

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

```
task-8 question1.py - C:/New folder/python 3.10/task-8 question1.py (3.10.0)
File Edit Format Run Options Window Help
# question-1
import numpy as np

vector = np.array([10, 11, 12, 13, 14])
no_consecutive_zeros = 5
new_vector = np.zeros(len(vector) + (len(vector)-1) * no_consecutive_zeros)
new_vector[0:len(new_vector): no_consecutive_zeros+1] = vector
print(new_vector)
```

```
IDLE Shell 3.10.0
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929
64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question1.py =====
>>>
[10. 0. 0. 0. 0. 11. 0. 0. 0. 0. 12. 0. 0. 0. 0. 13. 0. 0. 0. 0. 14.]
>>>
```

Question2. Consider two random array A and B, check if they are equal?

```
task-8 question2.py - C:/New folder/python 3.10/task-8 question2.py (3.10.0)
File Edit Format Run Options Window Help
from numpy import *

arr1 = random.randint(0,2,6)
print("First array:")
print(arr1)
arr2 = random.randint(0,2,6)
print("Second array:")
print(arr2)
array_equal = allclose(arr1, arr2)
print(array_equal)
```

```
IDLE Shell 3.10.0
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question2.py =====
>>>
First array:
[0 1 1 1 1 0]
Second array:
[1 1 0 0 0 0]
False
>>>
```

Question-3. What is the result of the following expression?

task-8 question3.py - C:/New folder/python 3.10/task-8 question3.py (3.10.0)

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```
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)
```

IDLE Shell 3.10.0

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Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (AMD64)] on win32
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```
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question3.py =====
nan
True
False
nan
False
>>>
```

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

task-8 question4.py - C:\New folder\python 3.10\task-8 question4.py (3.10.0)

File Edit Format Run Options Window Help

```
import pandas as pd

ser = pd.Series(['amrita', 'school', 'of', 'engineering', 'chennai', 'campus'])
new_ser = ser.str.title()
new_string = ""
for(index, words) in new_ser.iteritems():
    new_string += words
    new_string += " "
print(new_string)
```

