20 Popular NumPy Programs in Data Science

1. Create a NumPy array

```
import numpy as np
arr = np.array([1, 2, 3, 4, 5])
print(arr)
```

Output:

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

2. Zeros and Ones

```
a = np.zeros((3,3))
b = np.ones((2,4))
print(a)
print(b)
```

Output:

```
[[0. 0. 0.]
 [0. 0. 0.]
 [0. 0. 0.]]

[[1. 1. 1. 1.]
 [1. 1. 1. 1.]]
```

3. Random Numbers

```
rand_arr = np.random.rand(3,3)
print(rand_arr)
```

Output:

```
Random values between 0 and 1 (changes every run)
Example:
[[0.91 0.32 0.40]
 [0.38 0.12 0.75]
 [0.58 0.64 0.49]]
```

4. Reshape

```
arr = np.arange(12).reshape(3,4)
print(arr)
```

Output:

```
[[ 0  1  2  3]
 [ 4  5  6  7]
 [ 8  9 10 11]]
```

5. Array Slicing

```
arr = np.array([10,20,30,40,50])
print(arr[1:4])
```

Output:

```
[20 30 40]
```

6. Mathematical Operations

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

Output:

```
[5 7 9]
[ 4 10 18]
```

7. Matrix Multiplication

```
a = np.array([[1,2],[3,4]])
b = np.array([[5,6],[7,8]])
print(np.dot(a,b))
```

Output:

```
[[19 22]
 [43 50]]
```

8. Transpose

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

Output:

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

9. Mean, Median, Std

```
data = np.array([10,20,30,40,50])
print(np.mean(data))
print(np.median(data))
print(np.std(data))
```

Output:

```
30.0
30.0
14.142135623730951
```

10. Sorting

```
arr = np.array([5,2,8,1,9])
print(np.sort(arr))
```

Output:

```
[1 2 5 8 9]
```

11. Concatenate

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

Output:

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

12. Unique Elements

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

Output:

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

13. Linspace

```
arr = np.linspace(0,1,5)
print(arr)
```

Output:

```
[0.   0.25 0.5  0.75 1.  ]
```

14. Identity Matrix

```
print(np.eye(4))
```

Output:

```
[[1. 0. 0. 0.]
 [0. 1. 0. 0.]
 [0. 0. 1. 0.]
 [0. 0. 0. 1.]]
```

15. Argmax and Argmin

```
arr = np.array([10,50,20,5])
print(np.argmax(arr))
print(np.argmin(arr))
```

Output:

```
1
3
```

16. Where Condition

```
arr = np.array([10,20,30,40])
print(np.where(arr>25))
```

Output:

```
(array([2, 3]),)
```

17. Cumulative Sum

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

Output:

```
[ 1  3  6 10]
```

18. Random Integers

```
rand_ints = np.random.randint(1,100,10)
print(rand_ints)
```

Output:

```
10 random integers between 1 and 100
Example: [45 78 12 99  5 64 37 28 88  9]
```

19. Correlation Coefficient

```
x = np.array([1,2,3,4,5])
y = np.array([2,4,6,8,10])
print(np.corrcoef(x,y))
```

Output:

```
[[1. 1.]
 [1. 1.]]
```

20. Save and Load NumPy Array

```
arr = np.array([1,2,3,4,5])
np.save('my_array.npy', arr)
loaded = np.load('my_array.npy')
print(loaded)
```

Output:

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