⌄ File

```python
f = open('sample.txt','w')
f.write('Hello Python\n')
f.write('This is a text\n')
f.write('Hello\n')
f.write('World\n')
f.close()
```

```python
f = open('input.txt','r')
print(f.read())
f.close()
```

```python
f = open('input.txt','r')
print(f.readline())
print(f.readline())
print(f.readline())
f.close()
```

```python
f = open('input.txt','r')
print(f.readline(),end='')
print(f.readline(),end='')
print(f.readline(),end='')
f.close()
```

```python
f = open('input.txt','r')
print(f.readlines(),end='')
file_content = f.readlines()
f.close()
```

```python
for i in file_content:
    print(i.strip())
```

```python
for i in file_content:
    print(i.strip(),end=' ')
```

```python
f = open('sample.txt','a')
f.write('Hello Python\n')
f.close()
```

```python
f = open('sample.txt','w')
f.write('Fahim 30\n')
f.write('Ali 25\n')
f.write('Talha 35\n')
f.close()


f = open('sample.txt','r')
A = f.readlines()
f.close()
d = {}
for i in A:
    a = i.strip()
    b = a.split()
    for j in range(len(b)-1):
        d[b[j]] = b[j+1]
print(d)

'''Other Way'''

f = open('sample.txt','w')
f.write('Fahim 30\n')
f.write('Ali 25\n')
f.write('Talha 35\n')
f.close()


f = open('sample.txt','r')
A = f.readlines()
f.close()
d = {}
l =[]

for i in A:
    a = i.strip()
    b = a.split()
    l.append(b)
for i in l:
    for j in i:
        key = i[0]
        value = i[1]
        d[key] = int(value)
print(d)

'''complete  korte hobe'''

f = open('sample.txt','w')
f.write('Fahim 30\n')
f.write('Ali 25\n')
f.write('Talha 35\n')
f.close()


f = open('sample.txt','r')
A = f.readlines()
f.close()

d = {}
for line in A:
    name,age = line.split()
    d[name] = age
print(d)
```

```
{'Fahim': '30', 'Ali': '25', 'Talha': '35'}
```

NumPy array

```python
import numpy as np

arr = np.array([1,2,3,4,5])
print(arr)
print(type(arr))
print(arr.ndim)
```

```
[1 2 3 4 5]
<class 'numpy.ndarray'>
1
```

2D array

```
arr = np.array([[1,2,3],[4,5,6]])
print(arr)
print(type(arr))
print(arr.ndim)
```

```
    [[1 2 3]
     [4 5 6]]
    <class 'numpy.ndarray'>
    2
```

```
arr = np.array([[1,2],[4,5,6]])
print(arr)
print(type(arr))
print(arr.ndim)
```

Indexing

```
arr = np.array([1,2,3,4,5])
print(arr[0])
print(arr[2]+arr[3])
```

```
    1
    7
```

2D indexing

```
arr = np.array([[1,2,3,4,5],[6,7,8,9,10]])
print('2nd element on 1st row: ', arr[0,1])
print('Last element from 2nd dim: ',arr[1,-1])
```

```
    2nd element on 1st row:  2
    Last element from 2nd dim:  10
```

Slicing

```
arr = np.array([1,2,3,4,5,6,7])
print(arr[1:5])
print(arr[:4])
print(arr[4:])
print(arr[1:5:2])
print(arr[::2])
```

```
    [2 3 4 5]
    [1 2 3 4]
    [5 6 7]
    [2 4]
    [1 3 5 7]
```

2D slicing

```
arr = np.array([[1,2,3,4,5],[6,7,8,9,10]])
print(arr[1,1:4])
print(arr[0:2,2])
```

```
    [7 8 9]
    [3 8]
```

method

```
grades = np.array([[87,96,70],[100,87,90],[94,77,90],[100,81,82]])
print(grades.sum())
print(grades.sum(axis=0))
print(grades.sum(axis=1))
```

```
1054
[381 341 332]
[253 277 261 263]
```

min and max return

```python
arr = np.array([1,2,3,4,5,6,7])
print(arr.min())
print(arr.max())
```

min and max index return

```python
arr = np.array([1,2,3,4,5,6,7])
print(arr.argmin())
print(arr.argmax())
```

```
0
6
```

attribute

```python
arr = np.array([[1,2,3,4,5],[6,7,8,9,10]])
print(arr.shape)
```

```
(2, 5)
```

```python
arr = np.array([[1,2,3,4,5],[6,7,8,9,10]], dtype = np.float64)
print(arr.dtype)
```

```
float64
```

```python
arr = np.array([[1,2,3,4,5],[6,7,8,9,10]])
print(arr.shape)
print(arr.size)
```

```
(2, 5)
10
```

```python
arr = np.arange(1,10)
reshaped_arr = arr.reshape(3,3)
```