Capsule 3

Q1) Write a Python program to initialize a 3x3 NumPy array with any integer values of your choice. Then, perform the following operations: Multiply the entire array by 2. Add 5 to each element of the array. Calculate the square of each element in the array. Print the original array and the results of each operation.

```python
import numpy as np

arr=np.array([[1,2,3],[4,5,6],[7,8,9]])
arr1=arr*2
arr2=arr+5
arr3=arr**2
print("original array:\n", arr,"\n")
print("arr*2:\n ",arr1,"\n")
print("arr+5:\n ",arr2,"\n")
print("arr**2:\n ",arr3,"\n")
```

```
original array:
 [[1 2 3]
 [4 5 6]
 [7 8 9]]

arr*2:
  [[ 2  4  6]
 [ 8 10 12]
 [14 16 18]]

arr+5:
  [[ 6  7  8]
 [ 9 10 11]
 [12 13 14]]

arr**2:
  [[ 1  4  9]
 [16 25 36]
 [49 64 81]]
```

What can I help you build?

Q2) Write a Python program to initialize a 3x3 NumPy array with any integer values of your choice. Then, perform the following slicing operations: Extract the first row of the array. Extract the last column of the array. Extract a 2x2 sub-array from the center of the original array.

[29]

```python
import numpy as np

arr=np.array([[1,2,3],[4,5,6],[7,8,9]])

print("original array:\n", arr,"\n")
print(f"first row of the array:\n {arr[0,:]} \n")
print(f"last column of the array:\n {arr[:,2]} \n")
print(f"2*2 subarray from the center of the original array:\n {arr[:2,1:]} \n")
```

```
original array:
 [[1 2 3]
 [4 5 6]
 [7 8 9]]

first row of the array:
 [1 2 3]

last column of the array:
 [3 6 9]

2*2 subarray from the center of the original array:
 [[2 3]
 [5 6]]
```

Q3) Write a program to create a DataFrame in Python to store the names and marks of 10 students. Each row of the DataFrame should represent a student, with columns as 'Name' and 'Marks'. Populate the DataFrame with appropriate data and then print it.

```
import pandas as pd

data={
   ' Name': ['priya','niraj','Niyati','Nisha','kunj','tanvi','diya','hridya','keeru','fayzaa'],
   'Marks': [97,56,98,100,45,67,69,36,40,98]
   }
df=pd.DataFrame( data)
print(df)
```

```
      Name  Marks
0    priya     97
1    niraj     56
2   Niyati     98
3    Nisha    100
4     kunj     45
5    tanvi     67
6     diya     69
7   hridya     36
8    keeru     40
9   fayzaa     98
```

Q4) Write a python program to create a DataFrame representing the names and income of 5 employees. The DataFrame should include columns ' Employee_name' and 'Income', and each row should correspond to an individual employee. Use the indices 'a', 'b', 'c', 'd', and 'e' for the DataFrame entries to uniquely identify each employee.

[33]

```
import pandas as pd

data={
    "Employee_Name": ['samji','dinesh','divy','niyati','nisha'],
    "income":[10000,30000,60000,40000,20000]
}
df=pd.DataFrame(data,index=['a','b','c','d','e'])
print(df)
```

```
  Employee_Name  income
a         samji   10000
b        dinesh   30000
c          divy   60000
d        niyati   40000
e         nisha   20000
```

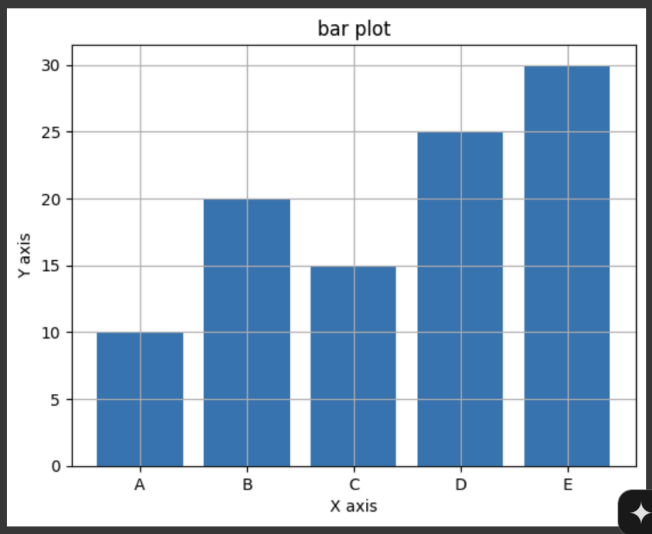
Q5) Imagine you're tasked with visualizing data using Python. You have the following dataset representing the frequency of occurrences for categories A, B, C, D, and E, stored in two lists: x = ['A', 'B', 'C', 'D', 'E'] y = [10, 20, 15, 25, 30] Write a Python script that creates a bar plot to visualize this data. The categories A, B, C, D, and E should be displayed on the x-axis, while the corresponding frequencies should be displayed on the y-axis.

+ Code + Text

[36]
```
import matplotlib.pyplot as plt

x=['A', 'B', 'C', 'D', 'E']
y= [10, 20, 15, 25, 30]

plt.bar(x,y)
plt.xlabel("X axis")
plt.ylabel("Y axis")
plt.title("bar plot")
plt.grid()
plt.show()
```



What can I help you build?