Introduction to Multimedia Computing

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1. Considering text data compression using run length coding:
    a. Discuss if run length coding can always reduce the data size
    b. Is the code length an effective factor is compressing data (1, 2 or 3 bytes of codes for instance)?
    c. Can we combine run length coding with variable length coding? How?
2. Assume 10 codes with the following probabilities are given.
    a. Create the variable length code-words for the codes using Huffman coding. Show how you obtain the code-words.
    b. Show that the coding method has the self-adjusting characteristic using an example from your code-words.

Code	Probability
A	0.25
B	0.19
C	0.16
D	0.14
E	0.09
F	0.06
G	0.04
H	0.04
M	0.02
P	0.01

3. In which steps of the lossy jpeg algorithm do we have data loss? How can we reduce the compressed data size?
4. Mention the main methods in speeding up the motion estimation in video coding.
5. A group of pictures (GOP) in MEPG consists of inter-frame and intra-frames. Why do we need to have two different types of frame coding in a GOP? What are the advantages and disadvantages of each?
6. Explain what is meant by masking in audio. Describe different types with examples.
7. Mention different types of redundancy with examples.
8. Assume a single channel image is encoded using LZW algorithm. The first 5 bytes are 120,124, 124, 124,124. Follow the algorithm and show what is written to the file.