



KENYATTA UNIVERSITY

EXAMINATION FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

SCO 405: COMPRESSION

2ND SEMESTER 2023/2024

TIME: 2 HOURS

INSTRUCTIONS:

QUESTION ONE (30 MARKS)

- a. Differentiate between Data Compression and Entropy (4 marks)
- b. For each of the following algorithms explain what happens during encoding and decoding (4 marks)
 - i. Ziv-Lempel algorithm,
 - ii. MPEG
- c. Describe four measures of performance for data compression algorithms (4 marks)
- d. Describe how Run-length algorithms compression data. (4 marks)
- e. Briefly describe the four basic types of data redundancy that data compression algorithms can apply to audio, image and video signals. (4 marks).
- f. Explain four characteristics of sampling and quantization for digital representation (4 marks)
- g. For each of the following state the appropriate compression techniques, provide examples (6 marks)
 - i. Text
 - ii. Audio
 - iii. Image
 - iv. Video

QUESTION TWO (20 MARKS)

- a. Briefly define Huffman coding (4 marks).
- b. Give three reasons why Huffman coding works well on a text file (6 marks)

- c. Compress 'BILL BEATS BEN.' (15 characters in total) using the Huffman approach. (10 Marks)

QUESTION THREE (20 MARKS)

- a. Explain two Limitations of lossless compression technique. (4 marks)
- b. Illustrating your answer, explain two Audio compression algorithms (6 marks)
- c. Outline five general stages of developing a compression algorithm. (5 marks)
- d. Motion-JPEG is a video format that uses JPEG picture compression for each frame of the video. Explain three reasons why M-JPEG is not widely used as a video compression standard today (5 marks)

QUESTION FOUR (20 MARKS)

- a. Differentiate between analog signals from digital signals (4 marks)
- b. Explain three features of Musical Instrument Digital Interface (MIDI) make it suitable for use in the MPEG-4 audio compression standard (6 marks)
- c. Describe three reasons why GIF graphic file format is popular in web designing (6marks)
- d. Give examples of real-life data that suitable for lossy and lossless compression algorithm. (4 marks)

QUESTION FIVE (20 MARKS)

- a. Describe how the process of digital image compression flows to accomplish their tasks. (6 marks)
- b. Highlight Two limitations of bitmaps types of images (4marks)
- c. Explain three advantages of Huffman coding algorithm over arithmetic coding algorithm with respect to data compression (6 marks)
- d. Briefly
- i. Explain the basic approach of entropy coding algorithms. (2 marks)
 - ii. Give two examples of entropy coding algorithms. (2 marks)