

# Implementation of a simple neural network in the graph mode

## Task 1

Use tensor operations and graph mode to implement a neural network operating on precision `tf.float32`, with 10-6-1 architecture (vector input length of 10, layer of 6 neurons and layer with one neuron) with Sigmoid activation functions and dense connections.

The definition of the network should be in the form of a function:

```
@tf.function
def neural_net(x: tf.Tensor, w1: tf.Tensor, w2: tf.Tensor, b1: tf.Tensor, b2: tf.Tensor):
    ...
    return y
```

where `x` is the input vector of features, `y` is the network response, `w` is the vectors of weights, and `b` is the bias vectors.

**The network performs a simple binary classification task (decides between class A or B). Call the function for the following parameters:**

```
w1 = [[ 1.4334732, -1.5244598, 1.139654, 2.723477, 2.372128, -1.8221221],
 [ 1.6633688, -1.3922757, 2.0349483, 1.6314147, 1.6997916, -1.719175],
 [ 1.6464833, -1.6136154, 1.6790704, 2.1913328, 1.7154503, -2.122219],
 [ 2.2029521, -2.2169485, 1.1411709, 1.7363839, 1.9620435, -1.990284],
 [ 1.864349, -1.9724554, 1.282788, 1.3895663, 1.2881863, -1.3681948],
 [ 0.4421571, 0.24537054, 0.49080196, -0.0939824, 0.36308903, -0.32526237],
 [-1.6102886, 1.7532632, -1.3683709, -1.2728035, -1.8335032, 1.6637068],
 [-1.0453694, 0.95990705, -1.913037, -1.637573, -1.8312218, 1.9757035],
 [-2.6982157, 1.5073962, -2.243781, -2.7327728, -2.5648139, 1.9095569],
 [-2.0628226, 2.3980575, -1.3550557, -2.1798916, -2.1485612, 2.2912557]]
b1 = [-1.6460503, 1.5486399, -1.5155386, -1.6247352, -1.2638505, 1.5515162]
w2 = [[ 2.220895 ], [-2.903738 ], [ 1.7675139], [ 2.3042984], [ 2.6292808], [-2.763858 ]]
b2 = [-1.1827456]
```

**and input feature vectors:**

```
x1 = [0.85, 0.86, 0.76, 0.73, 0.95, 0.5, 0.5, 0.5, 0.5, 0.5]
```

$x_2 = [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.67, 0.87]$

**For the set values, the results should look like this:**

$y_1 = 0.9977336$

$y_2 = 0.00667116$

**The use of operations with `tf.keras` is prohibited. The whole should be implemented using basic tensor operations and functions `tf.math.sigmoid()`.**