**Question one: Solve the following problems**

1. Obtain the run length Encoding (RLE) for the following segment of a binary image:  
   11111110000000001111110000.
   * There are 2 answers, either to write the number of successive zeros/ones starting by ones, or to write the index of starting ones, and then the number of the successive ones :
     + 7, 9, 6, 4.
     + (1, 7), (17, 6).
2. Given the frequency of occurrence of each symbol, deduce the Huffman codewords for the symbols and calculate the average code length.

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| --- | --- |
| Symbol | Frequency |
| A | 21 |
| B | 7 |
| C | 6 |
| D | 4 |
| E | 2 |

1. Consider the dictionary-based LZW compression algorithm. Suppose the alphabet is the set of symbols {0,1}. Show the dictionary (symbol sets plus associated codes) and output for LZW compression of the input:  
   0110011
2. Consider the dictionary-based LZW compression algorithm. Suppose the alphabet is the set of symbols {A,B,C}. Show the dictionary (symbol sets plus associated codes) and output for LZW compression of the input:  
   ABABBABCABABBA