Computer Architecture Lab - Report Assignment - 0

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August 8, 2022

Summary

In this lab according to given problem we have to calculate the time taken by infiltrator in crossing the border between two countries, varying the width of the border and probability of the head by some constant.

Approach

For infiltrator to cross the border we adopted one strategy in which we are considering 4 cells instead of 8 that are $\rightarrow$ 3 front cells and 1 cell on which infiltrator is standing. At time = 0 we are considering that infiltrator is standing on the cell with width 1. So from there infiltrator have to take decision whether or not he will move to another cell.

If sensor for the cell on which infiltrator is standing is off then infiltrator will check where he is, i.e., if he is at a position where step taken is equal to width then he will just take one step and he is done with his job. If this is not the case(meaning step taken is not equal to width) then infiltrator will check is there any sensor is off or not among 3 cells which are in front of him. If no sensor is off then infiltrator won't take any step and will wait for next

10 seconds to take decision. If any one sensor is off(given sensor on which he is standing is off) then he will take one step towards ahead. Infiltrator will keep doing this until he enters the defending country.

Code and Execution

In code, country is the main file in which we have used the following classes

- Country Class

- Border Class

- Sensor Class

- Infiltrator Class

- Time Class

After executing Country.java file we will get the time as output in an output.txt file containing width probability and time taken to cross the border.

Graph

To create below graphs we made a file named graph.ipynb which will take the output.txt as input file and will generate the following graphs.

Figure 1 & 2 shows the graph where we have used the parameters as follows:

