FIT3155: Lab questions for week 10

Objectives: Concepts from weeks 9

1. Write an Encoder for Elias integer code. Your program should be able to take as input one or more integers $\{z_1, z_2, \ldots, z_n\}$, and encode each integer z_i using its Elias code. Your program should then write out to an output file in **binary mode** the following pieces of information:

   (a) The total **number of integers** n that were encoded by your encoder. Again use Elias code for this.

   (b) Elias code for z_1, followed by the Elias code for z_2, and so on, until finally the code for z_n has been written out.

2. Write a Decoder for Elias code. Your program should take as input the output file written out by your Encoder and decode the integers $\{z_1, z_2 \ldots, z_n\}$.

3. Write a program that reads an ASCII text file, and constructs a Huffman code for all the distinct characters in it. Using this code, your program should write out an output file in **binary mode** that contains the following pieces of information (concatenated one after another in the following order):

   (a) The number of unique ASCII characters you have read. This should be encoded into binary using the Elias code for integers.

   (b) The frequency of each distinct character (again encoded using the Elias integer code), immediately followed by the ASCII code of that character.

   (c) The total number of characters in the input file (again encoded using the Elias integer code)

   (d) The variable-length encoding of all the characters that appear in the text file using the constructed Huffman code.

   Run you program on the input file available at [here].

4. Write a decoder for the above task. Your program takes as input the output file written by your program above, and then decodes the original ASCII text file.

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