Code Assessment MSG

You are an engineer working on a simulation environment for the Ministry of Defense. This simulation environment can simulate scenarios with a multitude of active platforms. For example *Multiple* inbound aircraft and *multiple* air defense systems, that may be of a similar type (respectively). Your task it to add a model for the Patriot air defense system. This system consists of three elements:

- Radar
- IFF
- Firing Unit

During each time-step, the radar will scan for inbound threats and outputs a line similar as shown in the `radar-output.csv` file, included in this assignment. The IFF module (Identification Friend or Foe), in turn, checks if a hostile entity is detected. This is the case when there are more odd value entries compared to even value entries in the decimal representation of the radar output. The firing unit should fire a missile as soon as a hostile is identified. The chance of a successful engagement is defined by the Probability of Kill (Pk) ratio. Your missile will have a Pk of 0.8. Engagement success can be simulated by using a random number generator with a uniform distribution. Any value below or equal to your Pk value will indicate a positive result and vice-versa for values larger than the Pk.

The Assignment

Create an application that can run this simulation for a Patriot Air Defense System based on the discription above and the `radar-output.csv` file included. The simulation should last 20 seconds and present what it is simulating at every time-step (1s). Was a hostile entity identified, was a missile launched and did the missile neutralize the target? You may create a console application that simply writes to the console.

You are free to use any programming language. Though keep into consideration that your code should be clean and readable, as the simulation may be extended in the future (by someone other than you).

Delivery instructions

Please place your code in a public GitHub or GitLab repository and send us the link. Please do not send code as an attachment through email.

Best of luck.

Input file

radar_data.csv:

```
0001010;0110011;0100110;0010000;0011100;0101101;1111010;1011101;0110100;1101011;0010011
0111000;1101001;0011101;1000010;1010000;0011010;0110000;0010111;0101001;1001001;0010100
1101001;1010110;0101100;0110011;0011000;1111101;0001100;0111110;0011010;0110110;1011111
0111011;0100001;1001100;0010110;0010011;0100010;0110111;0101010;0101110;0000111;0110111
0110100;1011111;0101101;1010111;1101011;0010001;1011111;1111010;0100100;1000110;0101010
0100100;1111111;1100010;0111001;0111000;1010011;1100001;0010111;0111001;1000001;0110101
1110111;0101010;1010110;0010100;1111100;1001000;0000101;1111010;0001001;1011111;0010111
0100101;0101011;0010001;1101000;1010010;0101000;0010010;1001010;1000011;0010001;1000111
0010110;1010111;1011000;0011101;0100110;1110001;1001111;1111111;0101110;0010010;0001010
0001010;0001110;1111100;1001010;1000110;1110111;1010110;0101110;1000100;1010111;0010100
1101111;1000000;0101011;1100011;1001000;0011010;0101100;1000111;0100111;0101010;1010000
1100011;1011111;1110100;0101101;0010011;1110010;0011110;1000101;0110101;1011011;1001000
1110000;0110011;0011110;1000000;1001001;0101010;1101101;0001111;1010001;1000101;1011011
0101010;1000101;0110100;1000000;0001101;0001110;1011101;1001001;0001010;0101111;1001100
0011101;1111011;0000011;0011101;1011000;1011110;1111111;1110010;1001010;0100110;1001101
0011100;1011111;0101110;0011010;0111001;1100100;0001111;0000100;0010111;0111000;1101110
```

```
0110111;1111110;0011000;1101011;0001101;1101000;0011001;1100111;0101011;0100111;1010010
0000010;0110100;1001100;1111101;1110010;1110001;1101001;1100110;1011110;0010010;1111101
0010001;0100100;0100110;0100001;0001110;1001100;1001110;0001111;1100101;0101111;0110101
0110101;0100001;0100100;0111101;1010111;0111101;0000111;0001100;1000101;0100010;1110010
```