- x-axis: Probability

- y-axis: Width

- z-axis: Time

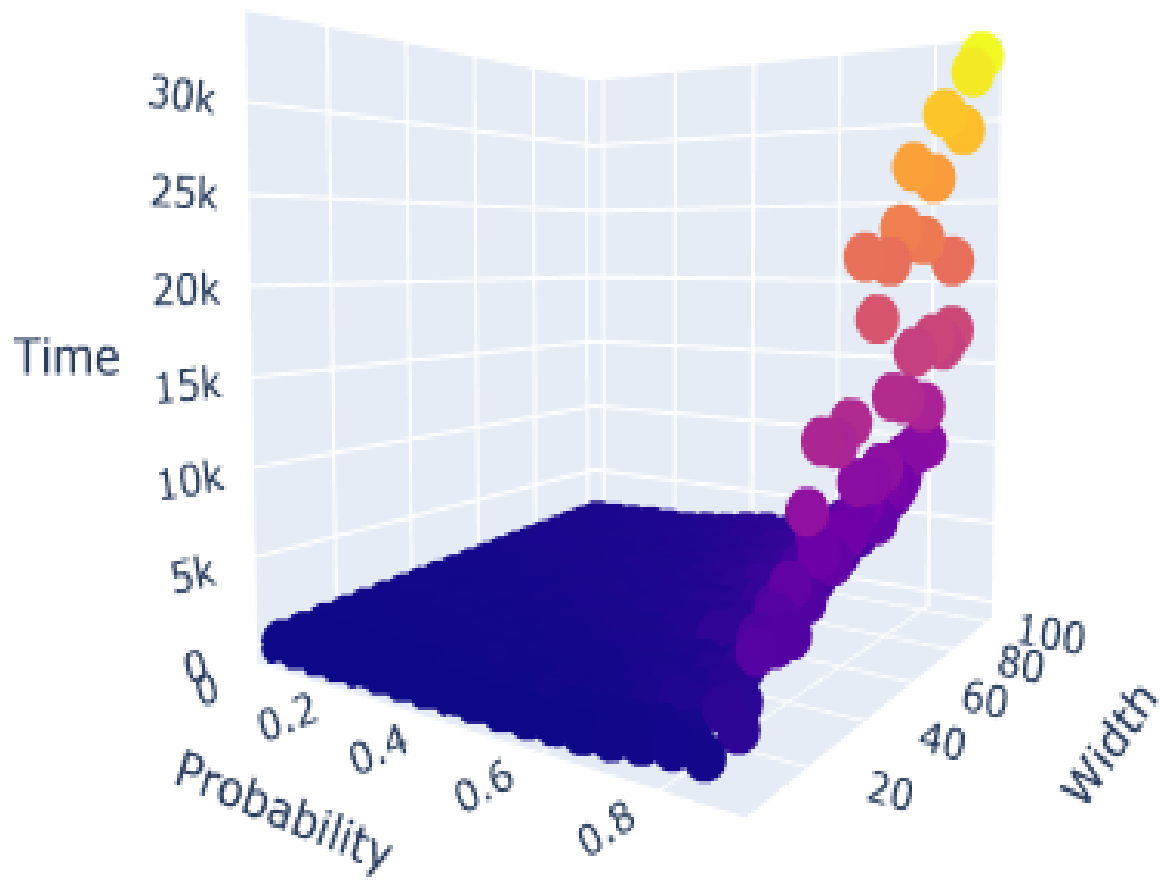The graph shows the variations of time with change in probabilities and widths.
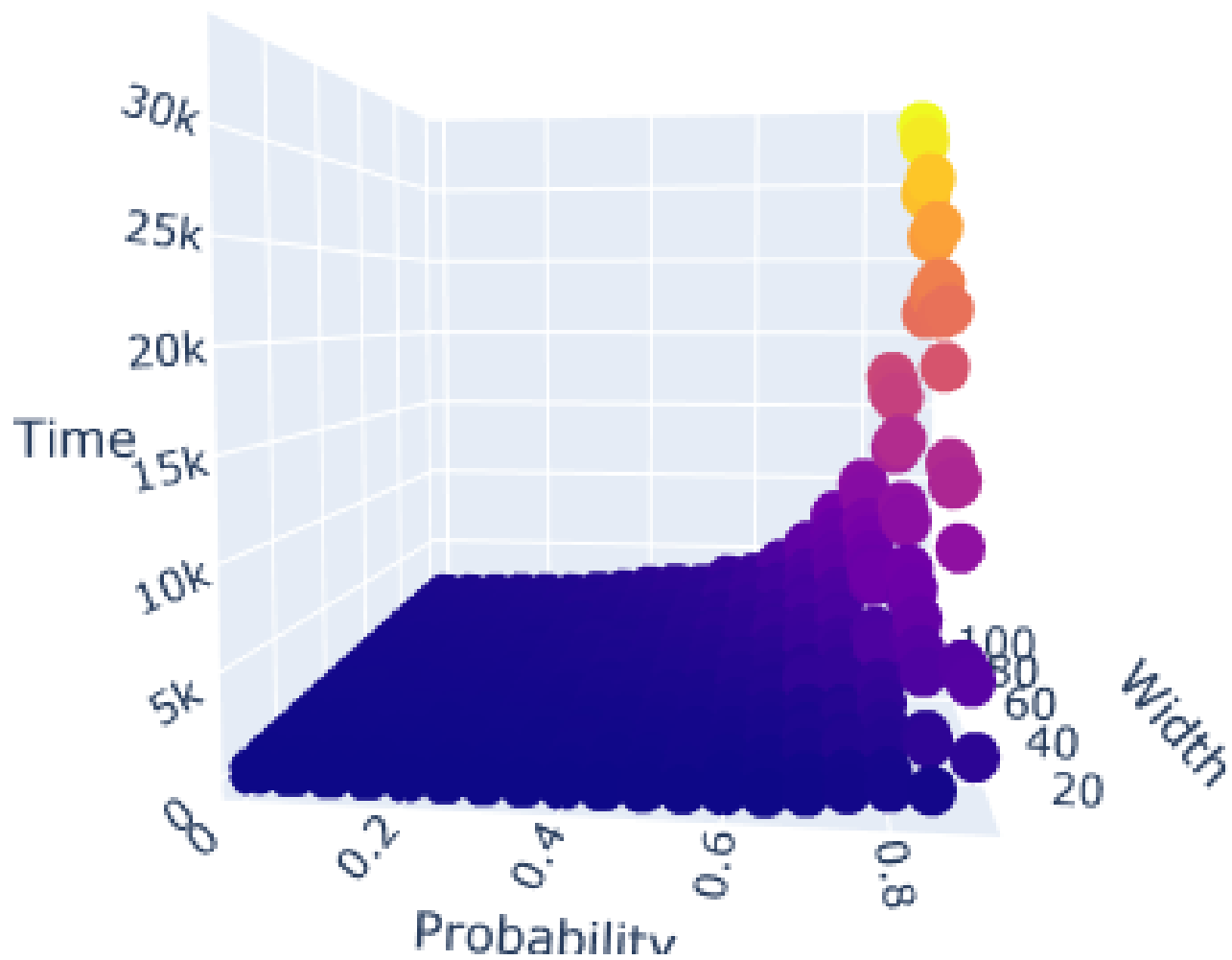
Figure 1: Variation of Probability, Width and Time

Figure 2: Variation of Probability, Width and Time