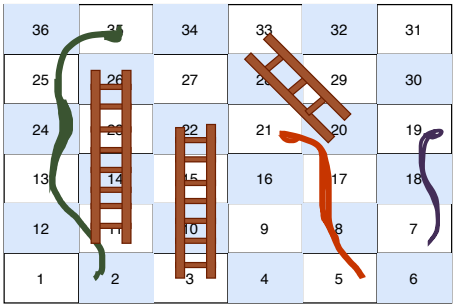
CS29003 ALGORITHMS LABORATORY
(WorkSheet 3)
Date: Sep 26 2020

1 Write a graph-based algorithm to solve the following problem. Explain each step and compute the time complexity.

You are playing a board game that consists of N $\times$ N number of cells and each is numbered as $1, 2, ..., N^2$. The cell numbers start from the bottom left of the board, and keep alternating the direction in each row. You start from cell 1, and can move your way up to cell N^2 by throwing a dice. Some cells have 'ladders' that can move you forward a few cells, and other cells have 'snakes' that can send you back a few cells. In each throw, you can move the number of cells that appear on the dice and you can also control the outcome of the dice. You need to find the minimum number of dice throws required to reach the destination cell D, D $<= N^2$.



Consider the board shown above. N = 6 and D = 30
Snake locations: $(35, 2), (21, 5), (19, 7)$
Ladder locations : $(11, 26), (3, 22), (20, 33)$
Output: Minimum Dice throws required is 3
Throw 2 $\longrightarrow$ reach 3. Climb the ladder to reach 22
Throw 6 $\longrightarrow$ reach 28
Throw 2 $\longrightarrow$ reach 30