

0a-scalar.vector.matrix.tensor

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Tensor Rank	Prog/Math	Python
0	scalar	int, float, string, bool
1	vector	list, tuple, set, dict, string, array, series
2	matrix	nested list, matrix, data frame, list of lists, array of arrays
3		list of data frames, list of lists of lists, array of arrays of arrays

```
[ ]: import numpy as np
```

```
[ ]: foo = np.arange(2**6)
foo
```

```
[4]: foo.shape
```

```
[4]: (64,)
```

```
[5]: foo.reshape(1,-1)
```

```
[5]: array([[ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15,
          16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31,
          32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47,
          48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63]])
```

```
[6]: foo.reshape(1,-1).shape
```

```
[6]: (1, 64)
```

```
[7]: foo.reshape(1, 2,-1)
```

```
[7]: array([[[ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15,
            16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31],
            [32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47,
            48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63]])])
```

```
[8]: foo.reshape(1, 2,-1).shape
```

```
[8]: (1, 2, 32)
```

```
[9]: foo.reshape(2, 2,-1)
```

```
[9]: array([[[ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15],
            [16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31]],

          [[32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47],
            [48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63]])
```

```
[10]: foo.reshape(2, 2, -1).shape
```

```
[10]: (2, 2, 16)
```

```
[11]: foo.reshape(2, 2, 2, -1)
```

```
[11]: array([[[[ 0,  1,  2,  3,  4,  5,  6,  7],
              [ 8,  9, 10, 11, 12, 13, 14, 15]],

            [[16, 17, 18, 19, 20, 21, 22, 23],
              [24, 25, 26, 27, 28, 29, 30, 31]]],

          [[[32, 33, 34, 35, 36, 37, 38, 39],
              [40, 41, 42, 43, 44, 45, 46, 47]],

            [[48, 49, 50, 51, 52, 53, 54, 55],
              [56, 57, 58, 59, 60, 61, 62, 63]]]])
```

```
[12]: foo.reshape(2, 2, 2, -1).shape
```

```
[12]: (2, 2, 2, 8)
```

```
[13]: foo.reshape(2, 2, 2, 2, -1).shape
```

```
[13]: (2, 2, 2, 2, 4)
```

```
[14]: foo.reshape(2, 2, 2, 2, 2, -1).shape
```

```
[14]: (2, 2, 2, 2, 2, 2)
```

```
[15]: foo.reshape(2, 2, 2, 2, 2, 2, -1).shape
```

```
[15]: (2, 2, 2, 2, 2, 2, 1)
```

```
[16]: foo.reshape(1, 2, 2, 2, 2, 2, 2, -1).shape
```

```
[16]: (1, 2, 2, 2, 2, 2, 2, 1)
```

```
[23]: len(foo.reshape(1, 1, 2, 2, 2, 2, 2, 2, -1).shape)
```

```
[23]: 9
```

```
[18]: foo.reshape(1, 64).shape
```

```
[18]: (1, 64)
```

```
[19]: foo.reshape(1, 1, 64).shape
```

```
[19]: (1, 1, 64)
```

```
[22]: foo.reshape(1, -1, 2).flatten().shape
```

```
[22]: (64,)
```

```
[ ]:
```