ARAB INTERNATIONAL UNIVERSITY

Faculty of Informatics & Communication Engineering

الجامعة العربية الدولية الخاصة

كلية الهندسة المعلوماتية والاتصالات

سلم تصحيح

Course: Multimedia (MM)

Midterm 2014_1

Number of pages: 3

Total points: 20

Allowed Facilities: None

Duration: 1.5 hours

Date: 23.11.2014

Answer on the same exam sheets

الإجابة على أوراق الأسئلة

Q.1 [7 points] **Answer the following as True or False (if it is False you should correct it)**

1.1 IPTV is multimedia services of delivering television/audio/text/graphics/data over circuit switching networks managed to provide the required level of Quality of Service (QoS). (over IP based networks)

1.2 Huffman coding assigns shorter codes to symbols that occur less frequently and longer codes to those that occur more frequently. (shorter codes to symbols that occur **more** frequently and .... less)

1.3 An analog audio signal is sampled 16,000 times per second, and each sample is quantized into one of 1024 levels. Then the resulting bit rate of the PCM digital audio signal would be 16 Mbps. Quantizing a sample into 1024 levels means 10 bits per sample. The resulting rate of the PCM digital audio signal is 160 Kbps.

1.4 Bitmap images can be displayed with the same quality for different resolutions. (Vector)

Select the most appropriate answer

1.5 The JPEG compression process involves image division into blocks then:

a. DCT, Quantization, and data compression
b. Inverse DCT, data encoding
c. DCT, Quantization, and Sampling

1.6 High definition color television takes 2000 × 1000 pixels per frame, 25 frames per second, and 24 bits per color. Then the transmission rate without compression is _____

a. 1.5 Gbps
b. 1.7 Gbps
c. 2000 x 1000 x 24 x 25 = 1.2 Gbps

1.7 IPTV provides one facet of the so-called "triple play" of services: _____

a. voice, video and data.
b. voice, video and video on demand
c. video, voice, and mobility

Q.2 [5 points]

Consider the sub-image below, find the coefficient of the DCT at F(0, 0) and F(0, 1).

x \ y	0	1	2	3
0	50	50	50	50
1	0	0	0	0
2	50	50	50	50
3	0	0	0	0

$$F(u,v) = \frac{2C(u)C(v)}{\sqrt{MN}} \sum_{x=0}^{M-1} \sum_{y=0}^{N-1} I(x,y) \cos\left(\frac{(2x+1)u\pi}{2M}\right) \cos\left(\frac{(2y+1)v\pi}{2N}\right) \quad \text{where } C(\xi) = \begin{cases} \frac{\sqrt{2}}{2} & if\ \xi = 0 \\ 1 & otherwise \end{cases}$$

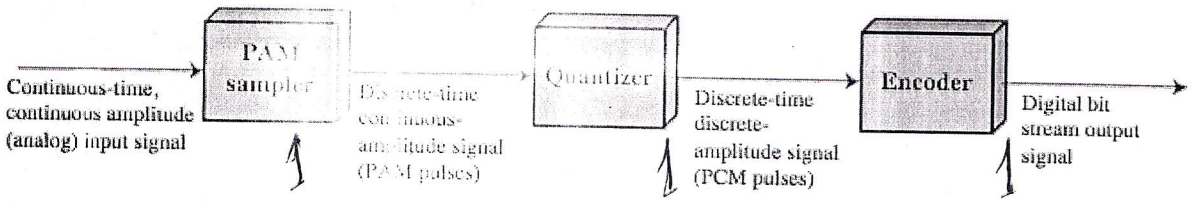
$$F(0,0) = \frac{1}{4}\sum_{x=0}^{3}\sum_{y=0}^{3} I(x,y) = 100$$ 2

$$F(0,1) = \frac{\sqrt{2}}{4}\sum_{x=0}^{3}\sum_{y=0}^{3} I(x,y) \cos\left(\frac{(2y+1)\pi}{8}\right) = 25\sqrt{2}\left[\cos\left(\frac{\pi}{8}\right) + \cos\left(\frac{3\pi}{8}\right) + \cos\left(\frac{5\pi}{8}\right) + \cos\left(\frac{7\pi}{8}\right)\right]$$
$$= 0$$ 3

Q.3 [4 points]

Draw a block diagram that shows the Pulse Code Modulation (PCM) and the type of the output at each step.

What is the advantage of using Differential Pulse Code Modulation (DPCM)?



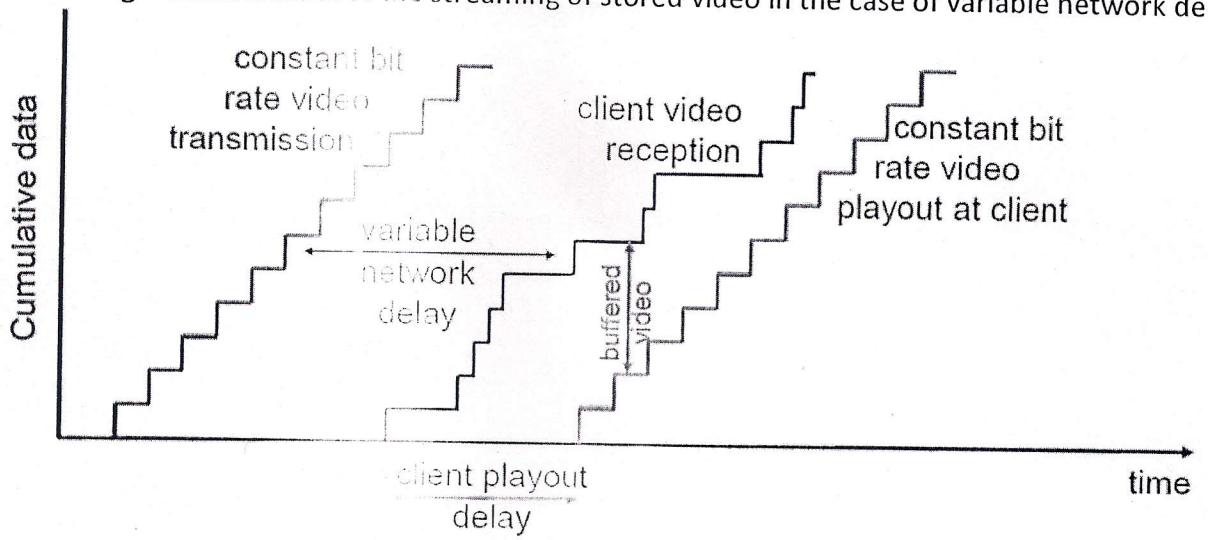
1 1 1

In DPCM we look at sample differences, not the samples themselves → Differences tend to be smaller

So Difference coding need less bits 1

Q.4 [4 points]

Draw a figure that illustrates the streaming of stored video in the case of variable network delay.



End of Questions