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Algorithm 2 Moed A 5770

Errors and Corrections

Question 1

1. Choose correct group **10 Points**
    a. Size of new Alphabet $O\left(\sqrt{m \log m}\right)$ instead of $O\left(\sqrt{m/\log m}\right)$ **5 Points**
    b. Choosing group of non-optimal size **0-10 Points**
2. Full Proof **10 Points**
    a. Multiplication phase
        i. Time Complexity **3 Points**
        ii. Explanation for the time complexity **2 Points**
    b. Correction phase
        i. Time Complexity **3 Points**
        ii. Explanation for the time complexity **2 Points**
    c. 2m to n phase **Upto 2 Points**
3. Optimality **13 Points**
    a. With no computation but based on a correct explanation: "If enlarge a little…", "If diminish a little…" **6 Points**
    b. Showing examples of different sizes to show how the total complexity changes. **6 Points**
4. Incorrect attempt to change the size of the text in order to get the desired complexity. (That is, instead of taking intersecting groups of size 2m, trying to take groups of a different size.) **Upto 4 Points**
5. Full Abrahamson-Kusaraju Algorithm with no change **Upto 4 Points**

Question 2

In addition to these comments: http://u.cs.biu.ac.il/~amir/AlgII/m08a_ans.pdf

12. No proof for or reference to the fact that the algorithm gives a homeomorphic tree. **-4 Points**
13. Proof based on "For each equation we take four instead of one, and so it is an approximation of 4…" **-4 Points**
    This explanation is not satisfactory because there could be an intersection between the equations. For example:
    a + b + c + d >= 1
    a + e + f + g >= 1
    a + h + i + j >= 1
    a + k + l + m >= 1
    a + n + o + p >= 1
    The optimal solution would be to set *a = 1* and the rest to 0. The explanation given

refers to the case where each variable is set to 1 (because every equation takes all four variables instead of just 1). However in this case we take 16 variables total instead of 1.

Question 3

In addition to these comments regarding the 'on-line' question:
http://u.cs.biu.ac.il/~amir/AlgII/m07a_ans.pdf

2. Small mistake in the cost computation of the algorithm. **-2 Points**
14. No conclusion to the equation in the form $4d^2 + 2d + 2 <= a(2d+2)$ **-4 Points**
    It is necessary to mention that there exists no constant 'a' that satisfies the equation because 'd' can be increased as we wish.
15. No computation of the time complexity of the optimal algorithm **-10 Points**
16. No computation of the time complexity of the new algorithm **-10 Points**
17. Correct answer (not competitive) even without an explanation or an incorrect explanation. **14 Points**