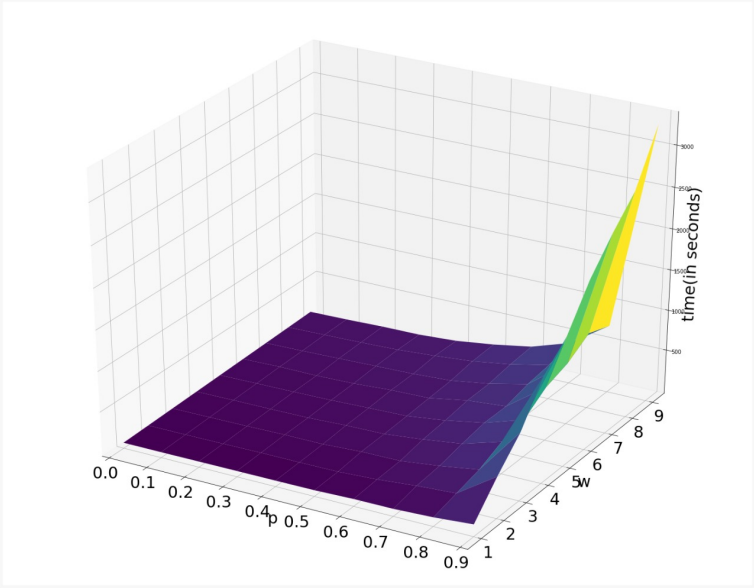
# Lab - 0

5th September 2020

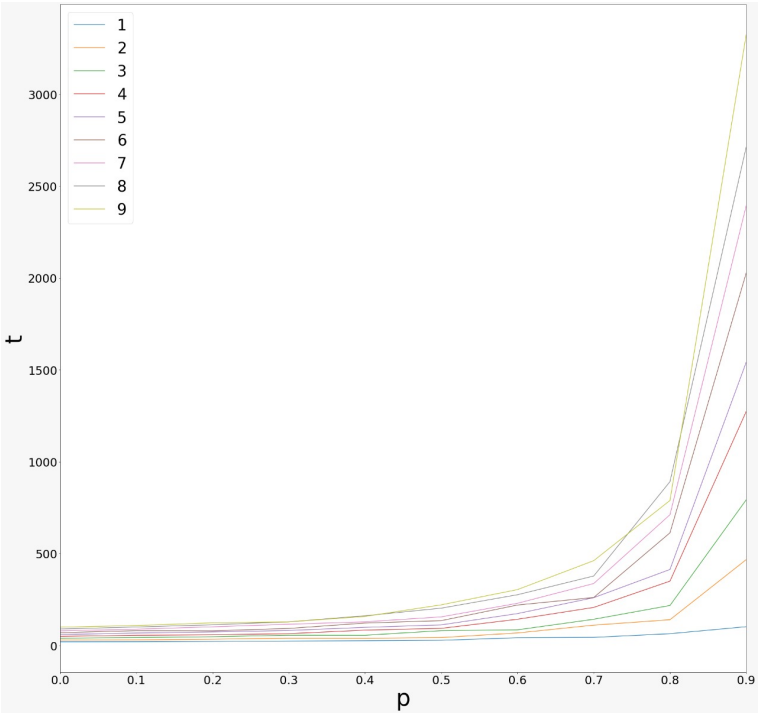
## 1 Abstract

An infiltrator wants to move from Attacking country to Defending country. Betweenthe 2 countries there lies border of width(w) with w cells which has motion sensors. Sensor is turned ON based on probability p. Time period for sensors in cell to change ON/OFF state is 10 seconds and Infiltrator takes 1 second to think about his next step and 9 seconds to reach next cell.
Infiltrator never gets caught. Let's explain this statement clearly, suppose infiltrator goes to a safe(OFF) cell then after 10 sec if the safe cell changes to ON then he doesn't move at all(since sensor only catches motion) and if the cell remains safe then he will move forward if and only if there is a chance of moving towards DC without getting caught else again he remains in the same position as before.This clearly explains why he never gets caught.

## 2 Observations



Above graph represents width(w) vs probability(p) vs Time (in seconds) As the color range goes from violet to yellow, value of time increases. As you can see for a fixed width if you go on incresing the probability,the time to reach DC for an infiltrator increases because if the probability is high then most of the sensors remain ON which makes infitrator to take more time to reach DC.




It is difficult to to observe the increasing relation for small w.So lets increase w to 9 then you can clearly observe the curve's non linear increasing behaviour as probability increases.

# 3 conclusion

According to our observations, time taken by infiltrator to reach Defending country is directly proportional to width of border and probability of sensor switching ON.

We came to this conclusion based on 1000 simulations for each input and taking average of that. We are sure that this relations holds the same for any other valid input.