Human Brain VS Computer

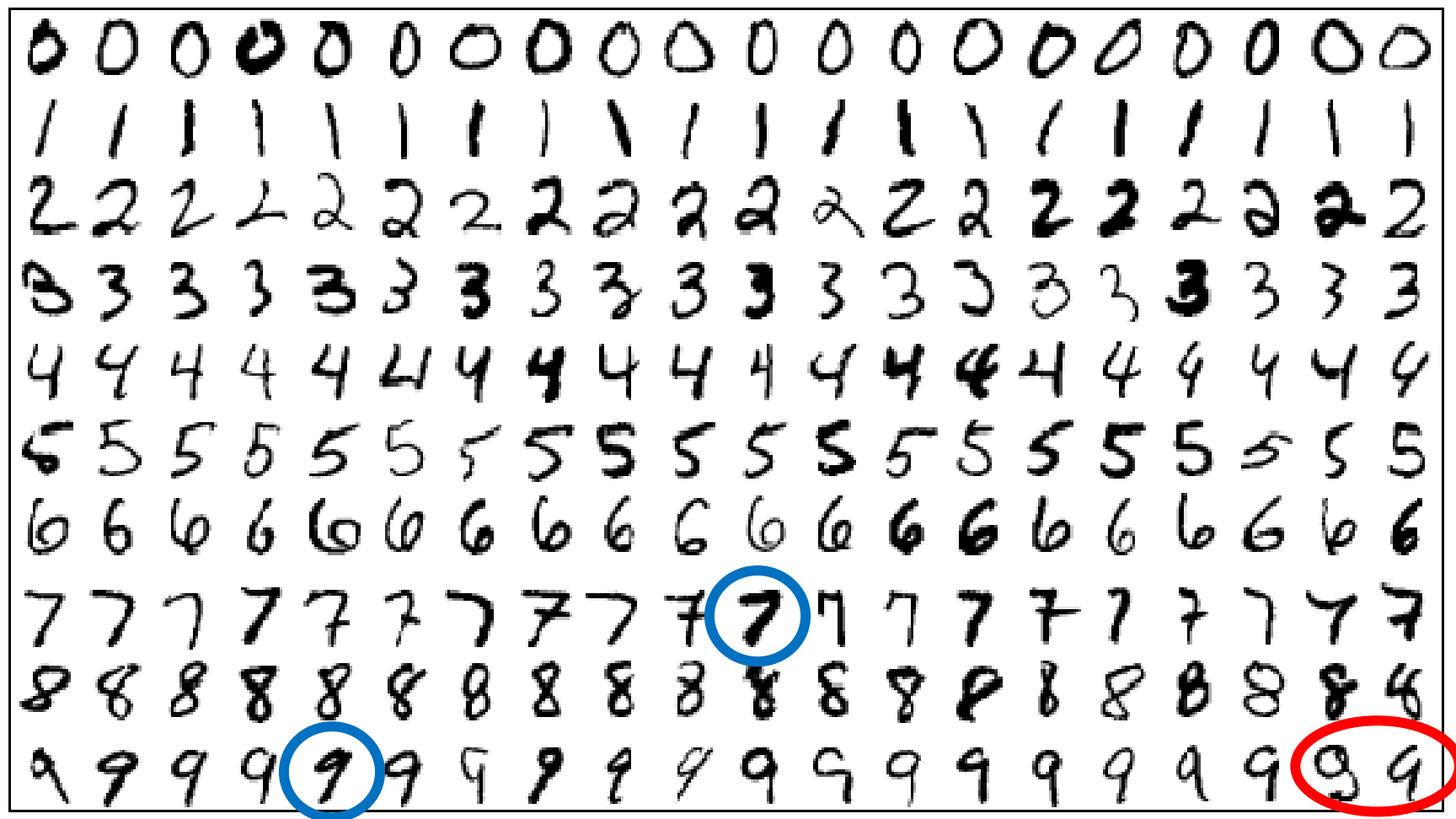**Motivation**

Human mind   - Good at image recognition, pattern recognition etc
Computer   - Good at arithmetic calculations

