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MAIN EXAMINATION

MAY – JULY 2018 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER AND LIBRARY SCIENCE

REGULAR PROGRAMME

CMT 418: MULTIMEDIA SYSTEMS

Date: JULY 2018	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and any other TWO Questions	

Q1. a) **Explain** the main *advantages* of multimedia systems. **(4 Marks)**

b) **Describe** the main *elements* of multimedia systems **(6 Marks)**

c) Explain **Tokenisation** as a *compression* technique. **(4 Marks)**

d) Explain three **technical parameters** that affect the *design* and *delivery* of multimedia applications. **(6 Marks)**

e) Contrast between a computer **animation** and a **movie**. **(6 Marks)**

f) Describe the **compression** process? **(4 Marks)**

Q2. a) Explain the **reason** why an animation or movie would require *more memory* storage area as compared to text. **(4 Marks)**

b) Explain what makes loss concealment **techniques** feasible for *digital video*. **(4 Marks)**

c) Describe how an audio signal is **digitized**. In particular, explain how the *Nyquist Theorem* can be used to identify the amount of *data* that needs to be stored. **(6 Marks)**

d) Describe how the JPEG algorithm exploits the features of the human visual system to achieve high levels of compression while minimizing visual distortion. **(6 Marks)**

Q3. a) Describe using an example how a digital signal is quantized. **(4 Marks)**

b) Explain the importance of dithering **(2 Marks)**

c) Using sketches, discuss the 8-bit Gray-level Images and 24-bit Color Images **(4 Marks)**

d) Explain the following multimedia related terms:
   i) Bit depth **(1 Mark)**
   ii) Pixel **(1 Mark)**
   iii) Frame buffer **(1 Mark)**
   iv) Bitmap **(1 Mark)**
   v) lookup table **(1 Mark)**

e) "Colour is a vital component of multimedia. Colour management is both a subjective and a technical exercise". Explain. **(5 Marks)**

Q4. a) How does the human eye sense colour? What characteristics of the human visual system can be exploited for the compression of colour images and video? **(4 Marks)**

b) Briefly describe the **FOUR** basic types of *data redundancy* that *data compression algorithms* can apply to **audio**, **image** and **video signals**. **(4 Marks)**

c) When performing lossy audio encoding there is a trade-off between the amount of space used and sound quality. Describe the **MPEG approach** to *lossy audio compression*. **(6 Marks)**

d) Explain the **application** and **use** of multimedia in *education*, *communication* and *entertainment* industries. **(6 Marks)**

Q5. a) Explain what you understand by the term **Pulse Code Modulation** (PCM). **(2 Marks)**

b) Differentiate between **Temporal redundancy** and **spatial redundancy** as used in *video compression*. **(2 Marks)**

c) Explain the **Huffman Coding** Algorithm. **(4 Marks)**

d) Compare and contrast between the **JPEG2000** and **JPEG** standards. **(6 Marks)**

e) Explain **THREE** main tasks of media players. **(6 Marks)**

END