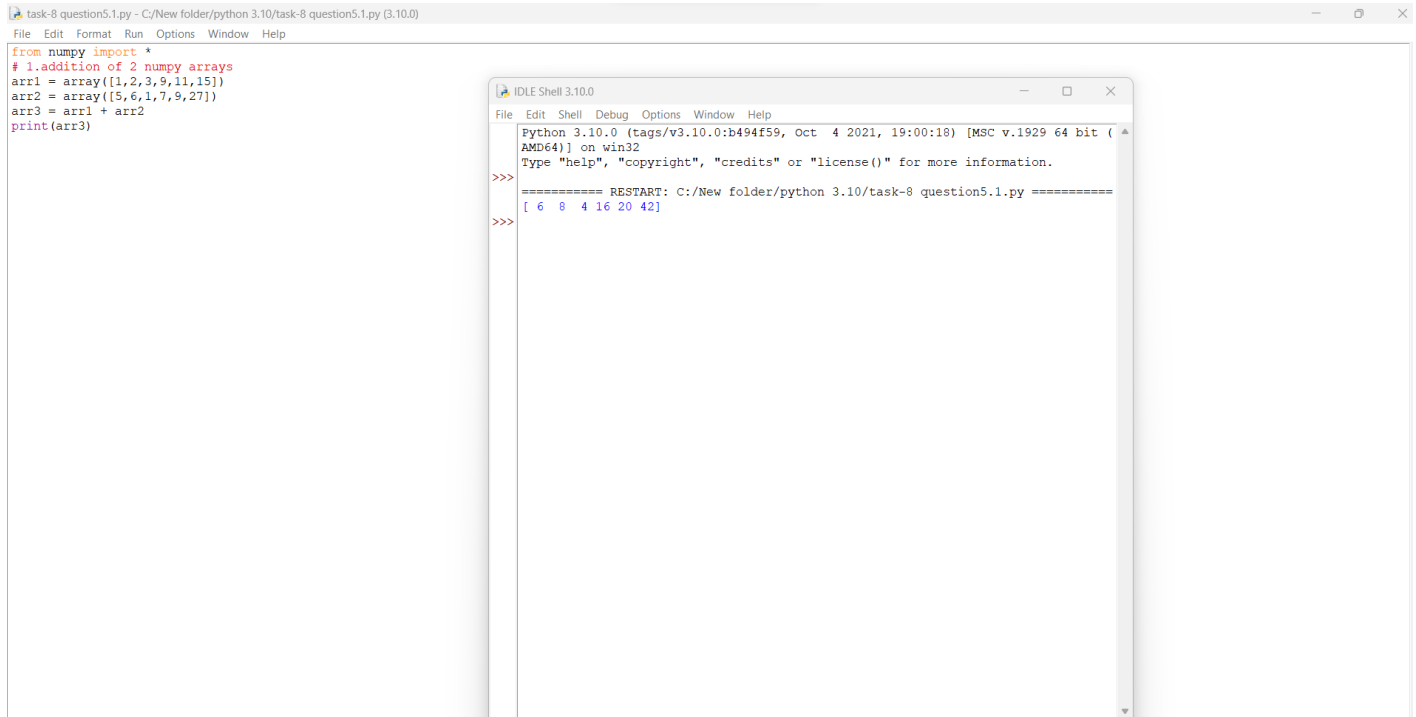
IDLE Shell 3.10.0

File Edit Shell Debug Options Window Help

Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

```
>>>
===== RESTART: C:\New folder\python 3.10\task-8 question4.py =====
Amrita School Of Engineering Chennai Campus
>>>
```

Question-5. 1.addition of 2 NumPy arrays:



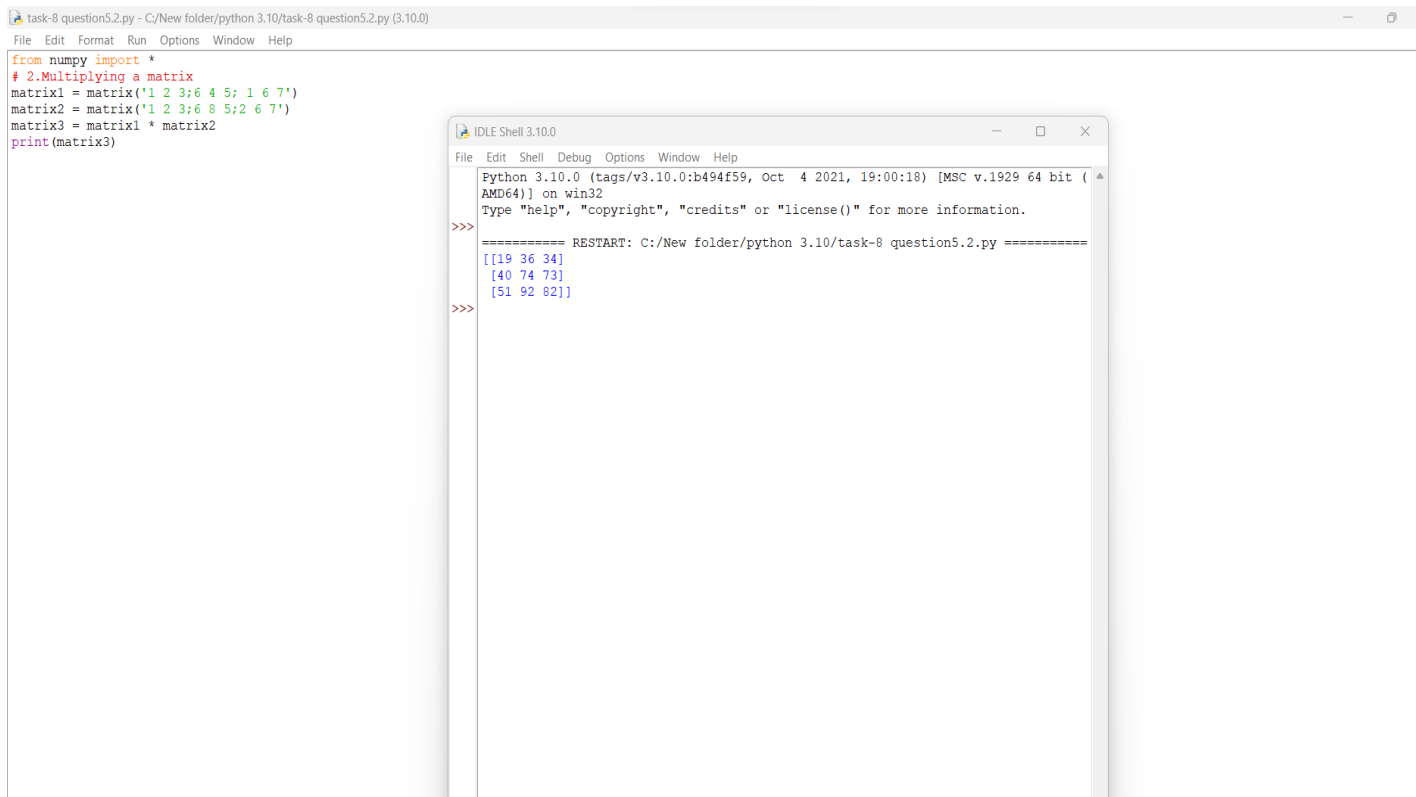
The screenshot shows an IDE window titled "task-8 question5.1.py - C:/New folder/python 3.10/task-8 question5.1.py (3.10.0)". The code in the editor is as follows:

```
from numpy import *
# 1.addition of 2 numpy arrays
arr1 = array([1,2,3,9,11,15])
arr2 = array([5,6,1,7,9,27])
arr3 = arr1 + arr2
print(arr3)
```

