Exploring Data Compression Standards

Names / Numbers:

Select the standard you will explore today

◊ MP3 (MPEG Audio Layer III): The basics of MP3 encoding, including psychoacoustic models, bitrate settings, and its impact on music distribution.

◊ AAC (Advanced Audio Coding): How AAC works, its improvements over MP3, and its applications in streaming platforms and digital broadcasting.

◊ H.264 (AVC): Core concepts of H.264, including intra- and inter-frame compression, motion compensation, and applications in video streaming

◊ H.265 (HEVC): Overview of H.265 and its improvements over H.264, including better compression efficiency and support for 4K and HDR content.

◊ AV1: An open-source video codec developed by the Alliance for Open Media, its compression techniques, and how it's used for streaming high-quality video with low bandwidth.

◊ JPEG Standard: How JPEG compression works, including DCT, quantization, and entropy coding. Applications in digital photography and web images.

◊ DEFLATE: How the DEFLATE algorithm combines LZ77 and Huffman coding to compress text and binary data.

◊ Zstandard (Zstd): A modern lossless compressor developed by Facebook that offers high compression ratios and fast decompression.

◊ LZMA and LZMA2: How LZMA achieves high compression. Compare performance with ZIP and GZIP.

◊ DNA Compression Algorithms (e.g., Biocompress, XMCompress, DSRC): Explore how algorithms exploit biological redundancy.

Objective: Each group will explore a specific data compression standard or method and present a concise summary of how it works, where it is applied, and what makes it effective.