Birla Institute of Technology & Science, Pilani
Data Structures & Algorithms (CS F211)
Lab Makeup Exam
(Closed Book)

DSA Lab Exam   **Time: 3 Hours**   **Total Marks: 40**

Exam Problem Specific Instructions:

- There are four problems to solve: P1, P2, and P3. The problems are arranged in increasing order of difficulty. Weightage of each problem is approximately proportional to its difficulty level (P1 = 10, P2 =10, and P3=20).
- Please complete your program for solving one problem, and then proceed to solve other problems. You will get marks only when your program gives correct output. You will not get any marks if your program is incomplete or it gives incorrect output.
- This is a closed book exam. You cannot use any notes or books (either softcopy or hard copy).Internet and network access will be disabled. You will not get any sheet for rough work. You can do rough work in text file on the computer.

Warnings (Possible Reasons for Cancellation of Lab Exam):
- Possession of any previously written code (irrespective of size, relevance, ownership, medium)
- Possession of any removable media or mobile.
- Attempt to access any machine other than allotted local machine and the Online Judge Server.
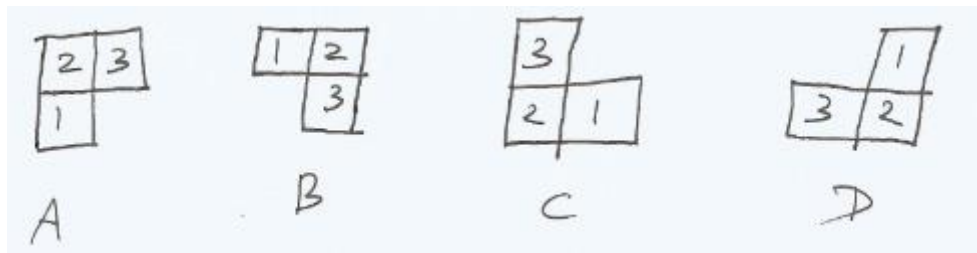
Problem 3

Solving the Defective Chessboard problem

A defective chessboard is a 2^k x 2^k board of squares with exactly one defective square. An example of defective chessboard for k=3 with a defective square at position (3,4) is shown below:

In the defective chessboard problem, we are required to tile a defective chessboard using triominoes. In this tiling two triominoes may not overlap, triominoes should not cover the defective squares, and triominoes must cover all other squares. There are four type of triominoes available:

Input Format:

Let n=2^k where k>=0.

For a defective chessboard of size nxn, and defective square at position (x,y), the input format is as follows:

n

x

y

Sample Input (for the given eample):

8

3

4

Output format:

Create a matrix corresponding to the tiling as follows: write "[ ]" (opening and closing square brackets without blank spaces) at the position of defective square. For all other squares, write the tile type (A,B,C or D) and cell number (1,2 or 3) without blank spaces. Output the matrix one row of the matrix per line such that the matrix entries are separated by a blank space.

Sample output (for the given example):

A2 A3 B1 B2 A2 A3 B1 B2

A1 A2 A3 B3 A1 B1 B2 B3

C3 A1 C3 [] B1 B2 B3 D1

C2 C1 C2 C1 D1 B3 D3 D2

A2 A3 C3 D3 D2 D1 B1 B2

A1 C3 C2 C1 D3 D2 D1 B3

C3 C2 C1 D1 C3 D3 D2 D1

C2 C1 D3 D2 C2 C1 D3 D2

Explanation: The output corresponds to the following tiling: