Questions

1. Given an array of 1s and 0s which has all 1s first followed by all 0s. Design a divide and conquer approach to find the number of 0s in the given array. Analyse the time complexity for the algorithm you have written.

2. In a certain question paper, there are four types of questions which carry 2, 5, 10 and 15 marks respectively. It takes 1 min, 2 mins, 4 mins and 7 mins to answer them respectively. The total duration of the exam is 30 mins. No marks for giving partial answer. The total marks required to pass is 20. A student arrives at the examination hall late by 20 mins. She needs 3 mins to read through the questions before attempting the answers. Effectively she has only 7 mins to answer. a. How many questions of each type should she attempt to maximize her marks. Formulate a solution and analyse the time complexity for your approach.

3. Consider the following problem. Given two strings word1 and word2, return the minimum number of operations required to convert word1 to word2. To convert from word1 to word2, you may insert, delete or replace a char. For example,

   (a) $abcd \longrightarrow abc$ requires a deletion.

   (b) insertion is required for $abd \longrightarrow abcd$.

   (c) Replacement is required for $abcd \longrightarrow abed$.

   Formulate a solution for the same. What is the time complexity for your approach.