TUTORIAL 7 – INTRODUCTION TO INFORMATION THEORY AND HUFFMAN CODING

1.   An input alphabet to a keypad at an ATM outlet consists of 20 characters.

   (i)   If the keystrokes are encoded by a fixed-length code, determine the required number of bits for the encoding.

   (ii)   We make the simplifying assumption that 10 of the keystrokes are equally likely and that each occurs with probability 0.07. Another 6 equally likely keystrokes have a total probability of 0.06. We also assume that the remaining keystrokes are equally likely. Determine the efficiency of the fixed-length code.

2.   The set of symbol A, B, C, D and E have possibilities of occurrence of 0.27, 0.08, 0.16, 0.19 and 0.30 respectively.

   (i)   Find a Huffman code for each of these symbols in terms of binary patterns. Design the codewords such that binary zero is sent as often as possible.

   (ii)   What is the average number of bits/symbol in your solution ?

   (iii)   What is the code efficiency ?