1 What are the differences among a linked list, a stack, and a queue ? <10>

2. (a) Briefly explain the concepts of time complexity, T(n) ,and space complexity, S(n). where n represents the length of input data. <5>
(b) Calculate the Big-Oh of t(n) if the running time of a certain code is t(n) = $\log_2$ (n!). <10>

3. (a) What are the differences between recursion and iteration in programming?<5>
(b) Develop a complete code by using any computer language you know to calculate Fibonacci series by recursive method. <10>
The Fibonacci can be defined recursively as the following:
Fibonacci (0) = 0
Fibonacci (1) = 1
Fibonacci (n) = Fibonacci (n-1) + Fibonacci (n-2)

4. (a) Briefly explain the principles of Huffman coding? <5>
(b) Develop a binary tree based on Huffman coding if we wish to transmit the following set of 28 data points. <15>
{7,6,6,5,5,5,4,4,4,4,3,3,3,3,3,2,2,2,2,2,2,1,1,1,1,1,1,1}

5. In an object-oriented programming, how are types and classes similar? How are they different? <10>

6. From the following list, extract a collection of numbers whose sum is 3165. How efficient is your approach to the problem? You can describe and analyze your idea.
26, 39, 104, 195, 403, 504, 793, 995, 1156, 1673. <20>

7. What conclusions can PROLOG find if faced with the goal **equal (X,Y)**. The initial statements are: **great&equal (a, b).** <20>

great&equal (b, c).
great&equal (c, a).
great&equal (U, W) :- great&equal (U, V), great&equal (V, W).
equal (X, Y) :- great&equal (X, Y), great&equal (Y, X)