ASSIGNMENT 0

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Introduction

The scenario involves a defending country (DC) that aims to protect its border against an attacking country (AC), whose goal is to send an infiltrator across the border. To achieve this defense, the DC deploys a wireless sensor network along the border, creating a grid-based system. The sensors are motion sensors that can detect an infiltrator in motion.

Elements of the Scenario

Border:

1. It consists of a 2D array of Sensor objects.
2. This class represents the border that the infiltrator is trying to cross.
3. The `updateSensors` method updates the status of all sensors on the border based on the time from a Clock object.

Sensor:

1. This class represents a sensor on the border.
2. Each sensor has a probability p of being on. The `updateStatus` method updates the sensor's status based on this probability.

Infiltrator:

1. The infiltrator starts at a certain position (`startX, startY`) and moves towards a target y position.
2. The `move` method updates the infiltrator's position based on the time from a Clock object.

Clock:

1. This class represents a clock that keeps track of the time. The `tick` method increments the time.

Objective:

The primary objective is to study the time taken by the infiltrator to cross the border when the width of the border and the probability of the sensor being ON is varied.

Solution (LOGIC)

- The infiltrator moves up one position every 9 seconds if it hasn't reached the target y position. The sensors on the border update their status every 10 seconds.
- The simulation continues until the infiltrator has crossed the border. The result, along with the width of the border, the probability of the sensors being on, and the time taken, is then printed out.

- The simulation is run for different border widths and sensor probabilities. This helps to study the time taken by the infiltrator to cross the border when the width of the border and the probability of the sensor being ON is varied.

PLOTS

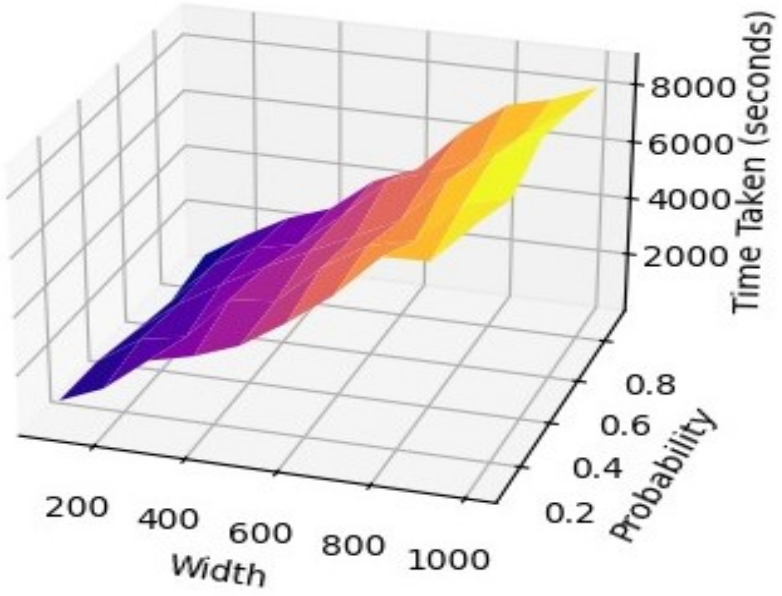

Figure 1: Width vs. Probability vs. Time Taken