

In [1]:

```
import numpy as np
```

In [10]:

```
def sigmoid(x): #シグモイド関数
    return 1 / (1 + np.exp(-x))
```

In [11]:

```
def softmax(x): #ソフトマックス関数
    c = np.max(x)
    exp_x = np.exp(x - c)
    sum_exp_x = np.sum(exp_x)
    y = exp_x / sum_exp_x

    return y
```

In [12]:

```
import numpy as np #3層マルチパーセプトロンによるNN

def init_network():
    network={}
    network['W1'] = np.array([[0.1, 0.3, 0.5], [0.2, 0.4, 0.6]])
    network['b1'] = np.array([[0.1, 0.2, 0.3]])
    network['W2'] = np.array([[0.1, 0.4], [0.2, 0.5], [0.3, 0.6]])
    network['b2'] = np.array([[0.1, 0.2]])
    network['W3'] = np.array([[0.1, 0.3], [0.2, 0.4]])
    network['b3'] = np.array([[0.1, 0.2]])
    return network

def forward(network, x):
    # layer 1
    W1=network['W1']
    b1=network['b1']
    a1=np.dot(x, W1) + b1
    z1=sigmoid(a1)
    # layer2
    W2 = network['W2']
    b2 = network['b2']
    a2 = np.dot(z1, W2) + b2
    z2 = sigmoid(a2)
    #Layer 3
    W3 = network['W3']
    b3 = network['b3']
    a3 = np.dot(z2, W3) + b3
    y = a3
    return y

network = init_network()
x=np.array([1.0, 0.5])
y=forward(network, x)
print(y) #[0.31682708 0.69627909]
```

```
[[0.31682708 0.69627909]]
```

In [21]:

```
import random
network = init_network()
batch_size = 16
x = np.random.rand(1000, 2)
for i in range(0, len(x), batch_size):
    x_batch = x[i: i + batch_size]
    y_batch = forward(network, x_batch)
    print(x_batch, i) #雰囲気掴むために
```

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In [17]:

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Out[17]:

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In [18]:

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y_batch
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Out[18]:

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       [0.31254796, 0.68676008],
       [0.31483196, 0.69183761]])
```

In [19]:

```
x
```

Out[19]:

```
array([[0. 73718245,  0. 29862692],
       [0. 24400164,  0. 17169518],
       [0. 18788538,  0. 51824473],
       ...,
       [0. 44655284,  0. 067121   ],
       [0. 07026904,  0. 55133318],
       [0. 51870911,  0. 54634789]])
```

感想

最初バッチ処理のサンプルコードが何を表しているのかいまいちわからなかったが、
x_batch,y_batch,x,print(x_batch)をみたことで扱い方のイメージが掴めた。

参考文献

ゼロから作るDeep Learning Pythonで学ぶディープラーニング」の理論と基礎