

Ans: to the q. No: 1

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Numpy is a powerful numerical computing library for python. It provides multidimensional array object, ~~array~~ along with a variety of function.

Performance: Numpy array are implemented in c, which make them much faster for numerical compared to python list.

Memory efficiency: Numpy array take up less memory compared to list

Convenience: Numpy provides a wide range of build-function and operation that are specifically

design for numpy. If your focus is on numerical computation and working with large dataset, Numpy is generally the better choice.

Ans: to the q: No: 2

My id is = 212-15-4145

friend id = 212-15-4154

import numpy as np

~~matrix = np.array([[2, 1, 2, 1, 5, 4, 5],
[2, 1, 2, 1, 5, 4,~~

matrix = np.array([[2, 1, 2, 1, 5, 4, 1, 4, 5],
[2, 1, 2, 1, 5, 4, 1, 5, 4]])

```
reshaped_matrix = matrix.reshape((4,5))  
print("Reshaped Matrix:")  
print(reshaped_matrix)  
  
diagonal_sum = np.trace(reshaped_matrix)  
print("Sum", diagonal_sum)
```

output:

```
[[ 2 12 14]  
 [ 1 4 5 21]  
 [ 5 4 1 52]  
 [ 1 2 1 45]]
```

Sum: 12

Ans. to freq: No: 3

```
import numpy as np
```

```
original_array = np.array([[1, 1, 1],  
                             [1, 2, 1],  
                             [1, 1, 1]])
```

```
modified_array = original_array.copy()
```

```
condition = modified_array == 2
```

```
modified_array[np.logical_not(condition)] = 0
```

```
padded_array = np.pad(modified_array,
```

```
                        pad_width=1, mode='constant',
```

```
                        constant-value=1)
```

```
print("Original Array:")
```

```
print(original_array)
```

```
print("modified Array")
```

```
print(modified-array)
```

```
print(padded-array)
```

Output:

original array:

$\begin{bmatrix} 1 & 2 & 1 \end{bmatrix}$

$\begin{bmatrix} 2 & 2 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 1 & 1 \end{bmatrix}$

Modified Array:

$\begin{bmatrix} 1 & 1 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 1 & 1 \end{bmatrix}$

padded Array:

$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 1 & 0 & 1 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 \end{bmatrix}$