To the right, an "IDLE Shell 3.10.0" window displays the output of the program:

```
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question5.1.py =====
>>> [ 6  8  4 16 20 42]
```

2.Multiplying a matrix:



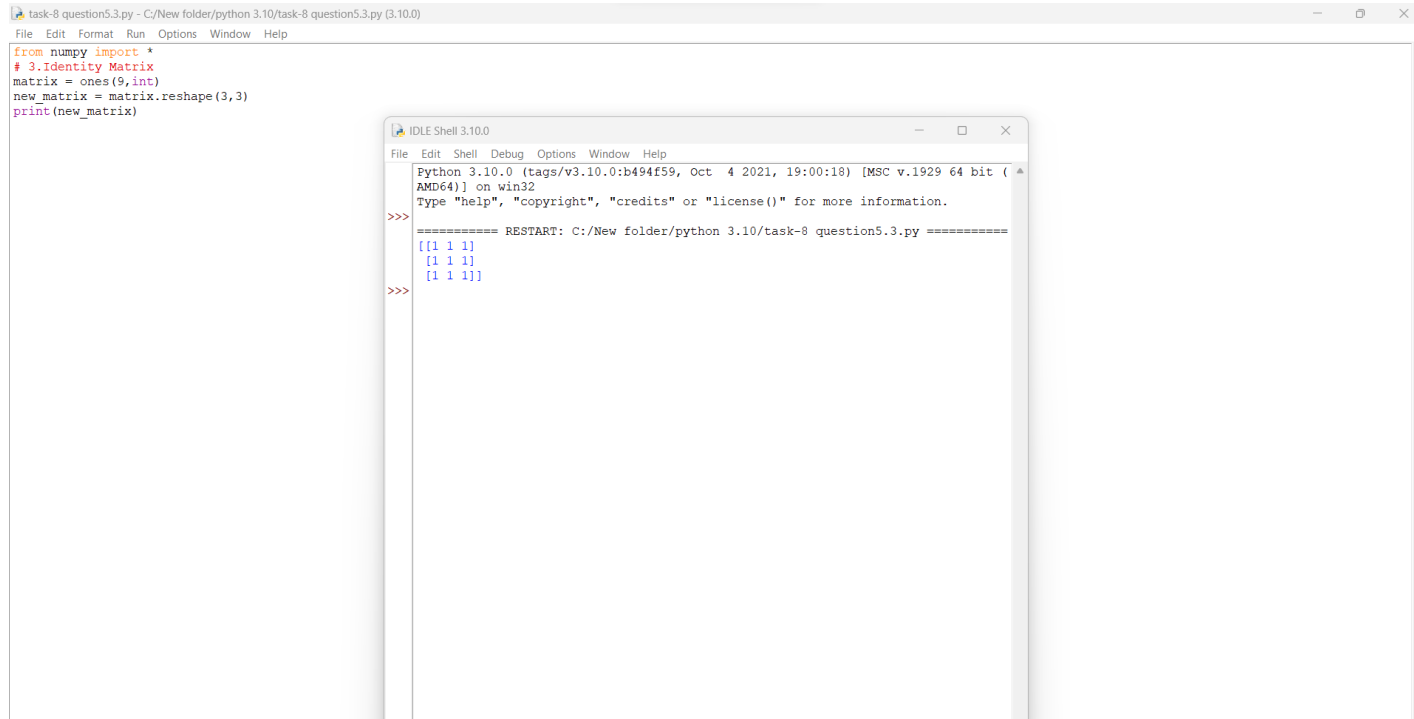
The screenshot shows an IDE window titled "task-8 question5.2.py - C:/New folder/python 3.10/task-8 question5.2.py (3.10.0)". The code in the editor is as follows:

```
from numpy import *
# 2.Multiplying a matrix
matrix1 = matrix('1 2 3;6 4 5; 1 6 7')
matrix2 = matrix('1 2 3;6 8 5;2 6 7')
matrix3 = matrix1 * matrix2
print(matrix3)
```