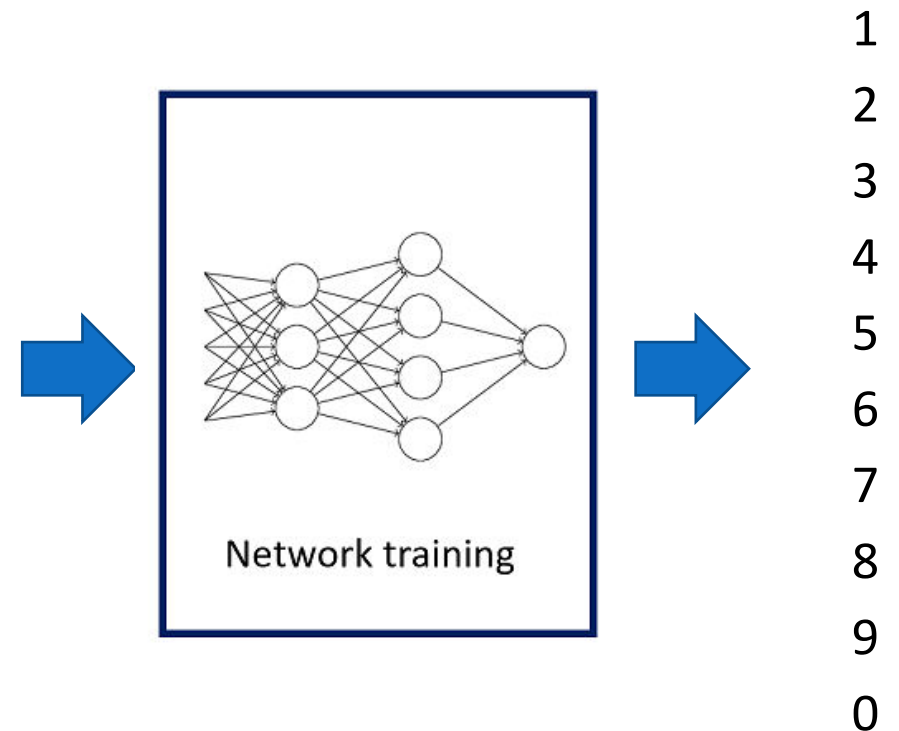$$2574304 \times e^{354} \div \tan 5.1\pi$$

