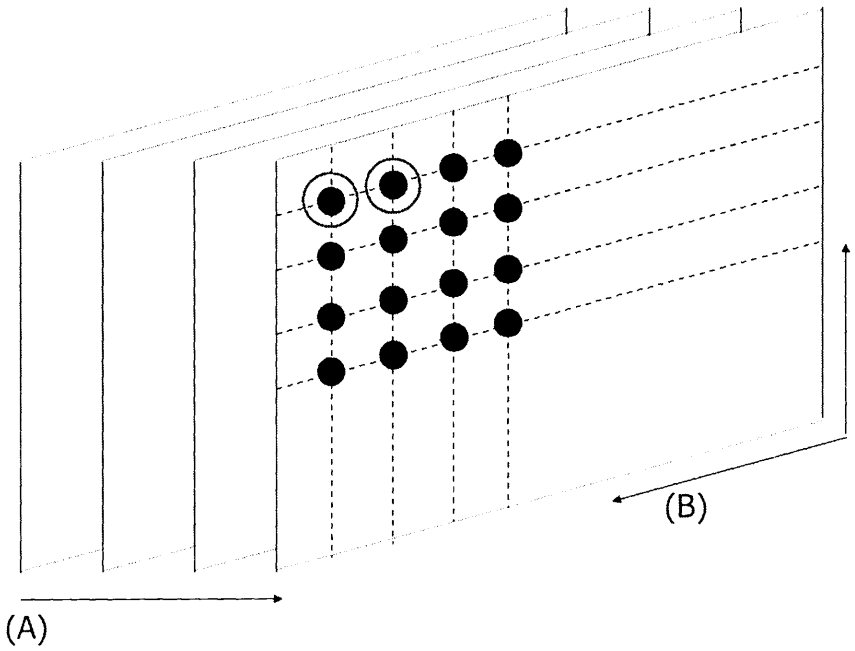
PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination: Semester I — Academic Year: 2015
Date: 15 December 2015 — Time: 13.30-15.30 (2 hrs)
Subject: 242-460 Multimedia Networks — Room: A201

ทุจริตในการสอบ โทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริตและพักการเรียน 1 ภาคการศึกษา

- All type of calculators, dictionaries and electronic devices are not allowed.
- All notes and books are not allowed.

1. What are (A) and (B) so called? (5 marks)



Answer

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2. Answer the following questions for video communication (10 marks)
   2.1 What is "Frame Rate"?
   2.2 What is "Video Resolution"?
   2.3 What is "Frame Size"?

2.4 What is "Video Colour Space"?

Answer

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2.5 If we send video on 1080p format (1920 x 1080) in 24 bits colour depth with 24 fps. Please calculate what the average bandwidth we need.

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3. Please explain how YCbCr Colour Space works, e.g. how the colours are displayed/shown (5 marks).

Answer:

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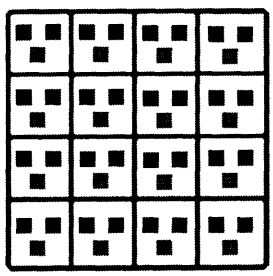
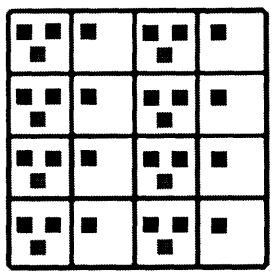
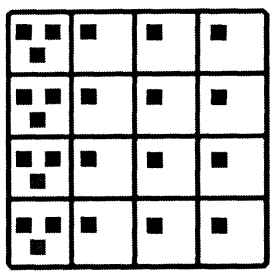
4. There are 3 types of sampling format YCbCR. Each sampling format has the same resolution in luminance component, but different resolution in chrominance components. What are the colour format of (A) and (B)? (5 marks)

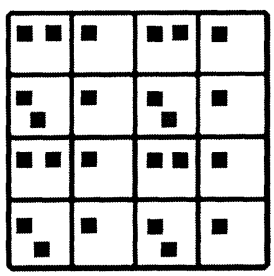


a 4 4 matrix of pixels in an image



4:2:2





(A). (B)

Answer

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5. In DCT (Discrete Cosine Transform) domain, each coefficient has different significant to visual quality. The most top left is the most significant coefficient. The significant level is reduce from left to right and from top to bottom. Easy to discard some data for better compression. Higher value of elements in the quantization table, produce more zero elements in the normalized quantized coefficients matrix. One of the most well-known of quantization is "Zig-Zag Scan". Please use Zig-Zag Scan technique to quantize the below information for 8 values. (10 marks)
(Note: draw the line direction how you get the values from the table)