To the right, an "IDLE Shell 3.10.0" window displays the output of the program:

```
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question5.2.py =====
>>> [[19 36 34]
[40 74 73]
[51 92 82]]
>>>
```

3.Identity Matrix:



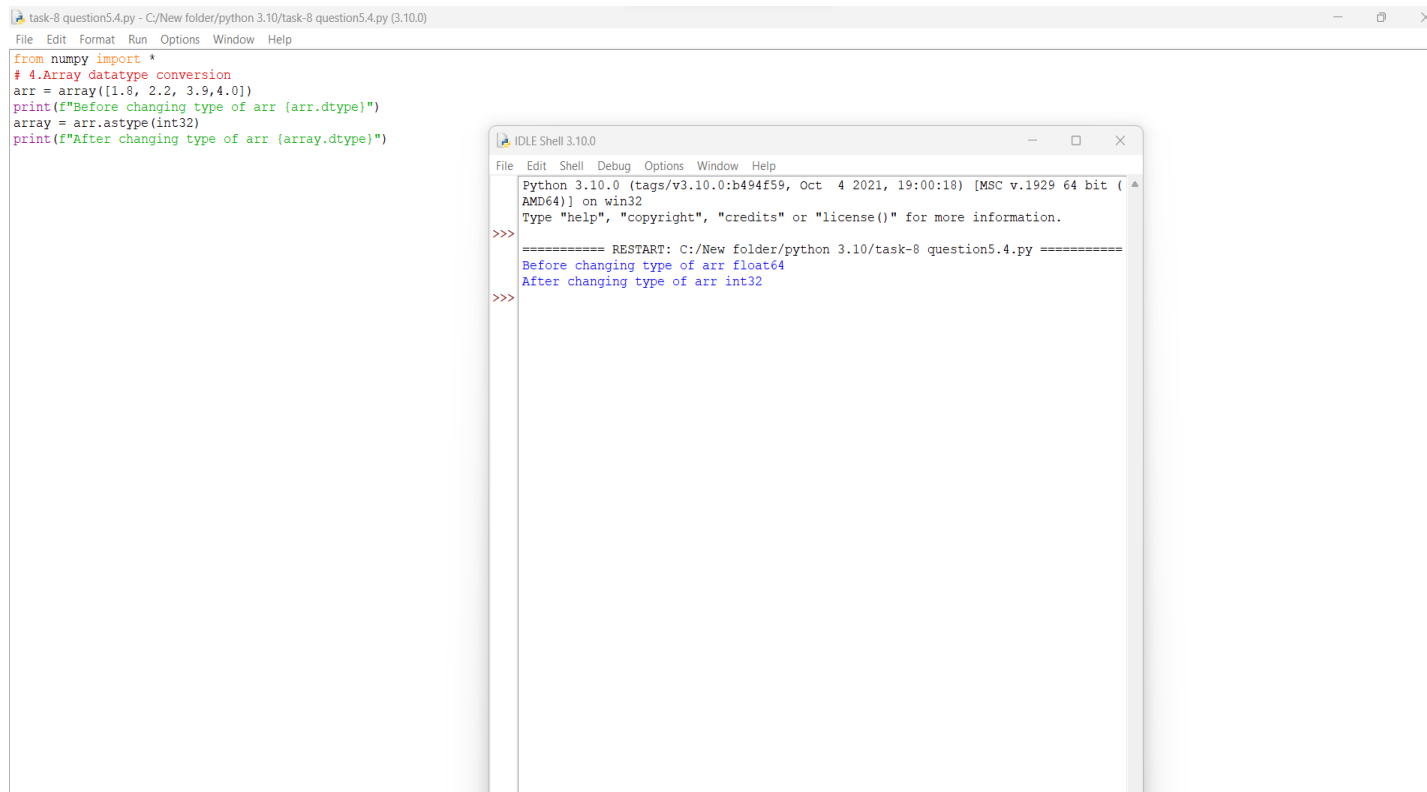
The screenshot shows the Python IDLE environment. The main editor window displays the following code:

```
from numpy import *
# 3.Identity Matrix
matrix = ones(9,int)
new_matrix = matrix.reshape(3,3)
print(new_matrix)
```