Handwriting recognition

Making precise rules is difficult

Neural Networks

Neural Networks creates own complex pattern recognition rules

Pattern recognition

Training data

Network training

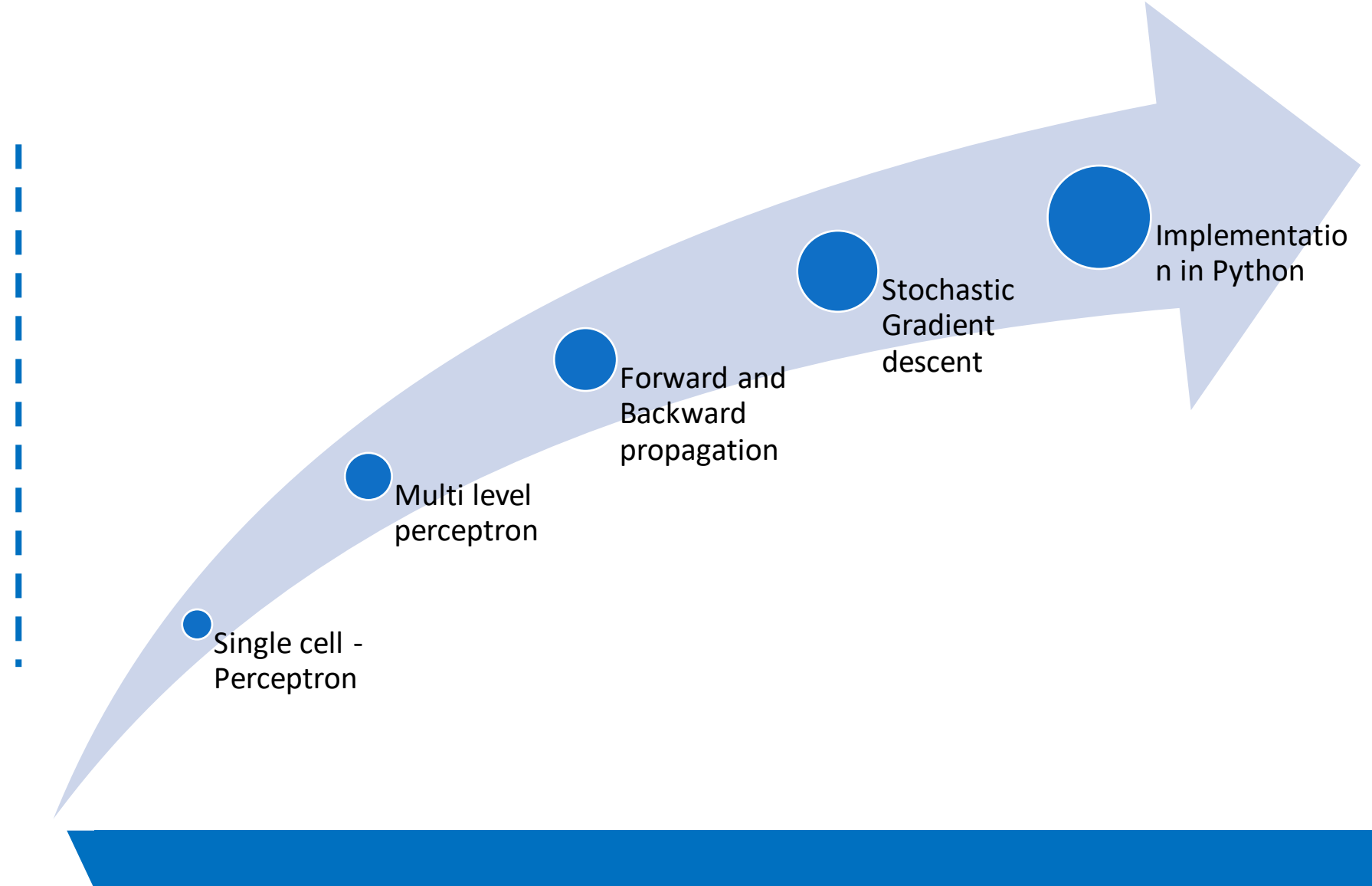Future Prediction

1
2
3
4
5
6
7
8
9
0

Dataset

Fashion MNIST

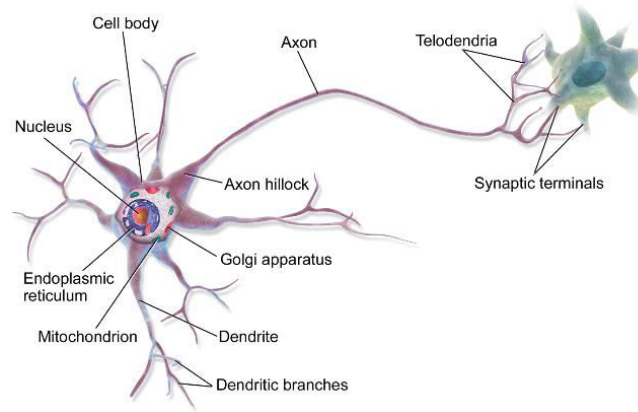We will classify images

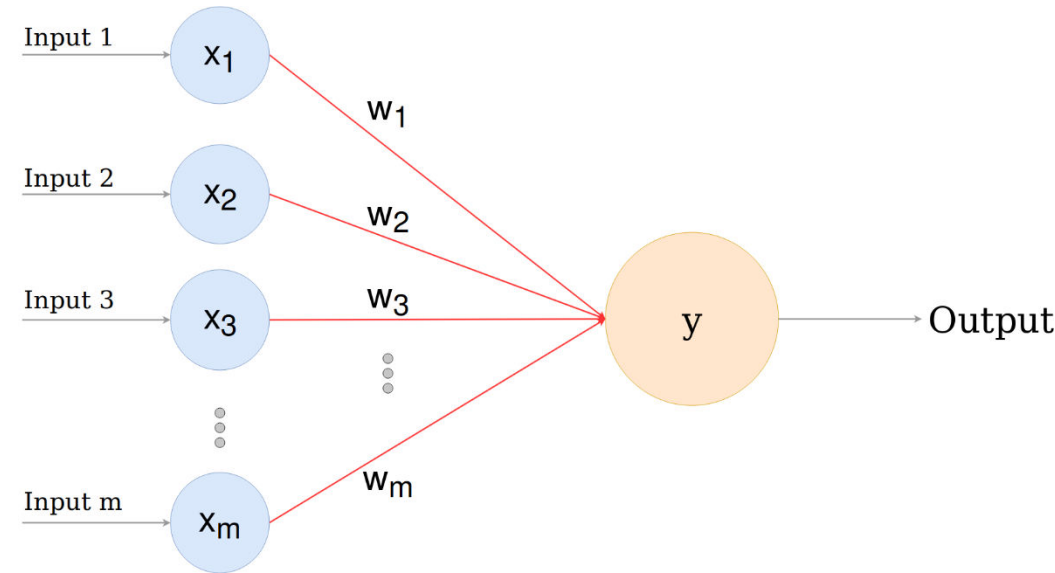into 10 fashion items

Course Flow

Course Flow

Perceptron

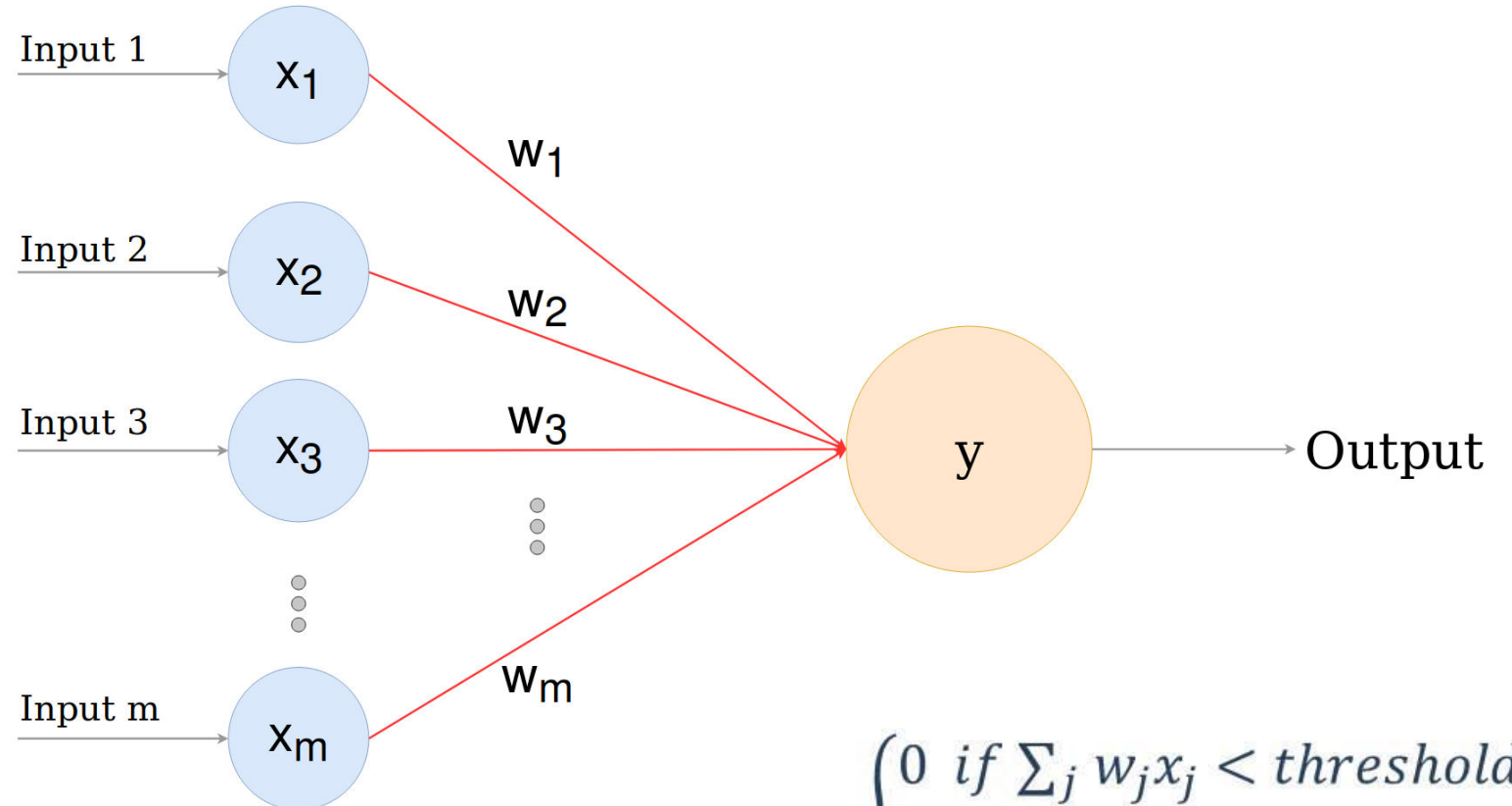**Artificial Neuron**

Biological Neuron

Artificial Neuron

