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numpy question and solution

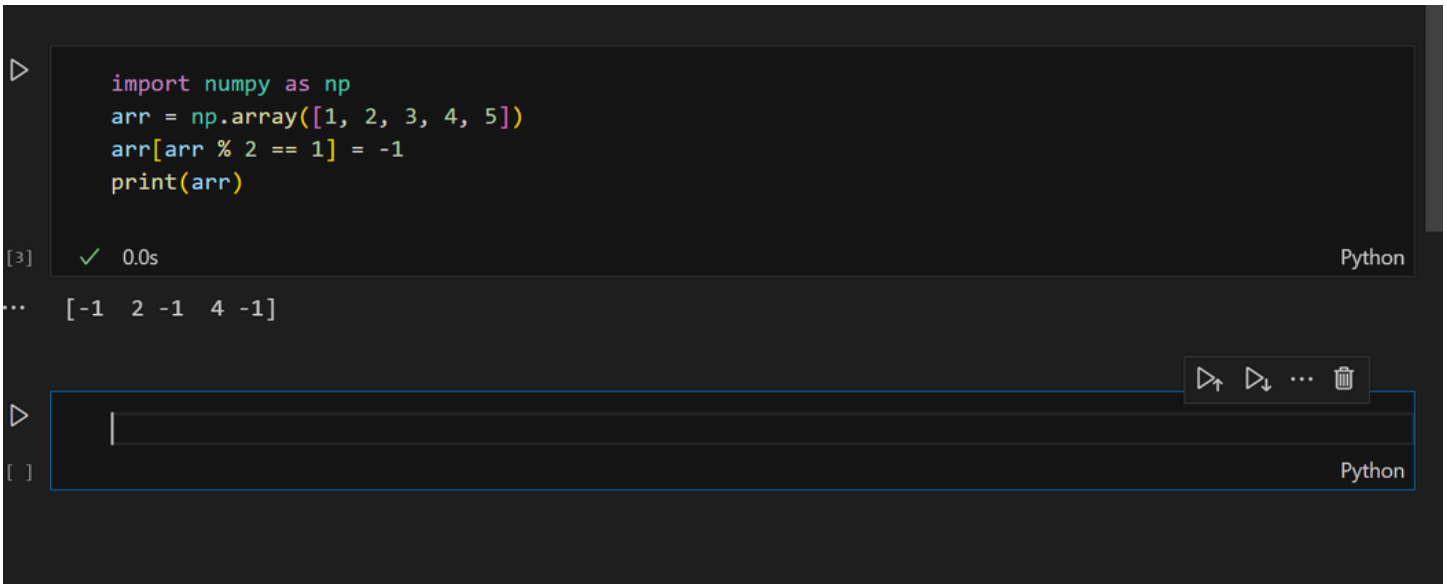
1. Create a 3x3 matrix with values ranging from 0 to 8.

```
Generate  + Code  + Markdown

import numpy as np
arr = np.arange(9).reshape(3, 3)
print(arr)

[1]  ✓ 2.9s

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

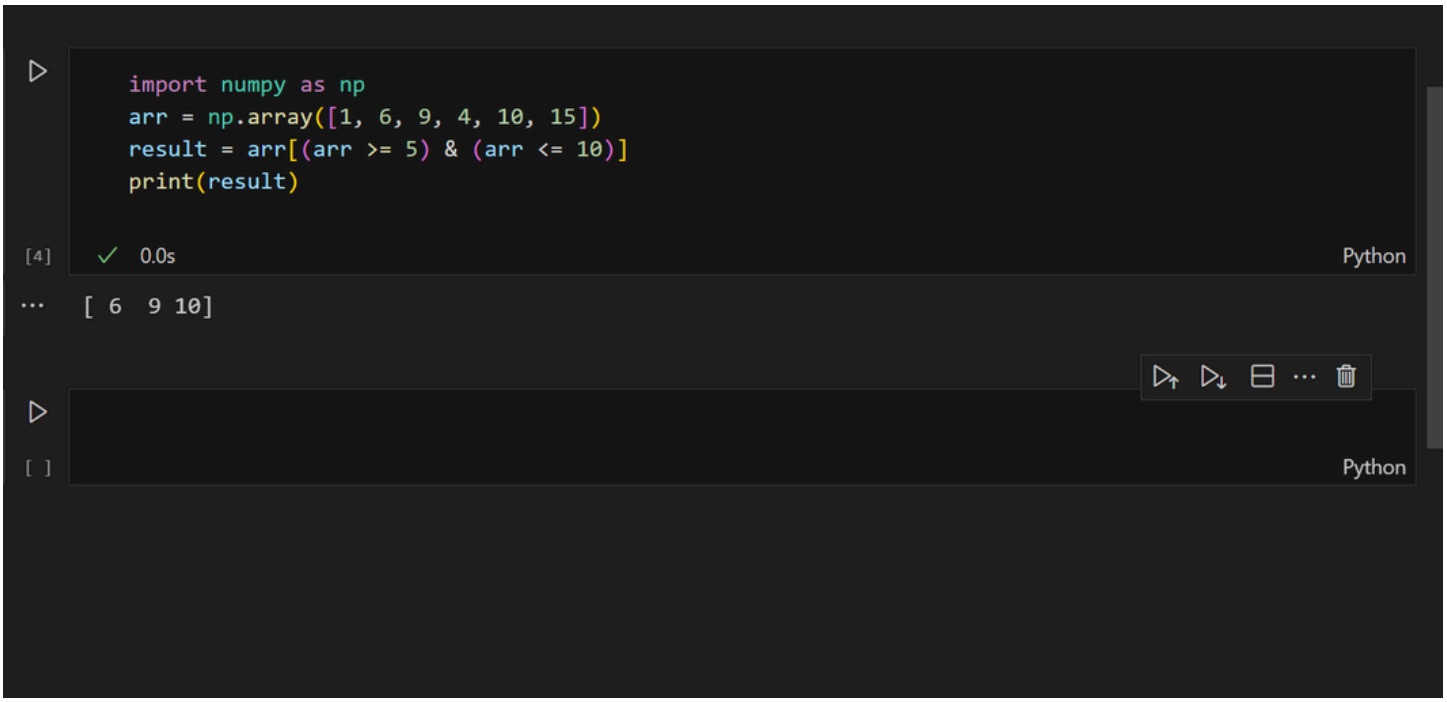
2. **How to find the positions of all even numbers in an array?**

