

End Semester Examinations - 2015-16 Even Semester - May 2016

15BI3003 Bioinformatic Algorithms

Set B

Time : 3 hrs
Total Marks: 100

1. a. How can you measure the complexity of an algorithm? Give one example of Big O notation. (10 marks)

- b. What is recursive algorithm? Give any two examples with Pseudocode (10 marks)

OR

2. We know that BetterChange is an incorrect algorithm for the set of denominations (25, 20, 10, 5, 1). Add new denomination to this set such that BetterChange will return the correct change combination for any value M . (20 marks)

3. Justify the *Motif Finding* is a maximization problem while *Median String* is a minimization problem (20 marks)

OR

4. What is DNA restriction mapping? Justify how brute force algorithm for the Partial Digestion problem that works well in practice i.e., Practical restriction mapping. (20 marks)

5. The SBH problem is to reconstruct a DNA sequence from its l -mer composition

Suppose that instead of a single target DNA fragment, we have two target DNA fragments and we simultaneously analyze both of them with a universal DNA array. Give a precise formulation of the resulting problem (something like that formulation of the SBH problem. Give an approach to the above problem which resembles the Eulerian Path approach to SBH. (20 marks)

OR

6. Find the shortest common superstring for eight 3-mers:

{ATG TGG TGC GTG GGC GCA GCG CGT}, and construct the graph of 8 vertices corresponding to these 3-mers (Hamiltonian path approach) and find a Hamiltonian path (7 edges) which visits each vertex exactly once. Does this path visit every edge of the graph? Write the superstring corresponding to this Hamiltonian path. (20 marks)

7. How does Benzer's experiment prove the linearity of the gene? Discuss in detail (20 marks)

OR

8. What do you mean by Evolutionary tree? Illustrate and explain in detail about distance based methods of tree reconstruction? (20 marks)

9. Discuss in detail about approximate pattern matching to solve the biological problem based on Heuristic Similarity Search algorithm. Give an example (20 marks)

Wishing you All the Best