



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (.....)

SCO 103/ SIT 203: OBJECT ORIENTED PROGRAMMING 1

DATE:

TIME:

INSTRUCTIONS:

Answer question **ONE** and Any other **Two** among the four selective questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain
 - i. any three challenges for data compression (6 marks)
 - ii. Any three data file format that compresses data (6 marks)
- b) Differentiate between lossy and lossless data compression (4 marks)
- c) State the steps in LZW coding algorithm (6 marks)
- d) Encode the message AAAABBBBAABBBBBBCCCCCCCCDABCBAABBBBCCD using
 - (i) Pattern Substitution (3 marks)
 - (ii) Huffman (5 marks)

QUESTION TWO (20 MARKS)

- a) Discuss audio compression (8 marks)
- b) Explain three reasons why data compression is important (6 marks)
- c) Using a diagram, explain compression and decompression process (8 marks)

QUESTION THREE (20 MARKS)

- a) Encode the message below using run length coding (fixed and variable length) coding
“AAABDCEFBBAADCDF” (8 marks)
- b) Describe entropy (6 marks)
- c) Explain three types of motion and prediction techniques in video compression (6 marks)

QUESTION FOUR (20 MARKS)

- a) Describe the following (6 marks)
 - i) ZIP
 - ii) JPEG
 - iii) MPEG
- b) State four frame types with different temporal correlations found in MPEG (4 marks)
- c) State H.32x Family (5 marks)
- d) Given that Alphabet: $X = \{A, B, C\}$ and Message: ABABCBABAB, encode the message using the LZW algorithm (5 marks)

QUESTION FIVE (20 MARKS)

- a) Define fractal compression and explain any of its two applications (6 marks)
- b) Calculate the average entropy for the message: **WELL COME TO MACHAKOS UNIVESITY!** (8 marks)
- c) A source image file with 65,536 bytes is compressed into a file with 16,384 bytes. Calculate the compression ratio (2 marks)
- d) Define DPCM and state three fundamental steps of DPCM (4 marks)