14	0	-1	0	0	0	0	0
-1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

Answer

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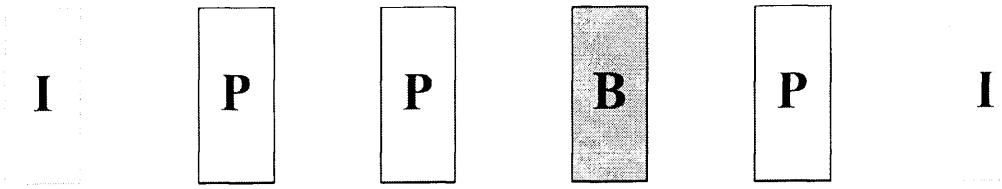
6. In MPEG-4, there are 3 Frame Types (of encoded frame): Intra Frame (I-Frame), Predicted Frame (P-Frame), and Bidirectional Frame (B-Frame). Please use the figure below, and draw a relationship between each frame (5 marks).



Answer

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7. What is High Efficiency Video Coding (HEVC)? What is its relationship to H.245, VP9 (5 marks)

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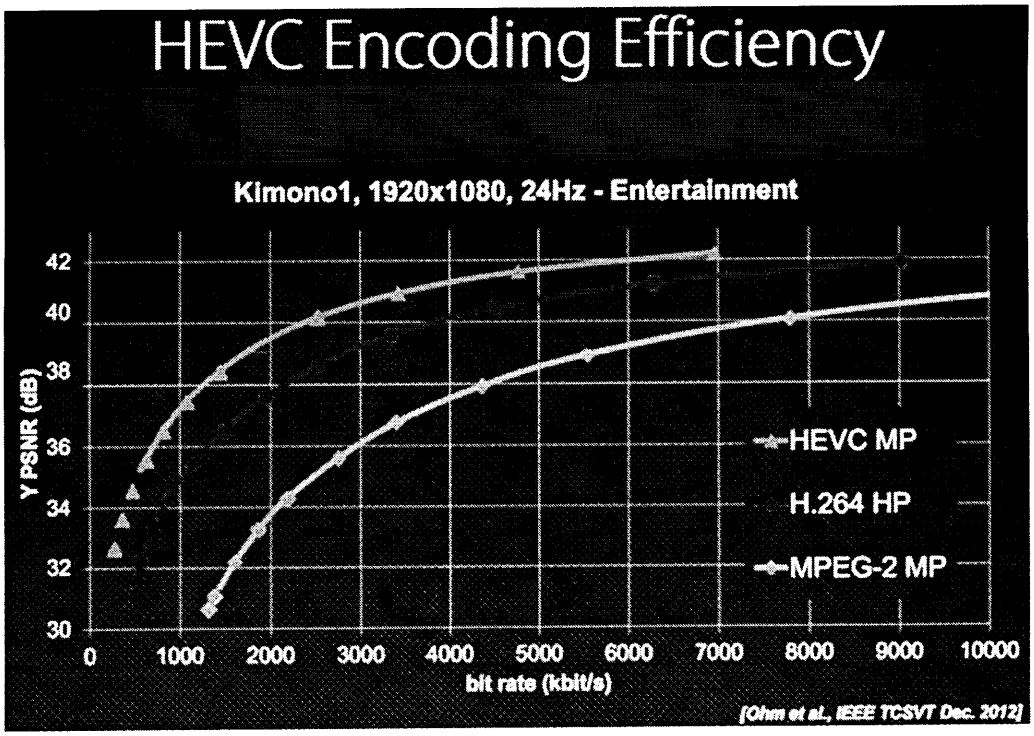
8. Typical values for the PSNR in lossy image and video compression are between 30 and 50 dB, provided the bit depth is 8 Bit, where higher is better. Use the graph below to explain what is the benefit of HEVC MP? (5 marks)



Answer

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9. What is VP9 and VP10 video compression? (5 marks)

