Q1. Matrix elements

What will be the **outcome** of the following code snippet ?

```
x = np.ones((5,5))
x[1:-1,1:-1] = 0
```

A. All the elements except those at the border are equated to zero.
B. All the elements at the border are equated to zero.
C. All the elements in the first and last columns are equated to zero.
D. All the elements in the first and last rows are equated to zero.

Q2. Swapper

```
import numpy as np

A = np.arange(9).reshape(3,3)

print(A[[1,0,2], :])
```

What is the above code doing?

A. Swap row 1 and row 3 in the array A
B. Swap column 1 and column 3 in the array A
C. Swap row 1 and row 2 in the array A
D. Swap column 1 and Column 2 in the array A

Q3. Swappers

What would the following code do?

```
import numpy as np

A = np.arange(9).reshape(3,3)

print(A[:, ::-1])
```

A. Reverse the rows of a 2D array A
B. Reverse the columns of a 2D array A
C. Reverse both rows and columns of a 2D Array A
D. None of the above

Q4. Fancy indexing

```
import numpy as np

X = np.arange(12).reshape((3, 4))

row = np.array([0, 1, 2])

mask = np.array([1, 0, 1, 0], dtype=bool)

print(X[row[:, np.newaxis], mask])
```

What is the output of the above code?

A. `[[ 0 2] [ 4 6] [ 8 10]]`
B. `[[1 0 1 0] [5 4 5 4] [9 8 9 8]]`
C. `[[0 1 0 1] [4 5 4 5] [8 9 8 9]]`
D. `[[ 1 3] [ 5 7] [ 9 11]]`

Q5. Numpy on 2D

Suppose we run the following code:

```
import numpy as np

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

Now we have a 2-D array X that looks like:-

```
[[ 0 1 2 3]

 [ 4 5 6 7]

 [ 8 9 10 11]]
```

Which of the following is/are true statements?

A. `X.max(axis=1) => [ 3, 7, 11]`
B. `X.sum() => 11`
C. `X.T.max(axis=0) => [ 3, 7, 11]`
D. `[i.min() for i in X] => [0, 4, 8]`

There may be more than one correct answer. If so, please submit all those are correct.

Q6. Dot Dot Dash

Which of the following code will NOT throw an error?

A.

```
arr1 = np.array([1,2,3])
arr2 = np.array([9,8,7])
np.dot(arr1, arr2)
```

B.

```
arr1 = np.array([[1,2], [3,4]])
arr2 = np.array([[1], [2]])
np.dot(arr1, arr2)
```

C.

```
arr1 = np.array([1,2,3])
k = 3
np.dot(arr1, k)
```

D.

```
arr1 = np.array([[1,2], [3,4]])
arr2 = np.array([1,1])
np.dot(arr1, arr2)
```

There may be more than one correct answer. If so, please submit all those are correct.

Q7. mapping in numpy

Given the NumPy array arr, which of the following line of code will return the expected output?

```
import numpy as np
arr= np.array([[2,3,4,5],[1,7,3,5],[2,8,6,9],[11,23,12,19]])
```

Expected output:

```
array ([[4,6,8,10],
 [2,14,6,10],
 [4,16,12,18],
 [22,46,24,38]])
```

a.

```
arr1 = np.array([[2,2,2,2]])
def func(x, y):
    return x * y
vec = np.vectorize(func)
vec(arr,arr1)
```

b.

```
arr1 = np.array([[2],[2],[2],[2]])
def func(x, y):
    return x * y
vec = np.vectorize(func)
vec(arr, arr1)
```

c.

```
arr1 = 2
def func(x, y):
    return x * y
vec = np.vectorize(func)
vec(arr, arr1)
```

There may be more than one correct answer. If so, please submit all those are correct.

Q8. What will be printed?

Mark the options which are true about the outputs for code snippets a and b.

Code Snippet a:

```
import numpy as np
x = np.array([[200,200,200],[300,300,300],[400,400,400]])
v = np.array([200,300,400])
print((x / v[:,None])[1][1])
```

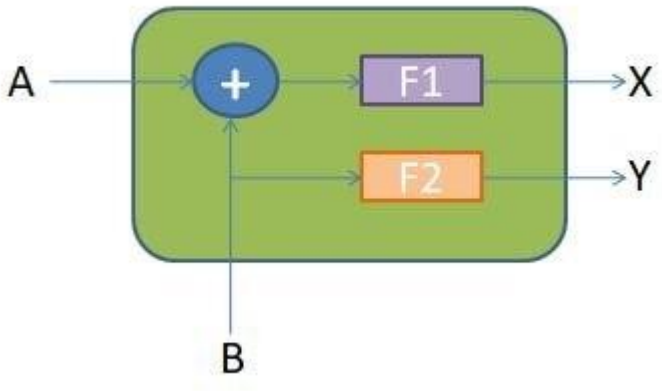
Code Snippet b:

```
import numpy as np
p = np.array([[0], [10], [20]])
q = np.array([10, 11, 12])
print((p + q)[1][1])
```

A. For 'a', the answer is 1.0
B. For 'a', the answer is 2.0
C. For 'b', the answer is 21
D. The code in 'b' will throw ValueError.

There may be more than one correct answer. If so, please submit all those are correct.

Q9. Output of architecture



Given the above architecture, where "+", "F1" and "F2" represent **element-wise** operations.

Suppose an array 'A' of shape (10,3,32) and array 'B' of shape (10,3,1) are given as input to the unit, what will be the shape of 'X' and 'Y'?

A. X.shape = (10,3,32)
B. X.shape = (10,3,1)
C. Y.shape= (10,3,1)
D. Y.shape = (10,3,32)

There may be more than one correct answer. If so, please submit all those are correct.