```
threshold = 1
learning_rate = 0.01
weights = [0, 0, 0]
training_set = [((1, 0, 0), 1), ((1, 0, 1), 1), ((1, 1, 0), 1), ((1, 1, 1), 0)]

def sum_function(values):
    return sum(value * weight for value, weight in zip(values, weights))

while True:
    print '-' * 60
    error_count = 0
    for input_vector, desired_output in training_set:
        print weights
        result = 1 if sum_function(input_vector) > threshold else 0
        error = desired_output - result
        if error != 0:
            error_count += 1
            for index, value in enumerate(input_vector):
                weights[index] += learning_rate * error * value
    if error_count == 0:
        break
```

```
------------------------------------------------------------
[0, 0, 0]
[0.01, 0.0, 0.0]
[0.02, 0.0, 0.01]
[0.03, 0.01, 0.01]
------------------------------------------------------------
[0.03, 0.01, 0.01]
[0.04, 0.01, 0.01]
[0.05, 0.01, 0.02]
[0.060000000000000005, 0.02, 0.02]
------------------------------------------------------------
[0.060000000000000005, 0.02, 0.02]
[0.07, 0.02, 0.02]
[0.08, 0.02, 0.03]
[0.09, 0.03, 0.03]
------------------------------------------------------------
[0.09, 0.03, 0.03]
[0.09999999999999999, 0.03, 0.03]
[0.10999999999999999, 0.03, 0.04]
[0.11999999999999998, 0.04, 0.04]
------------------------------------------------------------
[0.11999999999999998, 0.04, 0.04]
[0.12999999999999998, 0.04, 0.04]
[0.13999999999999999, 0.04, 0.05]
[0.15, 0.05, 0.05]
------------------------------------------------------------
[0.15, 0.05, 0.05]
[0.16, 0.05, 0.05]
[0.17, 0.05, 0.060000000000000005]
```

```
[0.18000000000000002, 0.060000000000000005, 0.060000000000000005]
------------------------------------------------------------
[0.18000000000000002, 0.060000000000000005, 0.060000000000000005]
[0.19000000000000003, 0.060000000000000005, 0.060000000000000005]
[0.20000000000000004, 0.060000000000000005, 0.07]
[0.21000000000000005, 0.07, 0.07]
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[0.22000000000000006, 0.07, 0.07]
[0.23000000000000007, 0.07, 0.08]
[0.24000000000000007, 0.08, 0.08]
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[0.24000000000000007, 0.08, 0.08]
[0.25000000000000006, 0.08, 0.08]
[0.26000000000000006, 0.08, 0.09]
[0.2700000000000001, 0.09, 0.09]
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[0.2800000000000001, 0.09, 0.09]
[0.2900000000000001, 0.09, 0.09999999999999999]
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[0.3200000000000001, 0.09999999999999999, 0.10999999999999999]
[0.3300000000000001, 0.10999999999999999, 0.10999999999999999]
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[0.35000000000000014, 0.10999999999999999, 0.11999999999999998]
[0.36000000000000015, 0.11999999999999998, 0.11999999999999998]
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[0.8500000000000005, 0.15, 0.16]
```

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[0.9100000000000006, 0.09, 0.09999999999999999]
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------------------------------------------------------------
[0.9100000000000006, 0.08, 0.08]
```

```
[0.9200000000000006, 0.08, 0.08]
[0.9200000000000006, 0.08, 0.08]
[0.9200000000000006, 0.08, 0.08]
------------------------------------------------------------
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[0.9300000000000006, 0.07, 0.08]
------------------------------------------------------------
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------------------------------------------------------------
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[0.9500000000000006, 0.04, 0.05]
[0.9600000000000006, 0.05, 0.05]
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------------------------------------------------------------
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------------------------------------------------------------
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------------------------------------------------------------
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[0.9800000000000006, 0.009999999999999997, 0.009999999999999997]
[0.9900000000000007, 0.009999999999999997, 0.019999999999999997]
```

```
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------------------------------------------------------------
[0.9800000000000006, -3.469446951953614e-18, 0.009999999999999997]
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[1.0100000000000007, -0.020000000000000004, -0.010000000000000004]
[1.0100000000000007, -0.020000000000000004, -0.010000000000000004]
[1.0200000000000007, -0.010000000000000004, -0.010000000000000004]
------------------------------------------------------------
[1.0100000000000007, -0.020000000000000004, -0.020000000000000004]
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[1.0200000000000007, -0.020000000000000004, -0.010000000000000004]
[1.0200000000000007, -0.020000000000000004, -0.010000000000000004]
------------------------------------------------------------
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[1.0200000000000007, -0.020000000000000004, -0.010000000000000004]
[1.0200000000000007, -0.020000000000000004, -0.010000000000000004]
[1.0200000000000007, -0.020000000000000004, -0.010000000000000004]
```

```
sum_function([1,1,1])
```

```
0.9900000000000007
```