

Computer Architecture Laboratory Report

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1 Assumptions

The length in the problem is given as infinity. We cannot implement infinity in real life. So we considered the length(L) as 1000.

$$L = 1000$$

We take various probabilities of turning the sensor OFF in an array, to get the time taken by the infiltrator to cross the border:

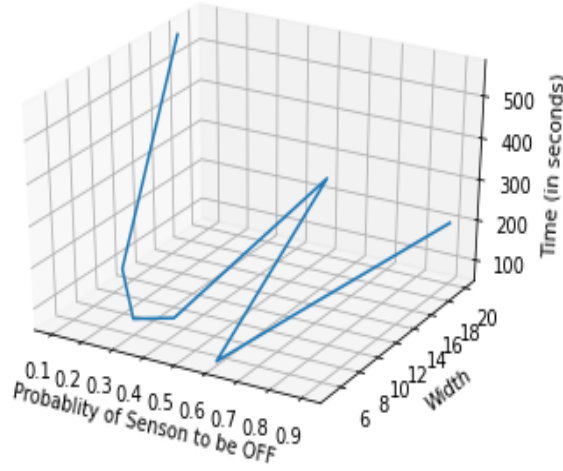
$$(P,W) = \{(0.1,17), (0.2, 8), (0.3, 6), (0.4, 7), (0.5, 20), (0.6, 5), (0.7, 10), (0.8, 15), (0.9, 20), (0.9, 25)\}$$

2 Approach

We aren't needed to optimize the time taken to cross the border, we just need to find the time taken. Initially we take one second to check the first row of the border to find any OFF sensor. If all are one wait for 9 seconds more and the process repeats. Once he finds an OFF cell he moves to that cell. After that we try to move towards the other border. In each iteration we try and see the next 3 positions towards the border. If an OFF sensor is found we move on it. If not found, we stay on the current sensor and wait 9 more seconds for the next chance.

3 Observation

From the below image we can see the following observations:



3.1 Observation 1

Irrespective of the width, when the value of Probability(to turn off) increases then the time taken by the infiltrator will decrease. This is due to the fact that when Probability(to turn off) is high, then the sensor is very likely to turn OFF. The infiltrator can now easily cross the sensor without waiting.

3.2 Observation 2

For any probability, as the width increases then the time taken by the infiltrator to cross the border also increases. This is because due to more width, the infiltrator has to pass through more sensors in the OFF state. So it does take time for the infiltrator to cross the border.

Following are the graph parameters:

- X axis - Border Width.
- Y axis - Probability of the sensor to be OFF.
- Z axis - Time to cross the border.

4 Result

From the above observations we see that the infiltrator takes less time when the value of P is high and value of W is low.