Perceptron

Artificial Neuron

$$output = \begin{cases} 0 \; if \; \sum_j w_j x_j < threshold \\ 1 \; if \; \sum_j w_j x_j > threshold \end{cases}$$
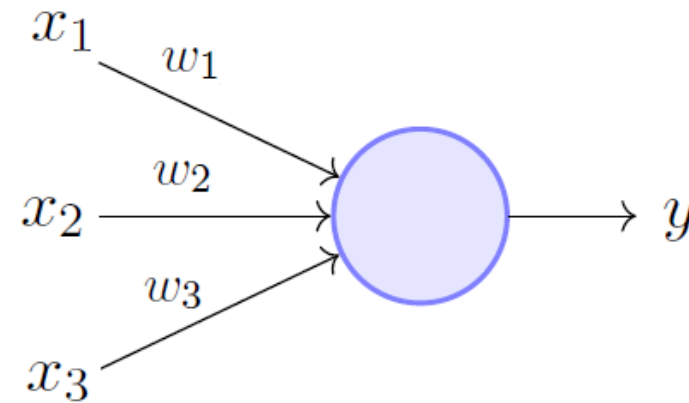
Example

Purchasing a Shirt

Color
- Blue or Not

Sleeves
- Full or half

Fabric
- Cotton or not

x_1 w_1

x_2 w_2

x_3 w_3

y

You will buy the shirt or not

Example

Purchasing a Shirt

Color
- Blue or Not

Sleeves
- Full or half

Fabric
- Cotton or not

x_1 7

x_2 4

x_3 2

Threshold Value

y

You will buy the shirt or not

Example

Purchasing a Shirt

Color
- Blue or Not

