COLLEGE OF ENGINEERING, PUNE

(An Autonomous institute of Govt. Of Maharashtra)

End-SEM EXAM

(CT326) Multimedia Communication System

Programme : T.Y. B.Tech. (Information Technology))

Year: 20012-13   Semester II   Date: 2nd May 2013

Duration: 3 hrs   Max. Marks: 50

Instructions:
1. **Answer any 5 questions. Write to the point.**
2. **Only first 5 questions will be evaluated**
3. **Once that question is attempted, all subquestions should be solved consecutively.**

Q.1   A   Briefly outline the four broad classes of approach that one may exploit to   03
          compress multimedia data. Give one example of a compression algorithm
          for each class.

      B   List distinct models of color used in Multimedia and mention applications   04
          for which they are targeted.

          Explain why there are a number of different color models exploited in
          multimedia data formats.

      C   Calculate the uncompressed digital output, i.e. data rate, if a video   03
          signal is sampled using the following values:
          25 frames per second
          160 x 120 pixels
          True (Full) color depth

          If a suitable CD stereo quality audio signal is included with the above video
          signal, what compression ratio would be needed to be able to transmit the
          signal on a 128 kbps channel?

Q.2   A   Following string has to be coded with Huffman coding.   05

BABACACADADABBCBABEBEDDABEEEBB

          Find out Huffman coding scheme for the same.
          How many bits are needed   to transfer this coded message and what is its
          entropy?

      B   With the help of block diagram, explain JPEG compression technique.   05
          For color images instead of R,G, B planes why Y,U,V planes are preferred?

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What are the DC and AC co-efficients in DCT computations ?
Is the procedure for encoding DC and AC coefficients same?
Which is the lossy step in compression technique?

Why Zig-zag scanning is used instead of linear scanning in DCT coefficient matrix.

Q.3   A What is the main difference between the *H.261* and *MPEG* video   04
         compression algorithms

         MPEG has a variety of different standards, *i.e.* MPEG-1, MPEG-2,
         MPEG-4, MPEG-7 and MPEG-21. Why have such standards evolved?
         Give an example target application for each variant of the MPEG standard

      B A multimedia presentation must be delivered over a network at a rate of 1.5   06
         Mbits per second. The presentation consists of digitized audio and video.
         The audio has an average bit rate of 300 Kbits per second. The digitized
         video is in PAL format and is to be compressed using MPEG-1 standard.
         Assuming a frame sequence of

                        IBBPBBPBBPBBI

         and average compression ratios of 10:1 and 20:1 for the I-frame and P- frame
         respectively, what is the compression ratio required for the B-frame to
         ensure the desired delivery rate?

         You may assume that for PAL the luminance signal is samples at the spatial
         resolution of 352x288 and the two chrominance signals are sampled at half
         of resolution. The refresh rate for Pal is 25 Hz. You should also allow 15%
         overheads for multiplexing and packetisation of MPEG-1 video.

Q.4   A What is Chroma sub sampling and explain how does it help in video   02
         compression

      B Explain the difference between intra frame and inter frame compression   05
         De scribe the MPEG-1 encoding process, with special mention to I, P. B
         frames.
         Why should be the transmission order need to be different from play back
         order.

      C Given the following YIQ image values: 03

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128	126	127	129
124	123	124	124
130	136	132	132
154	143	132	132

Y

55	66	54	54
56	57	56	56
45	56	58	49
34	36	39	37

I

44	44	55	55
44	44	55	55
34	34	36	35
35	35	34	34

Q

What are chroma sub sampling values for

1) 4:2:2 sub-sampling scheme
2) 4:2:0 sub-sampling scheme

Q.5   A Given the following coding order of a group of frames in MPEG-1:   02

I	P	B	B	B	P	B	B	B	I	B	B	B	I	P	B	P
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

What is display order of the frames?

B What are the most salient differences between ordinary TV and HDTV ?   04
What was the main impetus for the development of HDTV

C What are the different motion vector search algorithms. Compare their   04
Performance

Q.6   A Discuss in brief different parameters on which quality of service for   03
multimedia transmission depends upon.

B What is the difference between multimedia streaming and multimedia   02
downloading?

What is the difference between stored multimedia streaming and live
multimedia streaming

C Why TCP is not suitable for interactive multimedia communication?   05

What are the limitations of using UDP for interactive multimedia
communication?   How these limitations are overcome?

What is the purpose of using RTCP for interactive multimedia
communication