

```
Out[43]: array([[ 1,  2],
                [ 3,  4],
                [ 5,  6],
                [ 7,  8],
                [ 9, 10],
                [11, 12]])
```

```
In [44]: np.arange(1,13).reshape(5,5)
```

```
-----
ValueError                                Traceback (most recent call last)
Cell In[44], line 1
----> 1 np.arange(1,13).reshape(5,5)

ValueError: cannot reshape array of size 12 into shape (5,5)
```

## 12 August 2025

```
In [46]: mat = np.arange(0,100).reshape(10,10)
```

```
In [47]: mat
```

```
Out[47]: 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, 64, 65, 66, 67, 68, 69],
                [70, 71, 72, 73, 74, 75, 76, 77, 78, 79],
                [80, 81, 82, 83, 84, 85, 86, 87, 88, 89],
                [90, 91, 92, 93, 94, 95, 96, 97, 98, 99]])
```

```
In [49]: row = 4
        col = 5
```

```
In [50]: col
```

```
Out[50]: 5
```

```
In [51]: row
```

```
Out[51]: 4
```

```
In [52]: mat
```

```
Out[52]: 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, 64, 65, 66, 67, 68, 69],
                [70, 71, 72, 73, 74, 75, 76, 77, 78, 79],
                [80, 81, 82, 83, 84, 85, 86, 87, 88, 89],
                [90, 91, 92, 93, 94, 95, 96, 97, 98, 99]])
```

```
In [101... print(mat[row,col])
```

```
45
```

```
In [54]: mat[4,5]
```

```
Out[54]: np.int64(45)
```

```
In [55]: mat[:,]
```

```
Out[55]: 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, 64, 65, 66, 67, 68, 69],
                [70, 71, 72, 73, 74, 75, 76, 77, 78, 79],
                [80, 81, 82, 83, 84, 85, 86, 87, 88, 89],
                [90, 91, 92, 93, 94, 95, 96, 97, 98, 99]])
```

```
In [56]: mat[7]
```

```
Out[56]: array([70, 71, 72, 73, 74, 75, 76, 77, 78, 79])
```

```
In [57]: mat
```

```
Out[57]: 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, 64, 65, 66, 67, 68, 69],
                [70, 71, 72, 73, 74, 75, 76, 77, 78, 79],
                [80, 81, 82, 83, 84, 85, 86, 87, 88, 89],
                [90, 91, 92, 93, 94, 95, 96, 97, 98, 99]])
```

```
In [58]: mat[:,col]
```

```
Out[58]: array([ 5, 15, 25, 35, 45, 55, 65, 75, 85, 95])
```

```
In [59]: mat[col]
```

```
Out[59]: array([50, 51, 52, 53, 54, 55, 56, 57, 58, 59])
```

```
In [60]: mat[:, -1]
```

```
Out[60]: array([ 9, 19, 29, 39, 49, 59, 69, 79, 89, 99])
```

```
In [61]: row
```

```
Out[61]: 4
```

```
In [62]: mat[row,:]
```

```
Out[62]: array([40, 41, 42, 43, 44, 45, 46, 47, 48, 49])
```

```
In [69]: mat[row:,]
```

```
Out[69]: array([[40, 41, 42, 43, 44, 45, 46, 47, 48, 49],
               [50, 51, 52, 53, 54, 55, 56, 57, 58, 59],
               [60, 61, 62, 63, 64, 65, 66, 67, 68, 69],
               [70, 71, 72, 73, 74, 75, 76, 77, 78, 79],
               [80, 81, 82, 83, 84, 85, 86, 87, 88, 89],
               [90, 91, 92, 93, 94, 95, 96, 97, 98, 99]])
```

```
In [64]: mat[:,8]
```

```
Out[64]: array([ 8, 18, 28, 38, 48, 58, 68, 78, 88, 98])
```

```
In [70]: mat[:row]
```

```
Out[70]: 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]])
```

```
In [71]: mat[:, col]
```

```
Out[71]: array([ 5, 15, 25, 35, 45, 55, 65, 75, 85, 95])
```

```
In [72]: mat[:,col]
```

```
Out[72]: 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]])
```

```
In [74]: mat
```

```
Out[74]: 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, 64, 65, 66, 67, 68, 69],
               [70, 71, 72, 73, 74, 75, 76, 77, 78, 79],
               [80, 81, 82, 83, 84, 85, 86, 87, 88, 89],
               [90, 91, 92, 93, 94, 95, 96, 97, 98, 99]])
```

```
In [73]: mat[2:6,2:4]
```

```
Out[73]: array([[22, 23],
               [32, 33],
               [42, 43],
               [52, 53]])
```

```
In [75]: mat[1:2,2:4]
```

```
Out[75]: array([[12, 13]])
```

```
In [76]: mat[2:4,3:5]
```

```
Out[76]: array([[23, 24],
               [33, 34]])
```

# Masking

```
In [77]: mat
```

```
Out[77]: 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, 64, 65, 66, 67, 68, 69],
               [70, 71, 72, 73, 74, 75, 76, 77, 78, 79],
               [80, 81, 82, 83, 84, 85, 86, 87, 88, 89],
               [90, 91, 92, 93, 94, 95, 96, 97, 98, 99]])
```

```
In [78]: mat < 50
```

```
Out[78]: array([[ True,  True,  True,  True,  True,  True,  True,  True,  True,
                  True],
               [ True,  True,  True,  True,  True,  True,  True,  True,  True,
                  True],
               [ True,  True,  True,  True,  True,  True,  True,  True,  True,
                  True],
               [ True,  True,  True,  True,  True,  True,  True,  True,  True,
                  True],
               [ True,  True,  True,  True,  True,  True,  True,  True,  True,
                  True],
               [False, False, False, False, False, False, False, False, False,
                  False],
               [False, False, False, False, False, False, False, False, False,
                  False],
               [False, False, False, False, False, False, False, False, False,
                  False],
               [False, False, False, False, False, False, False, False, False,
                  False],
               [False, False, False, False, False, False, False, False, False,
                  False],
               [False, False, False, False, False, False, False, False, False,
                  False]])
```

```
mat [mat <= 50] # filter
```

```
In [120... mat [mat ]
```

```
-----
IndexError                                Traceback (most recent call last)
Cell In[120], line 1
----> 1 mat [mat]

IndexError: index 10 is out of bounds for axis 0 with size 10
```

```
In [85]: mat [mat!= 50]
```

```
Out[85]: 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, 51,
                52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68,
                69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85,
                86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99])
```

```
In [86]: mat [mat > 50]
```

```
Out[86]: array([51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67,
                68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84,
                85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99])
```

```
In [ ]:
```

## Matplotlib

```
In [1]: import matplotlib
```

```
In [2]: import matplotlib.pyplot as plt
```

```
In [3]: from PIL import Image
```

```
In [8]: rcb = Image.open(r"C:\Users\DELL\Downloads\RCB-IPL-2025-Champions.webp")
```

```
In [9]: rcb
```

```
Out[9]:
```



```
In [11]: type(rcb)
```

```
Out[11]: PIL.WebImagePlugin.WebImageFile
```

```
In [ ]:
```