

Q1. Wise split

What will be the output of following code?

```
import numpy as np
arr = np.arange(16).reshape(4,4)
print(np.split(arr,4))
```

A.

Error

B.

```
[array([[ 0,  4,  8, 12]]),
 array([[ 1,  5,  9, 13]]),
 array([[ 2,  6, 10, 14]]),
 array([[ 3,  7, 11, 15]])]
```

C.

```
[array([[0, 1, 2, 3]]),
 array([[4, 5, 6, 7]]),
 array([[ 8,  9, 10, 11]]),
 array([[12, 13, 14, 15]])]
```

D.

```
[array([[1, 2, 3, 4]]),
 array([[5, 6, 7, 8]]),
 array([[ 9, 10, 11, 12]]),
 array([[13, 14, 15, 16]])]
```

Q2. Split second

Problem statement:

Given an 1D array and an integer k that specifies the number of equal parts to split the array into, Perform the following operations:

1. Split the array into k number of equal parts.
2. Return the list of split arrays.

Assumption: The array can be split into k equal parts

Note: Recall how to split an array into equal parts.

Input Format:

Line separated numpy array and split count

Output Format:

List of numpy arrays

Sample Input:

arr = [0,1,2,4,5,6,7,8]

k = 3

Sample Output:

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

Write your code in the following format:

```
import numpy as np

def split(arr, k):
    '''
    INPUT: arr, k

    OUTPUT: split_arr -> list of arrays
    '''

    ## Your Code goes here

    return split_arr
```

Q3. Split the difference

Which of the following code snippet will raise an error?

A.

```
arr = np.arange(10)
np.split(arr, 3)
```

B.

```
arr = np.arange(10)
np.split(arr, 5)
```

C.

```
arr = np.arange(10)
np.split(arr, [2,5])
```

D.

```
arr = np.arange(10)
np.split(arr, [5, 12])
```

Q4. Column split

Given an MxN 2D array ($M \geq 4$),

Split the array **column wise** such that,

1. 1st sub array contains the first 2 columns
2. 2nd sub array contains the 3rd column
3. 3rd sub array contains the rest of the columns

Input Format:

A 2D array

Output Format:

List of arrays

Sample Input:

```
[[0, 1, 2, 3],
 [4, 5, 6, 7],
 [8, 9, 10, 11],
 [12, 13, 14, 15],
 [16, 17, 18, 19],
 [20, 21, 22, 23]]
```

Sample Output:

```
[  
array([[ 0,  1],  
      [ 4,  5],  
      [ 8,  9],  
      [12, 13],  
      [16, 17],  
      [20, 21]]),  
array([[ 2],  
      [ 6],  
      [10],  
      [14],  
      [18],  
      [22]]),  
array([[ 3],  
      [ 7],  
      [11],  
      [15],  
      [19],  
      [23]])]
```

Output explanation:

- Here, the first sub-array contains the first two columns of the input array.
- Second sub-array contains the third column of the input array.
- Third sub-array contains the rest of the columns, i.e the fourth column of the input array.

Write your code in the following format:

```
import numpy as np  
  
def split(arr):  
    '''  
    INPUT: arr -> 2D array  
  
    OUTPUT: subarrays -> list of 2D arrays  
    '''  
  
    ### Your code goes here  
  
    return subarrays
```

Q5. Row vs column

Given a 2D array, which of the following will split the array row-wise?

- A. Hsplit()
- B. Vsplit()
- C. Hstack()
- D. Vstack()

Q6. Stack up

Which of the following is used to stack arrays column wise?

- A. Hsplit()
- B. Vsplit()
- C. Hstack()
- D. Vstack()

Q7. Inter dimension

Given a 3D array of shape (2, 3, 3)

```
array([[[ 0, 1, 2],
        [ 3, 4, 5],
        [ 6, 7, 8]],
       [[ 9, 10, 11],
        [12, 13, 14],
        [15, 16, 17]]])
```

What will be the output of `arr[1, :, :]`?

A.

```
array([[ 3, 4, 5],
       [12, 13, 14]])
```

B.

```
array([[ 9, 10, 11],
       [12, 13, 14],
       [15, 16, 17]])
```

C.

```
array([[ 1, 4, 7],
       [10, 13, 16]])
```

D.

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

Q8. Dark dimension

Given a 3D array of shape (2,2,2)

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

What will be the output of **arr[:, 0::,1]**?

A.

```
array([[2, 3],
       [6, 7]])
```

B.

```
array([[0, 1],
       [4, 5]])
```

C.

```
array([[0],
       [2]],
      [[4],
       [6]])
```

D.

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

Q9. Copy types

```
1 import numpy as np
2 arr = np.array([2, 4, 6, 8, 10])
3 c0 = arr
4 c0[0] = 12
5 arr = np.array([2, 4, 6, 8, 10])
6 c1 = arr.view()
7 arr[0] = 12
8 arr = np.array([2, 4, 6, 8, 10])
9 c2 = arr.copy()
10 arr[0] = 12
```

According to the above code snippet, which two options are correct?

- ☐ A. c1 represents shallow copy and c2 represents deep copy.
- ☐ B. c1 represents deep copy and c2 represents shallow copy.
- ☐ C. If arr and c1 are printed after line 4 and 7 respectively, they would have printed 12 as first element.
- ☐ D. If c1 and c2 are printed after line 7 and 10 respectively, they would print 12 as first element of array.

*There may be more than one correct answer to this question. Please select all which you feel correct.

Q10. Filter Copy

Which of the following will return a deep copy of array?

```
arr = np.array([1,2,3,0,-2,4])
```

- ☐ A. arr1 = arr*1
- ☐ B. arr1 = arr[:]
- ☐ C. arr1 = arr[arr > 0]
- ☐ D. arr1 = arr.reshape(2,3)

*There may be more than one correct answer to this question. Please select all which you feel correct.

Q11. Hstack

Given the following array:

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

Which options are **correct**?

- ☐ A. np.hstack((arr, arr[:, 0])).shape = (3, 4)
- ☐ B. np.hstack((arr, arr[:, [0]])).shape= (3, 4)
- ☐ C. np.hstack((arr, arr[:, [0]])).shape= (4, 3)
- ☐ D. np.hstack((arr,arr[:, 0])) => Throws Error

*There may be more than one correct answer to this question. Please select all which you feel correct.

Q12. Add padding

Given a NumPy array of shape (n,m). Add padding of a layer of 0's on all 4 boundaries of the matrix.

Input Format:

First line will be consisting of two space-separated integers representing n and m.
There will be n lines of input consisting of m space-separated integers representing the elements of rows of the array.

Output Format:

A 2d numpy array.

Sample Input:

```
3 2
1 2
3 4
5 6
```

Sample Output:

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

```
import numpy as np
def add_padding(mat):
    '''mat-> NumPy array
       output-> NumPy array is expected to be returned'''

    # YOUR CODE GOES HERE

    return res
```

Q13. Changing Dimension

Given two numpy arrays **A** and **B** such that **A.shape = (3,3,1)** and **B.shape = (3,3)**

- a) **A = A.squeeze(axis=2)**
- b) **B = np.expand_dims(B, axis=2)**

After executing the above lines of code, the **shape** of arrays A and B will be?

- ☒ A. A.shape=(3,3), B.shape=(3,3,1)
- ☐ B. A.shape=(3,1,3), B.shape=(3,1,3)
- ☐ C. A.shape=(3,3,1), B.shape=(3,3)
- ☐ D. None of these