Lesson 20

Reshape the structure of tensor

```
x = tf.constant([1,2,3,4,5,6])
print(x)
```

tf.Tensor([1 2 3 4 5 6], shape=(6,), dtype=int32)

[1, 2, 3, 4, 5, 6]

Reshape the structure of tensor

```
x = tf.constant([1,2,3,4,5,6])
print(x)
```

```
tf.Tensor([1 2 3 4 5 6], shape=(6,), dtype=int32)
```

[1, 2, 3, 4, 5, 6]

```
x = tf.constant([1,2,3,4,5,6], shape=(2,3))
print(x)
```

```
tf.Tensor(
[[1 2 3]
 [4 5 6]], shape=(2, 3), dtype=int32)
```

[1, 2, 3]
[4, 5, 6]

Reshape the structure of tensor

```
x = tf.constant([1,2,3,4,5,6])
print(x)
```

```
tf.Tensor([1 2 3 4 5 6], shape=(6,), dtype=int32)
```

[1, 2, 3, 4, 5, 6]

```
x = tf.constant([1,2,3,4,5,6], shape=(2,3))
print(x)
```

```
tf.Tensor(
[[1 2 3]
 [4 5 6]], shape=(2, 3), dtype=int32)
```

[1, 2, 3]
[4, 5, 6]

[1, 2]
[3, 4]
[5, 6]

Reshape the structure of tensor

```
x = tf.constant([1,2,3,4,5,6])
print(x)
```

```
tf.Tensor([1 2 3 4 5 6], shape=(6,), dtype=int32)
```

[1, 2, 3, 4, 5, 6]

```
x = tf.constant([1,2,3,4,5,6], shape=(2,3))
print(x)
```

```
tf.Tensor(
[[1 2 3]
 [4 5 6]], shape=(2, 3), dtype=int32)
```

[1, 2, 3]
[4, 5, 6]

```
tf.reshape(x, (3,2))
```

```
<tf.Tensor: shape=(3, 2), dtype=int32, numpy=
array([[1, 2],
       [3, 4],
       [5, 6]])>
```

[1, 2]
[3, 4]
[5, 6]

Flatten the tensor

[1, 2, 3, 4]
[5, 6, 7, 8]

→

[1, 2, 3, 4, 5, 6, 7, 8]

```
x = tf.constant([[1,2,3,4],[5,6,7,8]], shape=(8))
print(x)
```

tf.Tensor([1 2 3 4 5 6 7 8], shape=(8,), dtype=int32)

Flatten the tensor

[1, 2, 3, 4]
[5, 6, 7, 8]

→

[1, 2, 3, 4, 5, 6, 7, 8]

```
x = tf.constant([[1,2,3,4],[5,6,7,8]], shape=(8))
print(x)
```

tf.Tensor([1 2 3 4 5 6 7 8], shape=(8,), dtype=int32)

```
x = tf.constant([[1,2,3,4],[5,6,7,8]])
tf.reshape(x, (8))
```

<tf.Tensor: shape=(8,), dtype=int32, numpy=array([1, 2, 3, 4, 5, 6, 7, 8])>

Reshape the tensor with (-1)

```
x = tf.constant([[1,2,3,4],[5,6,7,8]])
print(x)
```

```
tf.Tensor(
[[1 2 3 4]
 [5 6 7 8]], shape=(2, 4), dtype=int32)
```

[1, 2, 3, 4]
[5, 6, 7, 8]

```
tf.reshape(x, (-1))
```

```
<tf.Tensor: shape=(6,), dtype=int32, numpy=array([1, 2, 3, 4, 5, 6])>
```

[1, 2, 3, 4, 5, 6, 7, 8]

More on (-1) shape

```
x = tf.constant([[1,2,3,4],[5,6,7,8]])
print(x)
```

```
tf.Tensor(
[[1 2 3 4]
 [5 6 7 8]], shape=(2, 4), dtype=int32)
```

```
[ 1, 2, 3, 4]
[ 5, 6, 7, 8]
```

```
tf.reshape(x, (4,-1))
```

```
<tf.Tensor: shape=(4, 2), dtype=int32, numpy=
array([[1, 2],
       [3, 4],
       [5, 6],
       [7, 8]])>
```

```
[ 1, 2]
[ 3, 4]
[ 5, 6]
[ 7, 8]
```

More on (-1) shape

```
x = tf.constant([1,2,3,4,5,6,7,8])
tf.reshape(x, (2,-1,2))

<tf.Tensor: shape=(2, 2, 2), dtype=int32, numpy=
array([[[1, 2],
        [3, 4]],

       [[5, 6],
        [7, 8]]])>
```

[[1, 2]
  [3, 4]]
[[5, 6]
  [7, 8]]

More on (-1) shape

```
x = tf.constant([1,2,3,4,5,6,7,8])
tf.reshape(x, (2,-1,2))
```

```
<tf.Tensor: shape=(2, 2, 2), dtype=int32, numpy=
array([[[1, 2],
        [3, 4]],

       [[5, 6],
        [7, 8]]])>
```

```
x = tf.constant([[1,2,3,4],[5,6,7,8]])
tf.reshape(x, (-1,2,2))
```

```
<tf.Tensor: shape=(2, 2, 2), dtype=int32, numpy=
array([[[1, 2],
        [3, 4]],

       [[5, 6],
        [7, 8]]])>
```

```
[ [ 1, 2]
  [ 3, 4] ]
[ [ 5, 6]
  [ 7, 8] ]
```

More on (-1) shape

```
x = tf.constant([1,2,3,4,5,6,7,8])
tf.reshape(x, (2,-1,2))

<tf.Tensor: shape=(2, 2, 2), dtype=int32, numpy=
array([[[1, 2],
        [3, 4]],

       [[5, 6],
        [7, 8]]])>
```

```
[ [ 1, 2]
  [ 3, 4] ]
[ [ 5, 6]
  [ 7, 8] ]
```

```
x = tf.constant([[1,2,3,4],[5,6,7,8]])
tf.reshape(x, (-1,2,2))

<tf.Tensor: shape=(2, 2, 2), dtype=int32, numpy=
array([[[1, 2],
        [3, 4]],

       [[5, 6],
        [7, 8]]])>
```

```
x = tf.constant([[1,2,3,4],[5,6,7,8]])
tf.reshape(x, (2,2,-1))

<tf.Tensor: shape=(2, 2, 2), dtype=int32, numpy=
array([[[1, 2],
        [3, 4]],

       [[5, 6],
        [7, 8]]])>
```

Summary

We have learnt

- How to create a variable tensor?
- How to convert a constant tensor to a variable tensor, and vice versa?
- How to reshape a tensor?