

CSc 461/561

Multimedia Systems

Midterm Discussion

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Spring 2006

3/7/06

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1

Q1 (6): sampling & quantization

- Q1.a (3)
 - Nyquist Theorem
 - alias frequency
- Q1.b (3)
 - Lloyd-Max quantizer
 - quantization error

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2

Q2 (7): entropy encoding

- Q2.a (1)
 - entropy
- Q2.b (4)
 - Huffman encoding
 - bottom-up
 - sorted
- Q2.c (2)
 - *average* code word length per symbol

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3

Q3 (12 max): lossy/lossless

- Q3.a (2): nonuniform quantization
 - more bits for more important information
 - much *fewer* bits for less important information
 - e.g., small changes in small values (u-law)
- Q3.b (2): differential coding
 - difference btw values much *smaller* than values
 - full value first, then difference only
 - e.g., DPCM, JPEG DC encoding

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4

Q3 (12 max): lossless/lossy

- Q3.c (2): lookup table
 - # of tables entries much *smaller* than entry size
 - table is included!
 - e.g., pseudo color
- Q3.d (2): chroma subsampling
 - human *less* sensitive to color information
 - *aggressive* sampling on color info
 - e.g., 4:2:0 in JPEG

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5

Q3 (12 max): lossy/lossless

- Q3.e (2): interlaced scanning
 - 1 frame = 2 fields; frame rate = 1/2 field rate
 - odd/even fields perceived as 2 *frames*
 - e.g., PAL/NTSC
- Q3.f (2): dictionary-based compression
 - dictionary ref *smaller* than dictionary entry
 - dictionary is NOT included!
 - e.g., LZW

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6

Q3 (12 max): *lossless/lossy*

- Q3.h (2): domain transformation
 - time/space => freq; “energy compactness”
 - *coarse* quantization on high-freq components
 - e.g., DCT in JPEG
- Q3.i (2): motion estimation
 - indicate the “most similar”
 - encode the “difference”
 - e.g., I/B/P in MPEG