nonly Used NumPy Commands, Operations, Methods, and Attributes in Data Sc

1. Importing NumPy

```python
import numpy as np
```

This is the standard convention for importing NumPy.

2. Creating Arrays

```python
# Creating a 1D array
arr = np.array([1, 2, 3])

# Creating a 2D array
arr = np.array([[1, 2], [3, 4]])

# Creating an array of zeros
arr = np.zeros((2, 2))

# Creating an array of ones
arr = np.ones((3, 3))

# Creating an array with a range of values
arr = np.arange(0, 10, 2)

# Creating an array with evenly spaced values
arr = np.linspace(0, 1, 5)
```

3. Array Attributes

```python
# Get the shape of the array
shape = arr.shape

# Get the number of dimensions
ndim = arr.ndim

# Get the size (number of elements)
size = arr.size

# Get the data type
dtype = arr.dtype
```

4. Array Manipulation

```python
# Reshaping an array
arr = np.array([1, 2, 3, 4, 5, 6])
reshaped = arr.reshape((2, 3))

# Flattening an array
flattened = arr.flatten()

# Transposing a 2D array
transposed = arr.T
```

```
# Stacking arrays vertically

vstacked = np.vstack((arr1, arr2))


# Stacking arrays horizontally

hstacked = np.hstack((arr1, arr2))
```

5. Mathematical Operations

```python
# Element-wise addition

result = arr1 + arr2


# Element-wise subtraction

result = arr1 - arr2


# Element-wise multiplication

result = arr1 * arr2


# Element-wise division

result = arr1 / arr2


# Dot product

dot_product = np.dot(arr1, arr2)
```

6. Statistical Methods

```python
```

```
# Minimum and maximum
min_val = arr.min()
max_val = arr.max()

# Sum and product of elements
sum_val = arr.sum()
prod_val = arr.prod()

# Mean, median, and standard deviation
mean_val = arr.mean()
median_val = np.median(arr)
std_val = arr.std()

# Finding unique elements
unique_vals = np.unique(arr)
```

7. Indexing and Slicing

```python
# Accessing a single element
element = arr[0]

# Slicing an array
slice = arr[1:3]

# Boolean indexing
arr = np.array([1, 2, 3, 4, 5])
```

```
bool_idx = arr[arr > 3]

# Fancy indexing
arr = np.array([1, 2, 3, 4, 5])
fancy_idx = arr[[0, 2, 4]]
```

8. Broadcasting

```python
# Broadcasting an operation
arr1 = np.array([1, 2, 3])
arr2 = np.array([[1], [2], [3]])
result = arr1 + arr2  # Broadcasting addition
```

9. Random Numbers

```python
# Generating random numbers
rand_arr = np.random.rand(3, 3)

# Generating random integers
rand_ints = np.random.randint(0, 10, (3, 3))

# Setting a seed for reproducibility
np.random.seed(42)
```

10. Linear Algebra

```python
# Matrix multiplication
matmul = np.matmul(arr1, arr2)

# Inverse of a matrix
inv = np.linalg.inv(matrix)

# Determinant of a matrix
det = np.linalg.det(matrix)

# Eigenvalues and eigenvectors
eigvals, eigvecs = np.linalg.eig(matrix)
```

11. Saving and Loading Data

```python
# Saving an array to a file
np.save('array.npy', arr)

# Loading an array from a file
arr = np.load('array.npy')

# Saving to a text file
np.savetxt('array.txt', arr)

# Loading from a text file
arr = np.loadtxt('array.txt')
```

```
```