

1	<p>A) Locality of reference can play a role in enhancing the timing of your algorithm due to memory hierarchy. Bring out two concrete ways (techniques) which can be applied in different programs to have a better cache friendly algorithm.</p> <p>B) While calculating complexity it is advised to think asymptotically. How it affects the complexity calculations in a tangible manner. Give appropriate scenarios or examples to prove the point.</p>	2.5 2.5
2	<p>A) Differentiate between constant time, logarithmic, linear and quadratic time algorithms with respect to the characteristic of the problem and the algorithm associated with such complexity.</p> <p>B) Many times we are faced with the situation that when we want to insert in an array then the array is full and we need to either extend the size of the array or double the size of the array. Which strategy you will adopt (i) to increase by a constant C (ii) to double the array. Why? Also discuss, if there can be some exceptions to this rule.</p>	2.5 2.5
3.	<p>A) Why the Insertion Sort falls under the category of adaptive sorting algorithms? Prove your point.</p> <p>B) Prove the complexity of the Binary Counter using Amortized Analysis with Potential method.</p>	2.5 2.5
4	<p>A) Write an efficient algorithm to find ith smallest number in the given list of numbers. Algorithm should be complete in terms of Input/Output, variable declaration and comments so that it is properly understood.</p> <p>B) Write a program in python to find the successor of a node in the given tree with all the involved cases.</p>	2.5 2.5