

```
def sign(x):
```

```
    if x > 0:
```

```
        return 'positive'
```

```
    elif x < 0:
```

```
        return 'negative'
```

```
    else:
```

```
        return 'zero'
```

```
for x in [-1, 0, 1]:
```

```
    print(sign(x))
```

function call print,

Output:

negative

zero

positive

Numpy

- ⇒ Numpy କୁହାଯାଏ Python-ର ଏକ library
- ⇒ Large, Multi-dimensional array-like matrix କୁ ଏହା ସହଜରେ ବ୍ୟବହାର କରାଯାଏ।
- ⇒ Numpy GPU use କରାଯାଇ ବିଭିନ୍ନ ବଡ଼ ବଡ଼ matrix-ର calculation ସ୍ଥିତ କରାଯାଇପାରେ।
- ⇒ Numpy array କୁ ସାଧାରଣ list-ର Convert କରାଯାଇପାରେ, ଆଉ ଏହାକୁ array-ର Convert କରିହେବ।

Code → 30

```
import numpy as np
a = np.array([1, 2, 3])
Print (type(a)) // ଏହା ସମ୍ପର୍କରେ array type କଣ ଦିଅନ୍ତେ
Print (a.shape) // shape ; array-ର dimension return
Print (a[0], a[1], a[2]) // array-ର element ସମ୍ବନ୍ଧ
// index ଆଧାରରେ access କରି
a[0] = 5 // 0-ତମ index-ର value କୁ override
// କରି
```

Output

```
<class 'numpy.ndarray'>
(3,)
1 2 3
[5 2 3]
```


Code → 31

যদি আমরা একটা লিস্ট
convert করতে

হবে, তখন numpy array
ব্যবহার করে function ব্যবহার

```
import numpy as np
```

```
a = [1, 2, 3] // এটা লিস্ট
```

```
Print (type(a))
```

```
a = np.array(a) // এটা লিস্ট a থেকে numpy array  
তে convert করে দেবে।
```

```
Print (type(a))
```

```
a = list(a) // এটা লিস্ট a থেকে numpy array  
Print (type(a)) // এটা লিস্ট a থেকে convert  
হবে।
```

Output:

```
<class 'list'>  
<class 'numpy.ndarray'>  
<class 'list'>
```

Code → 32

আমরা একটা 2D array
বানাতে চাই।

```
import numpy as np
```

```
b = np.array([1, 2, 3], [4, 5, 6])
```

```
Print (b)
```

```
Print (b.shape)
```

Output :

```
[[1 2 3], [4 5 6]]
```

(2,3) 1 row 2 row 3 column array
 row column

Code → 33

Element index - numpy array
 Element index - numpy array

```
import numpy as np
```

```
b = np.array([1, 2, 3], [4, 5, 6])
```

```
print(b[0, 0], b[0, 1], b[1, 0])
```

Output :

```
1 2 4
```

Code → 34

```
import numpy as np
```

```
e = np.random.random((2, 2))
```

```
print(e)
```

Output :

```
[[ 0.939 0.7377]
```

```
[ 0.22 0.7954]]
```


`random.random ((m,n))`

`m` is number row

`n` is number column

একটি random array generate করে দিবে

Code → 35

`import numpy as np`

`a = np.array([[1,2,3,4], [5,6,7,8], [9,10,11,12]])`

`(row - row = a[1:3, :])`

এখানে আমরা বলছি array slicing

সিমা (row - row)

	0	1	2	3
0	1	2	3	4
1	5	6	7	8
2	9	10	11	12

`a[1:3, :]`

↓

1 নং row থেকে

২ নং row পর্যন্ত

সব column

পিক করা হবে

৩ -এ আস

একটি কিছু

সব row 1 করে

a এর indexed

show করবে

Output:

```
[ [5 6 7 8] [9 10 11 12]]
```

Code → 36

```
import numpy as np
a = np.array([ [1, 2, 3, 4], [5, 6, 7, 8], [9, 10, 11, 12] ])
row_no2 = a[1:3, 2:]
print(row_no2)
```

	0	1	2	3
0	1	2	3	4
1	5	6	7	8
2	9	10	11	12

a[1:3, 2:]

→ 1 -> 2nd row
→ 2 -> 3rd row

→ 2nd column, 3rd column

→ element value (11, 12)

Output :

```
[ [7 8]
  [11 12]]
```


Code → 31

```
import numpy as np
a = np.array([[1, 2, 3, 4], [5, 6, 7, 8], [9, 10, 11, 12]])
row = a[1:3, 1:3]
Print (row)
```

	0	1	2	3
0	1	2	3	4
1	5	6	7	8
2	9	10	11	12
3				

a[1:3, 1:3]

→ 1 থেকে
row গুলো
৩

১ থেকে
column
৩

১ থেকে শুরু করে
৩-৬৬ আগ পর্যন্ত column
৩ থেকে আগ পর্যন্ত

Output:

[[6 7]

[10 11]]

Code → 38

Numpy Array boolean

expression

```

import numpy as np
a = np.array([1, 2], [3, 4], [5, 6])
bool_idx = (a > 2)
Print(bool_idx)

```

Output:

```

[[False True]
 [ True True]
 [ True True]]

```

// 2 ଥର 4 ଥର
true value
କେ index ସ୍ଥାନରେ
false value

Code → 39

```

import numpy as np
a = np.array([1, 2, 3, 4], [5, 6, 7, 8], [9, 10, 11, 12])
Print(a[a > 2])

```

Output:

```

[3 4 5 6 7 8 9 10 11 12]

```

// 2 ଥର 4 ଥର value ସ୍ଥାନରେ return କରୁଛି

Code → 40

import numpy as np

a = np.array([1, 2, 3, 4], [5, 6, 7, 8], [9, 10, 11, 12])

Print (a*2)

Output :

[[2 4 6 8]

[10 12 14 16]

[18 20 22 24]]

এখানে $a \times 2$ আর্গে array-এর প্রতি element-এর সাথে 2 যোগ করা হয়েছে।