
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
CS21003 Algorithms I: First Class Test 2021 Spring

Date of Examination: 30th January 2021

Duration: 30 minutes + 5 minutes (for scanning, concatenating, and uploading)

Full Marks: 10

Subject: CS21003 Algorithms I

Part II

3. For admission to a medical school, an entrance test is conducted. This test is conducted in 3 batches, namely B_1 , B_2 and B_3 . After the evaluation, marks of all candidates are placed in decreasing / non-increasing order, batch-wise. Given these ordered batch-wise marks B_1 , B_2 and B_3 in three arrays, a cut-off mark is determined to select the top R students from the combined candidate list. Students having marks greater than or equal to this cut-off are eligible for admission.
- (a) Given ordered batch-wise arrays B_1, B_2, B_3 with sizes s_1, s_2, s_3 and a positive integer R , develop and present an efficient algorithm to solve this problem of determining the cut-off mark for the top R students.
- (b) Analyse the complexity of each part of your algorithm.
- (c) Show the working on an example developed by you having $s_1 = 3, s_2 = 6$ and $s_3 = 9$ students respectively in B_1, B_2 and B_3 , given $R = 6$. Create appropriate ordered lists B_1, B_2, B_3 with marks out of 100, based on your own choice to demonstrate the working of the steps of your proposed algorithm. All marks may be assumed to be distinct.

[10 Marks]

All the best