Sleeves
- Full or half

Fabric
- Cotton or not

x_1 [7]

x_2 [4]

x_3 [2]

Threshold Value

[8] y
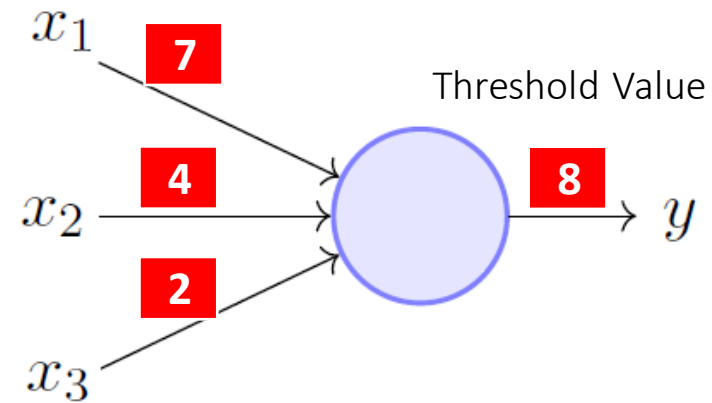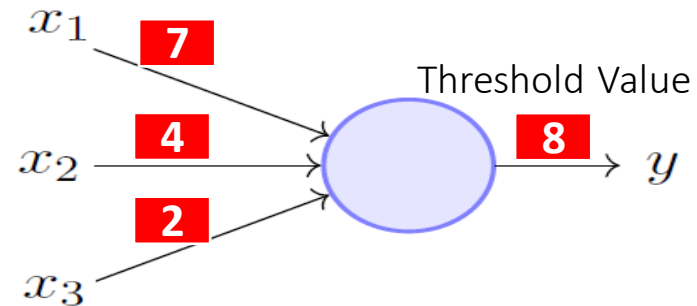
You will buy the shirt or not

Color	Sleeves	Fabric	Calculated Sum	Threshold	Buy / Not Buy
Blue	Half	Non Cotton	7*1 + 4*0 + 2*0 = 7	8	Not buy
Blue	Full	Non Cotton	11	8	Buy
Not Blue	Full	Cotton	6	8	Not Buy

Purchasing a Shirt

Color
- Blue or Not

Sleeves
- Full or half

Fabric
- Cotton or not

x_1 **8**

x_2 **6**   Threshold Value **16** y

x_3 **3**

You will buy the shirt or not