Answer

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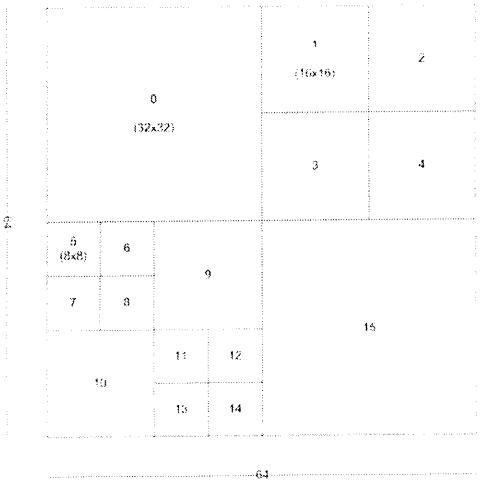
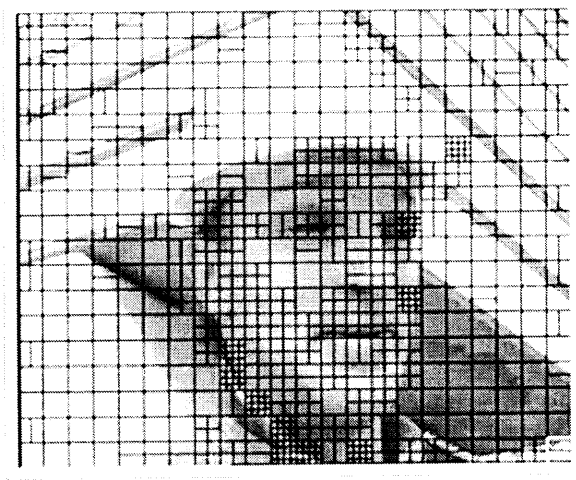
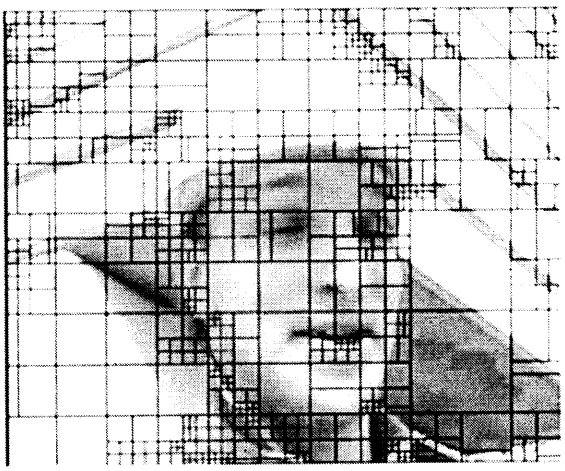
10. Please use the below information for your answer (5 marks)







H.264 H.265

Use the given information/demonstration above to explain what it is, how it works.

Answer

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11. What is WebRTC? Why does it differ from its previous Web standard? (5 marks).

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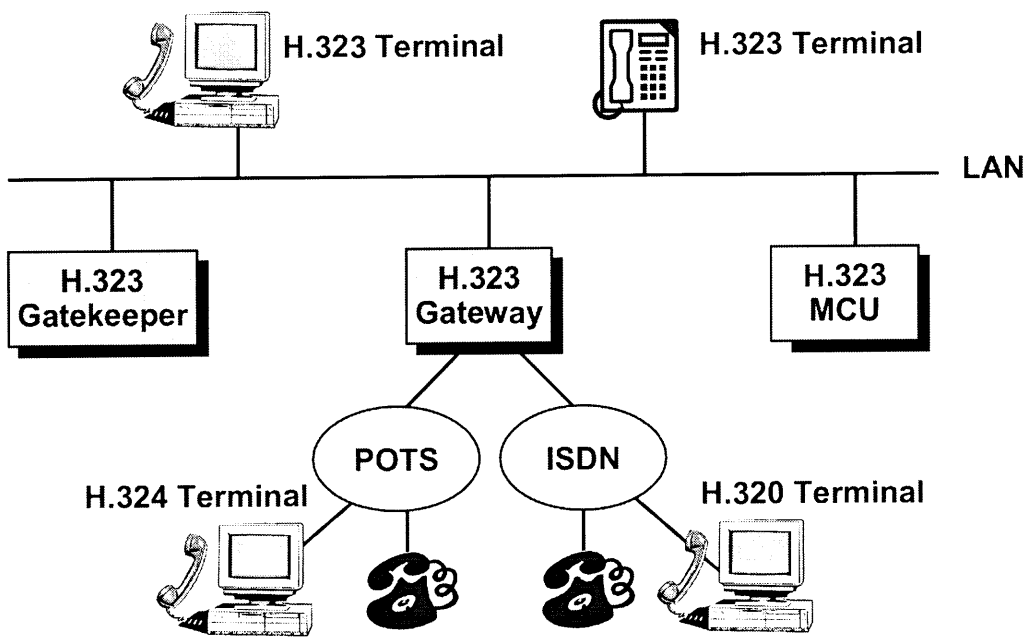
12. Below is H.322 system components: Gatekeeper, Gateway, MCU, and Terminal. Please give a short description of each component (10 marks).