The IDLE Shell window shows the output of the code:

```
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question5.3.py =====
[[1 1 1]
 [1 1 1]
 [1 1 1]]
>>>
```

4.Array datatype conversion:



The screenshot shows the Python IDLE environment. The main editor window displays the following code:

```
from numpy import *
# 4.Array datatype conversion
arr = array([1.8, 2.2, 3.9,4.0])
print(f"Before changing type of arr {arr.dtype}")
array = arr.astype(int32)
print(f"After changing type of arr {array.dtype}")
```

The IDLE Shell window shows the output of the code:

```
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question5.4.py =====
Before changing type of arr float64
After changing type of arr int32
>>>
```

5.Array re-dimensioning:

```
task-8 question5.5.py - C:/New folder/python 3.10/task-8 question5.5.py (3.10.0)
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from numpy import *
# 5.Array re-dimensioning
arr_1d = array([1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12])
print(f"array of 1d dimension {arr_1d.ndim}")
print(f"array of 1d {arr_1d}")
arr_2d = resize(arr_1d, (3, 4))
print(f"array of 2d \n {arr_2d}")
print(f"array of 2d dimension {arr_2d.ndim}")
arr_3d = resize(arr_1d, (2, 3, 2))
print(f"array of 3d \n {arr_3d}")
print(f"array of 3d dimension {arr_3d.ndim}")

IDLE Shell 3.10.0
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question5.5.py =====
array of 1d dimension 1
array of 1d [ 1  2  3  4  5  6  7  8  9 10 11 12]
array of 2d
[[ 1  2  3  4]
 [ 5  6  7  8]
 [ 9 10 11 12]]
array of 2d dimension 2
array of 3d
[[[ 1  2]
  [ 3  4]
  [ 5  6]]

 [[ 7  8]
  [ 9 10]
  [11 12]]]
array of 3d dimension 3
>>>
```

6.Custom Sequence Generation:

```
task-8 question5.6.py - C:/New folder/python 3.10/task-8 question5.6.py (3.10.0)
File Edit Format Run Options Window Help

from numpy import *
# 6.Custom Sequence Generation
arr = arange(15)
print(f"{arr} \n")
create_arr= arange(9) **2
print(create_arr)

IDLE Shell 3.10.0
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question5.6.py =====
[ 0  1  2  3  4  5  6  7  8  9 10 11 12 13 14]

[ 0  1  4  9 16 25 36 49 64]
>>>
```

7. Getting the positions (indexes) where elements of 2 NumPy arrays match:

task-8 question5.7.py - C:/New folder/python 3.10/task-8 question5.7.py (3.10.0)

File Edit Format Run Options Window Help

```
from numpy import *
# 7. Getting the positions (indexes) where elements of 2 numpy arrays match
arr_1 = array([1,2,3])
arr_2 = array([5,6,3])
for i in range(0, len(arr_1)):
    if arr_1[i] == arr_2[i]:
        print(f"The position or index where elements of numpy arrays match is {i}")
```

IDLE Shell 3.10.0

File Edit Shell Debug Options Window Help

```
Python 3.10.0 (tags/v3.10.0:b494f59, Oct 4 2021, 19:00:18) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/New folder/python 3.10/task-8 question5.7.py =====
The position or index where elements of numpy arrays match is 2
>>>
```