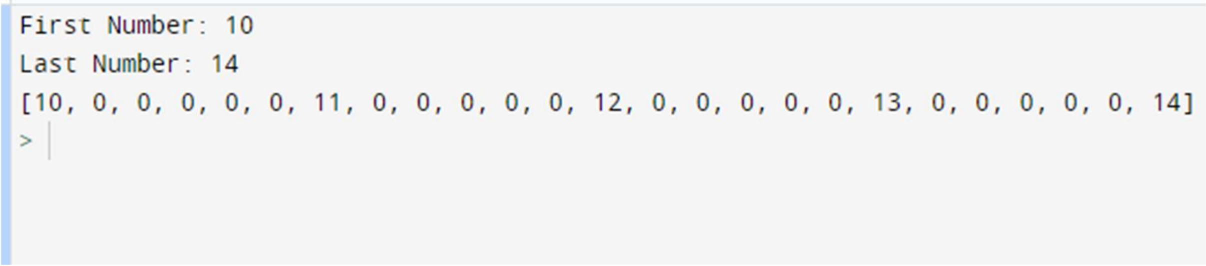
1. Consider the vector [10, 11, 12, 13, 14], how to build a new vector with 5 consecutive zeros interleaved between each value?

Code:

```
f = int(input("First Number: "))
l = int(input("Last Number: "))
inp=[]
for i in range(f,l):

    for _ in range(5):
        inp.insert(5*(i-f)+(i-f),0)
    inp.insert(5*(i-f)+(i-f),i)
inp.insert(5*(l-f)+(l-f),l)
print(inp)
```

output:



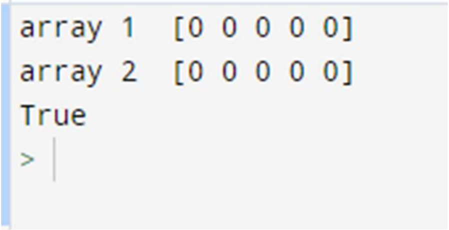
```
First Number: 10
Last Number: 14
[10, 0, 0, 0, 0, 0, 11, 0, 0, 0, 0, 0, 12, 0, 0, 0, 0, 0, 13, 0, 0, 0, 0, 0, 14]
>
```

2. Consider two random array A anb B, check if they are equal

Code:

```
import numpy as np
arr1 = np.random.randint(2,size=5)
arr2 = np.random.randint(2,size=5)
print("array 1 ",arr1)
print("array 2 ",arr2)
print(np.array_equiv(arr1,arr2))
```

output:



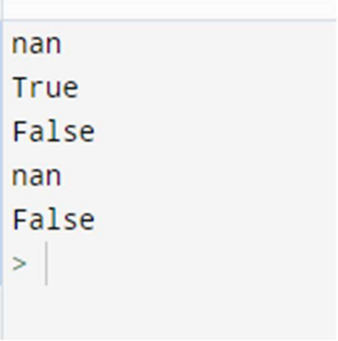
```
array 1  [0 0 0 0 0]
array 2  [0 0 0 0 0]
True
>
```

3. What is the result of the following expression ?
   print(0 * np.nan)
   print(np.nan != np.nan)
   print(np.inf > np.nan)
   print(np.nan - np.nan)
   print(0.3 == 3 * 0.1)

Code:

```
import numpy as np
print(0 * np.nan)
print(np.nan != np.nan)
print(np.inf > np.nan)
print(np.nan - np.nan)
print(0.3 == 3 * 0.1)
```

output:



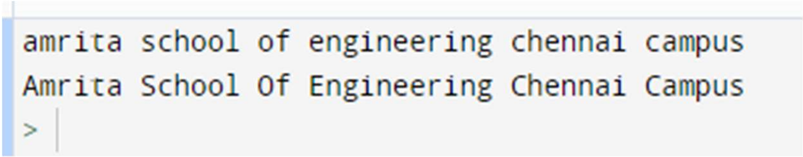
```
nan
True
False
nan
False
>
```

4. Convert the first character of each element in a series to uppercase?

Code:

```
import pandas as pd
inp = input().split()
ser = pd.Series(inp)
for i in ser.keys():
    ser[i]=ser[i].capitalize()
print(" ".join(ser))
```

output:



```
amrita school of engineering chennai campus
Amrita School Of Engineering Chennai Campus
>
```

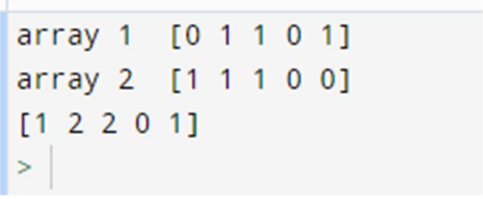
5. Do any two Exercises using Numpy

   a. addition of 2 numpy arrays

Code:

```
import numpy as np
arr1 = np.random.randint(2,size=5)
arr2 = np.random.randint(2,size=5)
print("array 1 ",arr1)
print("array 2 ",arr2)
print(np.add(arr1,arr2))
```

output:



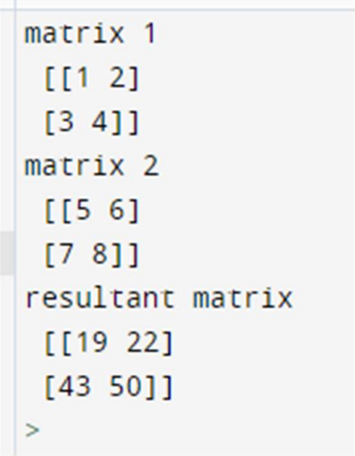
```
array 1  [0 1 1 0 1]
array 2  [1 1 1 0 0]
[1 2 2 0 1]
>
```

   b. Multiplying a matrix

Code:

```
import numpy as np
arr1 = np.matrix([[1,2],[3,4]])
arr2 = np.matrix([[5,6],[7,8]])
print("matrix 1 \n",arr1)
print("matrix 2 \n",arr2)
print("resultant matrix \n",arr1 @ arr2)
```

output:



```
matrix 1
 [[1 2]
 [3 4]]
matrix 2
 [[5 6]
 [7 8]]
resultant matrix
 [[19 22]
 [43 50]]
>
```