

**Python  
Bootcamp  
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**Ellipsis**



- **Ellipsis** is a singleton object of the built-in **ellipsis** class. It's produced by the `...` Expression
- **Ellipsis** is used in numpy to slice higher-dimensional data structures. So, `a[... , 0]` for a 3d array is same as `a[:, :, 0]` and for 4d, `a[:, :, :, 0]` etc.
- **Ellipsis** also used for type hinting in stub files (.pyi files)
- Python uses `...` for structures that are circular (circular reference in its objects)

```
...
```

```
Ellipsis
```

```
Ellipsis
```

```
Ellipsis
```

```
type(Ellipsis)
```

```
ellipsis
```

```
import numpy as np
A = np.random.rand(2, 3, 4)
A[:, :, 1]
A[Ellipsis, 1]
```

```
array([[0.10897661, 0.88532229, 0.52371866],
       [0.01645701, 0.60783512, 0.61693533]])
```

```
array([[0.10897661, 0.88532229, 0.52371866],
       [0.01645701, 0.60783512, 0.61693533]])
```

```
array([[0.10897661, 0.88532229, 0.52371866],
       [0.01645701, 0.60783512, 0.61693533]])
```

```
from numpy import arange
a = arange(16).reshape(2,2,2,2)
a[Ellipsis, 0].flatten()
```

```
array([ 0,  2,  4,  6,  8, 10, 12, 14])
```

```
from numpy import arange
a = arange(16).reshape(2,2,2,2)
a[Ellipsis].flatten()
```

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



# Online Resources

**For best python resources, please visit:**



[gknxt.com/python/](https://gknxt.com/python/)

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