# Spam Mail Classification

We have a **3-input vector**:

**Input vector**

$$x = (1, 0, 1)$$

**H1**

**Weights:**

$$w_{H1} = (0.5, -0.2, 0.3)$$

**H2**

**Weights:**

$$w_{H2} = (0.4, 0.1, -0.5)$$

**Classification Decision**

*If output > 0.5 → **spam***

$$0.6 > 0.5 \Rightarrow Spam\ Mail$$

**Python Code for Spam Mail Classifier:**

```python
import numpy as np
def relu(x):
    return np.maximum(0, x)
def sigmoid(x):
    return 1 / (1 + np.exp(-x))
x = np.array([1, 0, 1])
weights_hidden = np.array([
    [0.5, -0.2, 0.3],   # H1
    [0.4, 0.1, -0.5]   # H2
])
bias_hidden = np.array([0, 0])
z_hidden = np.dot(weights_hidden, x) + bias_hidden
h = relu(z_hidden)
print("Hidden layer output:", h)
weights_output = np.array([0.7, 0.2])  # from H1 and H2
bias_output = 0              # assume 0
z_output = np.dot(weights_output, h) + bias_output
```

```
output = sigmoid(z_output)
print("Output after sigmoid:", output)
if output > 0.5:
   print("Result: SPAM")
else:
   print("Result: NOT SPAM")
```