```
import numpy as np
arr = np.array([1, 2, 3, 4, 5, 6])
positions = np.where(arr % 2 == 0)
print(positions)

✓ 0.0s

(array([1, 3, 5]),)
```

3. Replace all odd numbers in an array with -1.



4. Extract all elements between 5 and 10 from an array.



5. **How do you split a NumPy array into 3 equal parts?**

```
import numpy as np
arr = np.arange(9)
split_arr = np.split(arr, 3)
print(split_arr)
```

✓ 0.0s Python

```
[array([0, 1, 2]), array([3, 4, 5]), array([6, 7, 8])]
```

6. Find the common elements between two arrays.

```
import numpy as np
a = np.array([1,2,3,4,5])
b = np.array([4,5,6,7,8])
common = np.intersect1d(a, b)
print(common)
```

✓ 0.0s

```
[4 5]
```

7. How to find the difference between two arrays (elements in one but not the other)?

```python
import numpy as np
a = np.array([1,2,3,4,5])
b = np.array([4,5,6,7,8])
diff = np.setdiff1d(a, b)
print(diff)
```

[8] ✓ 0.0s Python

```
[1 2 3]
```

8. How to get the indices of non-zero elements in an array?

```python
import numpy as np
arr = np.array([0, 3, 0, 7, 0, 5])
indices = np.nonzero(arr)
print(indices)
```

✓ 0.0s Python

```
(array([1, 3, 5]),)
```

9. How do you sort a 2D array by the second column?

