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CSC 527 – homework 1

Question 2

a. Input = 2

```
C:\Users\hanng\DamagePrediction\Scripts\python.exe C:/Users/hanng/PycharmProjects/DamagePrediction/CSC527_hw1_a.py
The truth table/input data for OR logic function:
 [[0, 0, 0], [0, 1, 1], [1, 0, 1], [1, 1, 1]]

Expected=0, Predicted=0
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1

The truth table/input data for AND logic function:
 [[0, 0, 0], [0, 1, 0], [1, 0, 0], [1, 1, 1]]

Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=1, Predicted=0

Process finished with exit code 0
```

b. Input = 5

```
C:\Users\hanng\DamagePrediction\Scripts\python.exe C:/Users/hanng/PycharmProjects/DamagePrediction/CSC527_hw1_b.py
The truth table/input data for OR logic function:
 [[0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 1, 1], [0, 0, 0, 1, 0, 1], [0, 0, 0, 1, 1, 1], [0, 0, 1, 0, 0, 1], [0, 0, 1, 0, 1, 1], [0, 0, 1, 1, 0, 1], [0, 0, 1, 1, 1, 1], [0, 1, 0, 0, 0, 1], [0, 1, 0, 0, 1, 1], [0, 1, 0, 1, 0, 1], [0, 1, 0, 1, 1, 1], [0, 1, 1, 0, 0, 1],

Expected=0, Predicted=0
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
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Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
```

```
The truth table/input data for AND logic function:
 [[0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 1, 0], [0, 0, 0, 1, 0, 0], [0, 0, 0, 1, 1, 0], [0, 0, 1, 0, 0, 0], [0, 0, 1, 0, 1, 0], [0, 0, 1, 1, 0, 0], [0, 0, 1, 1, 1, 0], [0, 1, 0, 0, 0, 0], [0, 1, 0, 0, 1, 0], [0, 1, 0, 1, 0, 0], [0, 1, 0, 1, 1, 0], [0, 1, 1, 0, 0, 0],

Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
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Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=1, Predicted=1

Process finished with exit code 0
```

c. User input (example = 10)

```
C:\Users\hanng\DamagePrediction\Scripts\python.exe C:/Users/hanng/PycharmProjects/DamagePrediction/CSC527_hw1_c.py
Please enter the input size: 10
The truth table/input data for OR logic function:
 [[0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1], [0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1], [0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1], [0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1], [0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 1], [0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1], [0, 0, 0, 0, 0

Expected=0, Predicted=0
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
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Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
Expected=1, Predicted=1
```

```
Run: CSC527_hw1_c
Expected=1, Predicted=1

The truth table/input data for AND logic function:
 [[0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0], [0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0], [0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0], [0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0], [0, 0, 0, 0, 0

Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
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Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=1
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
Expected=0, Predicted=0
```

d. As the number of input signals increases, how does the bias change?

Suppose we have n number of input (x1, x2, x3, ..., xn):

+ If bk = -n -> the MP neuron will produce AND logic
+ If bk = -1 -> the MP neuron will produce OF logic
+ If bk < n -> the MP neuron will always produces 1 (firing state)
+ If bk > b -> the MP neuron will always produces 0 (quiescent state)