Units 1, 2, 3
Data Storage

1. Perform the following operations and convert the results to their decimal equivalents:

   (a) 8-bit two's complement: $01100000_2 + 11100100_2$

   (b) 8-bit two's complement: $00000111_2 - 00001101_2$

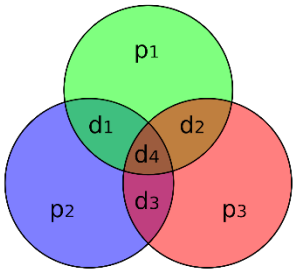
   (c) 8-bit excess (128-excess): (-100)+(-90)

2. Consider LZW with special symbol '_'. Using the following initial dictionary to code the string: "you_see_no_see_you_no_see_i_see". You need to show your dictionary.

Symbol	e	i	n	o	s	u	y	_
Code	1	2	3	4	5	6	7	8

3. A message encoded using Hamming Code (7,4) is received as 1011110. Use the Error Correction Code (ECC) technique to identify and correct any errors in the received message and then retrieve the original 4-bit data message.

   d_1, d_2, d_3, d_4 are 4-bit data; p_1, p_2, p_3 are their parities.



Bit #	1	2	3	4	5	6	7
Transmitted bit	p_1	p_2	d_1	p_3	d_2	d_3	d_4

4. Using Huffman encoding to code the message "ACDACACDBCCCACAA" consisting of 4 symbols and 16 characters. How many bits does Huffman code use? You need to draw the Huffman tree.