```python
import numpy as np
arr = np.array([[1, 2], [3, 1], [5, 0]])
sorted_arr = arr[arr[:,1].argsort()]
print(sorted_arr)
```

[10] ✓ 0.0s Python

```
[[5 0]
 [3 1]
 [1 2]]
```

10. Create a 5x5 matrix with row values ranging from 0 to 4.

```python
import numpy as np
arr = np.tile(np.arange(5), (5,1))
print(arr)
```

[11] ✓ 0.0s Python

```
[[0 1 2 3 4]
 [0 1 2 3 4]
 [0 1 2 3 4]
 [0 1 2 3 4]
 [0 1 2 3 4]]
```

Pandas Questions + Solutions

1. How do you create a DataFrame from a dictionary of lists?

```python
import pandas as pd
data = {'Name': ['Tom', 'Jerry'], 'Age': [20, 22]}
df = pd.DataFrame(data)
print(df)
```

✓ 0.0s Python

```
    Name  Age
0    Tom   20
1  Jerry   22
```

2. How to select rows where column "Age" is greater than 25?

```python
import pandas as pd
data = {'Name': ['Tom', 'Jerry'], 'Age': [20, 22]}
df = pd.DataFrame(data)
print(df)
```

✓ 0.0s Python

```
    Name  Age
0    Tom   20
1  Jerry   22
```

3. How to check if a column contains any missing values?

```python
import pandas as pd
df = pd.DataFrame({'A': [1, None, 3]})
print(df['A'].isnull().any())
```

✓ 0.0s Python

```
True
```

4. Fill missing values with the column mean.

```python
import pandas as pd
df = pd.DataFrame({'A': [1, None, 3]})
df['A'].fillna(df['A'].mean(), inplace=True)
print(df)
```

✓ 0.0s Python

```
     A
0  1.0
1  2.0
2  3.0
```

5. Create a new column which is 2 times the old column 'A'.

```python
import pandas as pd
df = pd.DataFrame({'A': [1,2,3]})
df['B'] = df['A'] * 2
print(df)
```

✓ 0.0s Python

```
   A  B
0  1  2
1  2  4
2  3  6
```

6. How to rename columns of a DataFrame?

```python
import pandas as pd
df = pd.DataFrame({'A': [1,2], 'B': [3,4]})
df.rename(columns={'A': 'Alpha', 'B': 'Beta'}, inplace=True)
print(df)
```

✓ 0.0s Python

```
   Alpha  Beta
0      1     3
1      2     4
```

7. Drop rows with any missing data.

```python
import pandas as pd
df = pd.DataFrame({'A': [1, None], 'B': [2, 3]})
df.dropna(inplace=True)
print(df)
```

✓ 0.0s Python

```
     A  B
0  1.0  2
```

8. How do you group a DataFrame by column 'Gender' and calculate sum?

```python
import pandas as pd
df = pd.DataFrame({'Gender': ['Male', 'Female', 'Male'], 'Score': [90, 95, 85]})
grouped = df.groupby('Gender').sum()
print(grouped)
```

✓ 0.0s Python

```
        Score
Gender
Female     95
Male      175
```

9. Merge two DataFrames on a common column 'ID'.

```python
import pandas as pd
df1 = pd.DataFrame({'ID': [1,2], 'Name': ['Tom', 'Jerry']})
df2 = pd.DataFrame({'ID': [1,2], 'Age': [20,22]})
merged_df = pd.merge(df1, df2, on='ID')
print(merged_df)
```

✓ 0.0s Python

```
   ID   Name  Age
0   1    Tom   20
1   2  Jerry   22
```

10. Sort a DataFrame by multiple columns ('Age' ascending, then 'Name' descending).

```python
import pandas as pd
df = pd.DataFrame({'Name': ['Tom', 'Jerry', 'Spike'], 'Age': [30, 20, 30]})
sorted_df = df.sort_values(by=['Age', 'Name'], ascending=[True, False])
print(sorted_df)
```

✓ 0.0s Python

```
     Name  Age
1   Jerry   20
0     Tom   30
2   Spike   30
```

end