IDENTITY

An identity array is a square matrix

with all the main diagonal elements as and the rest as .

The default type of elements is float.

```
import numpy as np
print(np.identity(3)) #3 is for  dimension 3 X 3
# DEFAULT OUTPUT IS FLOAT
```

```
[[1. 0. 0.]
 [0. 1. 0.]
 [0. 0. 1.]]
```

```
import numpy as np
print(np.identity(4,int)) # we can change output to int as below:
# dimension here is 4X4
```

```
[[1 0 0 0]
 [0 1 0 0]
 [0 0 1 0]
 [0 0 0 1]]
```

```
import numpy as np
print(np.identity(3,int))
```

```
[[1 0 0]
 [0 1 0]
 [0 0 1]]
```

```
import numpy as np
print(np.identity(3).ndim) # identity is a 2D array
```

```
2
```

EYE

Eye tool also returns a 2D array with 1's as the diagonal and rest as 0's.

The diagonal can be main, upper or lower depending on the optional parameter K

K=0 (the default) refers to the main diagonal,

a positive K value refers to an upper diagonal,

a negative K value refers to a lower diagonal

```
import numpy as np
np.eye(5,4,k=0) # Default K=0, or you may explicitly mention K=0
# 5 X 4 Dimension of array.
```

```
array([[1., 0., 0., 0.],
       [0., 1., 0., 0.],
       [0., 0., 1., 0.],
       [0., 0., 0., 1.],
       [0., 0., 0., 0.]])
```

```
import numpy as np
print(np.eye(5,4,k=-1)) # watch the diagonal shifting on the lower
side
# as we take K: negative
```

```
[[0. 0. 0. 0.]
 [1. 0. 0. 0.]
 [0. 1. 0. 0.]
 [0. 0. 1. 0.]
 [0. 0. 0. 1.]]
```

```
import numpy as np
print(np.eye(5,4,-2)) # here 3rd parameter is taken as K , by default.
```

```
[[0. 0. 0. 0.]
 [0. 0. 0. 0.]
 [1. 0. 0. 0.]
 [0. 1. 0. 0.]
 [0. 0. 1. 0.]]
```

```
import numpy as np
print(np.eye(5,4,k=1))
```

```
[[0. 1. 0. 0.]
 [0. 0. 1. 0.]
 [0. 0. 0. 1.]
 [0. 0. 0. 0.]
 [0. 0. 0. 0.]]
```

```
import numpy as np
print(np.eye(5,4,k=2))
```

```
[[0. 0. 1. 0.]
 [0. 0. 0. 1.]
 [0. 0. 0. 0.]
 [0. 0. 0. 0.]
 [0. 0. 0. 0.]]
```

```
import numpy as np
print(np.eye(5,4,k=2).ndim)
```

```
2
```