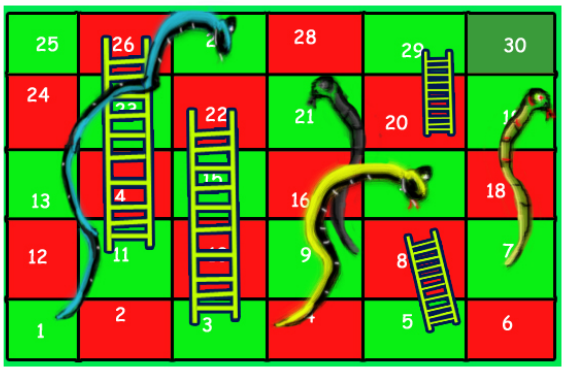
CS 254 - Design and Analysis of Algorithms Lab, Assignment-5

(To be submitted by 12 February 2024)

1. Consider a matrix, where each cell contains either a '0' or a '1'; any cell containing a '1' is called a filled cell. Two cells are said to be connected if they are adjacent to each other horizontally, vertically, or diagonally. If one or more filled cells are connected, they form a region. find the size of the largest region.

2. Given a snake and ladder board, assume, a player has total control over the outcome of the dice throw and wants to determine the minimum number of throws required to reach the last cell from the first cell. The solution is not necessarily unique.

   [Rule: If the player reaches a cell which is the base of a ladder, the player has to climb up that ladder and if reaches a cell is the mouth of the snake, and has to go down to the tail of the snake without a dice throw.]



   For example, consider the board shown, the minimum number of dice throws required is 3. The following are the steps: a) First throw 2 to reach cell number 3 and then use the ladder to reach 22 b) Then throw 6 to reach 28. c) Finally through 2 to reach 30.

3. A Clique is a subgraph of a graph such that all vertices in the subgraph are completely connected. Given a Graph, find if it can be divided into two Cliques.