

Perceptual Coding

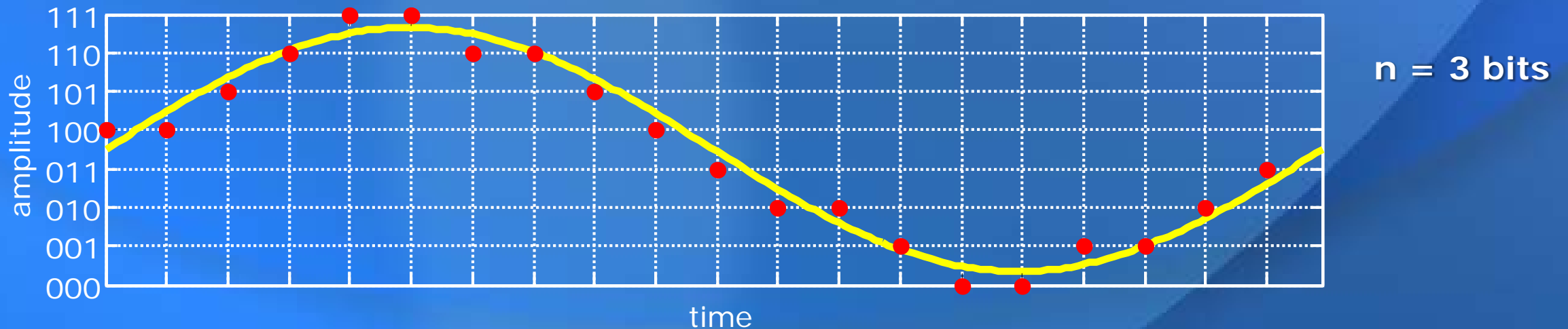
Lossy Source Coding



- OUTPUT "close" or "similar" to INPUT
- Often used for data streams intended for human consumption, e.g. audio and video data
 - Examples: MP3, JPEG, MPEG
 - Compression obtained by discarding information

Pulse Code Modulation

- Standard format for uncompressed audio (e.g. audio CD)
- Audio signal is
 - Sampled in time
 - Quantized in amplitude



Output bitstream: 100 100 101 110 111 111 110 110 101 100 011 010 010 ...

What info to remove?

- Reduce resolution?
 - Reduces number of bits per sample
 - e.g. 16 to 8 bits gives you a factor of two in compression
 - However, introduces noticeable distortion
- Reduce the sampling rate?
 - Reduces number of samples in a given time window.
 - e.g., 44kHz to 22kHz compresses by a factor of 2.
 - However, leads to a noticeable loss of high frequency information.
- These schemes result in highly perceptible changes in the signal, but a relatively small reduction in bit rate.

Perceptual Coding

- What matters is how the consumer (e.g. human ears or eyes) perceives the input.
- Perceptual coding seeks to identify information that can be removed from bit stream without perceived effect.
- This process depends upon models of human perception.

MP3

- MPEG = Moving Pictures Experts Group
 - Set up by ISO (International Standards Organization)
- MP3 = MPEG audio layer III
- MP3 achieves a 10:1 compression ratio!
- This enables
 - bit-streaming
 - compact audio storage

Key Steps in MP3 coding

