Assignment 1 – ELEC ENG 3TQ3
Due Date: Oct 3rd, 4:30 p.m. 2023
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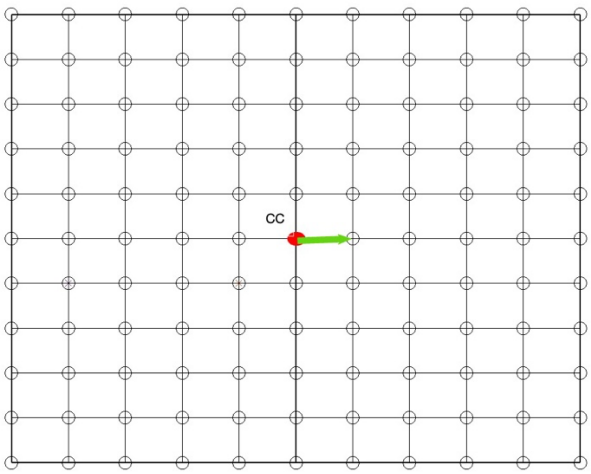
Q1 (10 points): Three players are rolling a dice in a sequential order starting with A i.e. they roll a dice in the following order A – B – C – A – B – C . The winner is a player who rolls 6 first.

a) (4 pts) Find probability for each one of the players (A,B,C) to win the game.
b) (4 pts) Find the probability that A wins a game if B did not win the game.
c) (2 pts ) Assuming that they are using different dice and that you know one of them is not fair. Further assume they repeat the game 1000 times. How would you determine which one of the players uses cheating dice?

Q2 (10 points): Consider AV vehicle moving on a grid given in the Figure below. Assume that the red point has coordinates (0,0) and that the lengths of the squares are 1 in both directions. Green line represents motion towards east from coordinate (0,0) to coordinate (1,0). Consequently for an arbitrary point (i,j) there are 4 possible motions: a) to east (i+1,j) b) to west (i-1,j), c) north (I,j+1) and d) south (I,j-1).

A) Assuming that all 4 motions are equally likely find probability that AV reaches (1,1) in exactly two motions.
B) Find probability mass function of DISTANCE between the location point to coordinate origin after EXACTLY two motions.
C) Repeat part b) for THREE motions.



Q3 (10 pts) Consider a switches diagram in the Figure below. Assuming that all the switches are independent with probabilities of being open 0.5 find the probability that there will be a current flowing through the circuit. What is the probability that switch S1 is closed IF there is a current flowing in the circuit?