# NumPy Products

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## Products

To find the product of the elements in an array, use the `prod()` function.

### Example

Find the product of the elements of this array:

```
import numpy as np

arr = np.array([1, 2, 3, 4])

x = np.prod(arr)

print(x)
```

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**Returns:** `24` because 1*2*3*4 = 24

### Example

Find the product of the elements of two arrays:

```
import numpy as np

arr1 = np.array([1, 2, 3, 4])
arr2 = np.array([5, 6, 7, 8])

x = np.prod([arr1, arr2])

print(x)
```

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**Returns:** `40320` because 1*2*3*4*5*6*7*8 = 40320

# Product Over an Axis

If you specify `axis=1`, NumPy will return the product of each array.

## Example

Perform summation in the following array over 1st axis:

```
import numpy as np

arr1 = np.array([1, 2, 3, 4])
arr2 = np.array([5, 6, 7, 8])

newarr = np.prod([arr1, arr2], axis=1)

print(newarr)
```

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**Returns:** `[24 1680]`

# Cummulative Product

Cummulative product means taking the product partially.

E.g. The partial product of [1, 2, 3, 4] is [1, 1*2, 1*2*3, 1*2*3*4] = [1, 2, 6, 24]

Perfom partial sum with the `cumprod()` function.

## Example

Take cummulative product of all elements for following array:

```
import numpy as np

arr = np.array([5, 6, 7, 8])

newarr = np.cumprod(arr)

print(newarr)
```

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**Returns:** `[5 30 210 1680]`

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