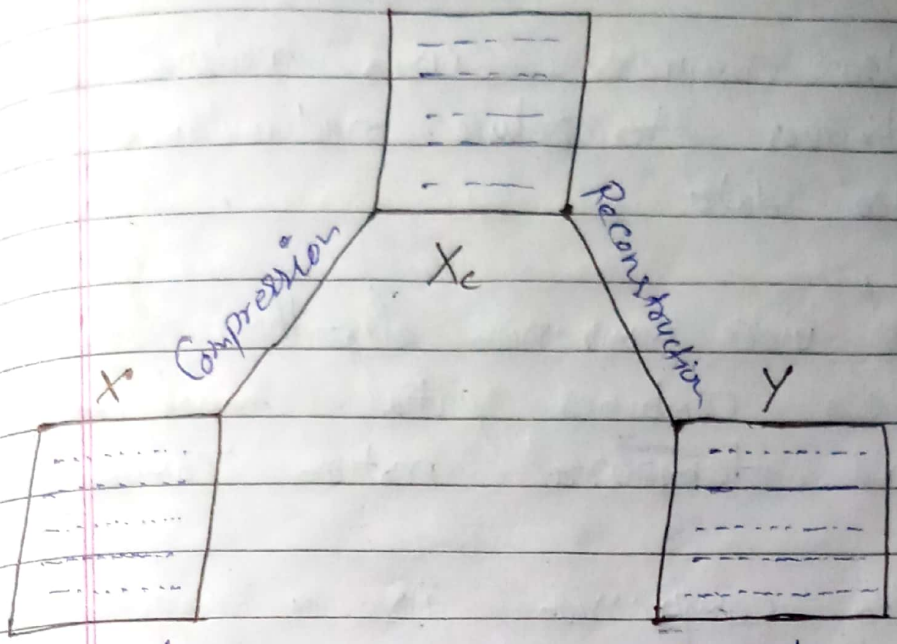
↳ The design of data compression schemes involves trade off among various factors including the degree of compression, the amount of distortion introduced and the computational resources required to compress and decompress the data.

* Compression and reconstruction →

↳ A compression technique of compression algorithm refers two algorithms i.e, compression algorithm and reconstruction algorithm.

↳ The compression algorithm takes an input x and generates a representation x_c that requires fewer bits, and the reconstruction algorithm operates on the compressed representation x_c to generate the reconstruction Y.

These generations are shown in fig



fig→ Compression and Reconstruction.

* Applications of Data Compression ⇒

1. Audio ⇒

↳ Audio data compression reduces the transmission bandwidth and storage requirements of audio data.

↳ Audio compression algorithms are implemented in software as audio codecs.

↳ Lossy audio compression algorithms provide higher compression at the cost of fidelity and are used in numerous audio applications.

2. Video ⇒

↳ Video compression uses modern coding techniques to reduce redundancy in video data.

↳ Most video compression algorithms and codecs combines spatial image compression and temporal motion compensation.

↳ Video compression is a practical implementation of source coding in information theory.

3. Genetics ⇒ Genetics compression algorithms are the latest generation of lossless algorithms that compress data using both conventional compression algorithms and genetic algorithms adapted to the specific datatype.

4. Emulation ⇒

↳ In order to emulate CD-based consoles such as the play-station 2, data compression is desirable to reduce huge amount of disk space used by ISOs.