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EAST WEST UNIVERSITY
Department of Computer Science & Engineering
B.Sc. in Computer Science and Engineering Program
Assignment 2, Summer 2023 Semester

Course: **CSE246 Algorithms Lab, Section-2**
Instructor: **Md. Mohsin Uddin, Senior Lecturer, Department of CSE**

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1. Tower of Hanoi, is a mathematical puzzle which consists of three towers (pegs/rods) and more than one rings/disks. These rings/disks are of different sizes and stacked upon in an ascending order, i.e. the smaller one sits over the larger one. The mission is to move all the disks to some another tower without violating the sequence of arrangement.
A few rules to be followed for Tower of Hanoi are:

- Only one disk can be moved among the towers at any given time.
- Only the "top" disk can be removed.
- No large disk can sit over a small disk.

Solve the Tower of Hanoi Problem iteratively as well as recursively. **Implement** the code using C or CPP or Java or Python programming language. You can not use any built-in functions.

2. Twisted Tower of Hanoi Problem: All rules are the same as the normal Tower of Hanoi in question 1, with an addition of a rule:
You can not move any disk directly from the first rod to last rod i.e., If you want to move a disk from the first rod to the last rod then you have to move the first rod to the middle rod first and then to the last one.

Solve the Twisted Tower of Hanoi Problem iteratively as well as recursively. **Implement** the code using C or CPP or Java or Python programming language. You can not use any built-in functions.

3. Given a set of n nuts of different sizes and n bolts of different sizes. There is a one-one mapping between nuts and bolts. Match nuts and bolts efficiently.
Constraint: Comparison of a nut to another nut or a bolt to another bolt is not allowed. It means a nut can only be compared with a bolt and a bolt can only be compared with a nut to see which one is bigger/smaller.
Another way of asking this problem is, to give a box with locks and keys where one lock can be opened by one key in the box. We need to match the pair.

Solve the problem using Quick Sort, iteratively as well as recursively. **Implement** the code using C or CPP or Java or Python programming language. You can not use any built-in functions.