BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

Department of Computer Science and Engineering

L-3/T-1   CSE 301: Mathematical Analysis for Computer Science

Time: 30 minutes   **Marks: 20**

Student Name: _____   Student No: _____

1. You have already learned how to formulate the recurrence relation for the shortest number of moves for 'Tower of Hanoi' problem. Now you will have to derive the recurrence relation with an added constraint: direct moves between the leftmost peg (i.e., the source) and the rightmost peg (i.e., the destination peg) are disallowed. You must explain how you have formulated the recursion. Don't forget to write the base case!

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2. You are given that following pair of recurrence relations:

$$A_n = \begin{cases} 2, \text{ if } n = 1 \\ 2A_{n-1} + 2, \text{ otherwise} \end{cases}$$

$$B_n = \begin{cases} 3, \text{ if } n = 1 \\ 2A_{n-1} + B_{n-1} + 4, \text{ otherwise} \end{cases}$$

Here n is a natural number. Prove that $A_n = 2^{n+1} - 2$ and $B_n = 2^{n+2} - 5$.

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