Answer

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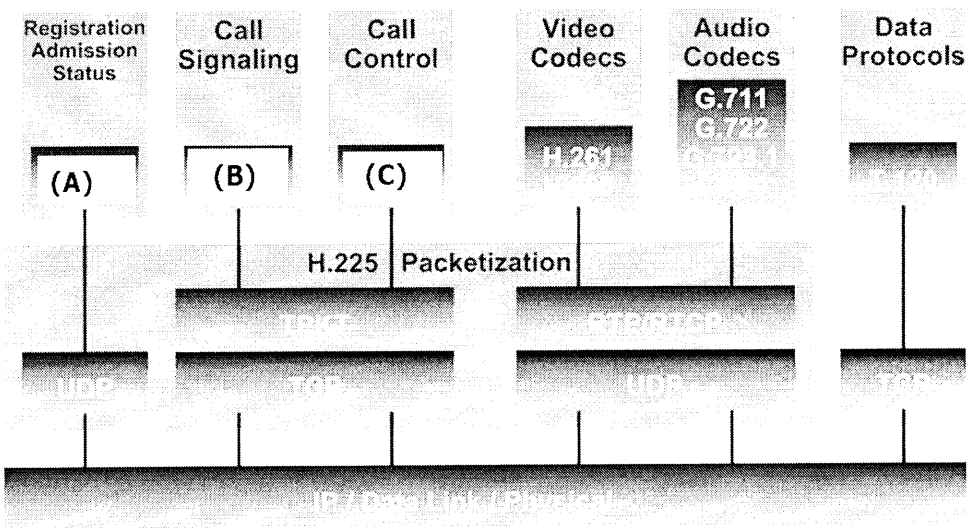
13. There are some important/core protocols for H.323 used for (A) Registration/Admission/Status, (B) Call Signaling, and (C) Call Control). What are they: (A), (B), and (C)? (5 marks)



Answer

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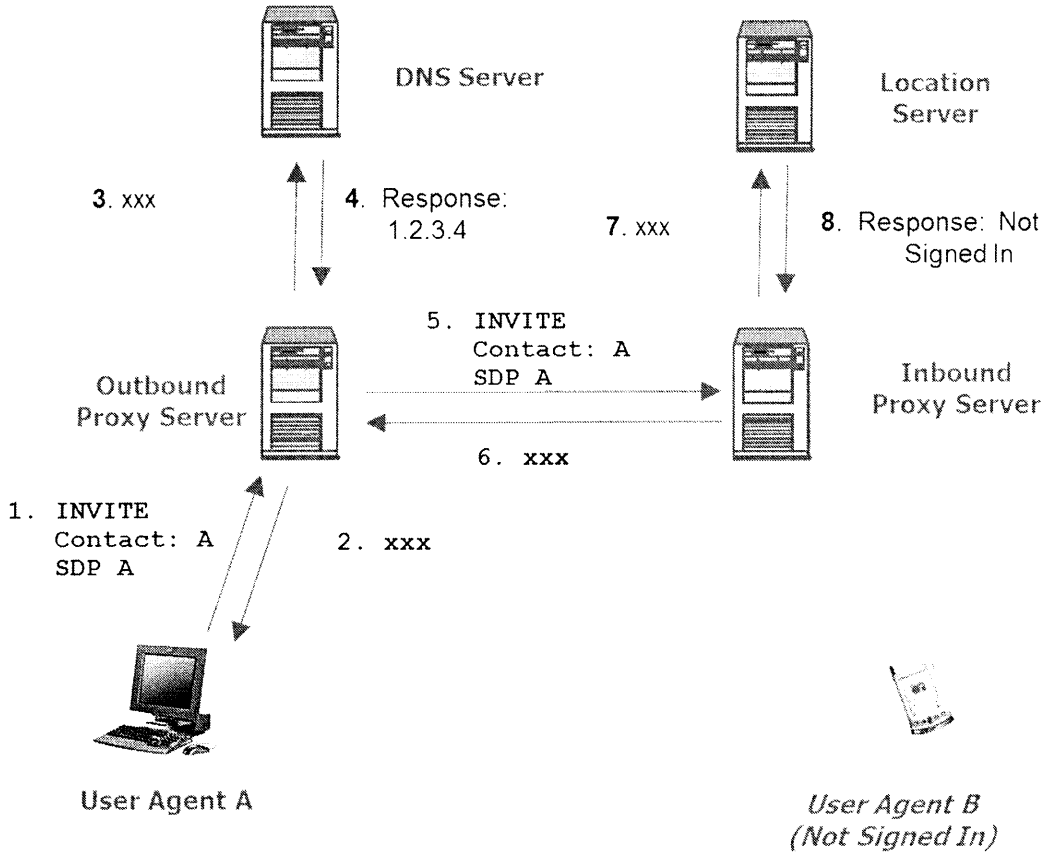
14. Below is SIP Call Setup Attempt Scenario. User Agent A would like to contact User Agent B. User agent A the initiated an invite signal. There are some missing signals, 2.xxx, 3.xxx, 6.xxx, and 7.xxx. Please put the name of each missing signal (5 marks).



Answer

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