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ASSIGNMENT N0 2.2

Build a 6x4 matrix of random numbers.

Using slicing, replace rows 5-6 of the matrix so that the 5th row becomes a sum of the 1st and the 3rd row, and the 6th row becomes a sum of the 2nd and the 4th one.

Solution:

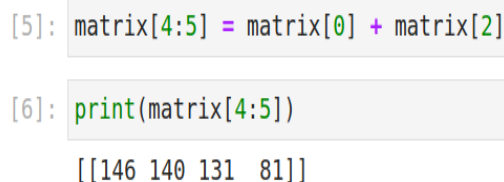
Step1:



The screenshot shows a Jupyter Notebook window titled 'assignment2.2.ipynb'. The code cell [4] contains the following Python code: `import numpy as np`, `matrix = np.random.randint(0, 101, size=(6, 4))`, and `print(matrix)`. The output of the code is a 6x4 matrix of random integers: `[[78 40 41 11]`, `[89 88 0 21]`, `[68 100 90 70]`, `[70 46 41 46]`, `[72 33 55 23]`, `[2 30 11 55]]`. The interface includes standard Jupyter Notebook controls like save, copy, paste, and a toolbar at the bottom.

To build a 6 x 4 matrix with random integer values ranging from 0 to 100 (inclusive), we can use the **`np.random.randint()`** function from the NumPy library. After importing NumPy as **`np`**, we can generate the random matrix by calling **`np.random.randint(0, 101, size=(6, 4))`**, where the first argument specifies the inclusive lower bound of the range of integers, the second argument specifies the exclusive upper bound of the range of integers, and **`size=(6, 4)`** specifies the dimensions of the matrix. After that we printed matrix which we build .

Step2 :



The screenshot shows two code cells in a Jupyter Notebook. Cell [5] contains the code `matrix[4:5] = matrix[0] + matrix[2]`. Cell [6] contains the code `print(matrix[4:5])`. The output of cell [6] is `[[146 140 131 81]]`.

To replace the fifth row of the matrix as the sum of the first and third rows, we can use NumPy's slicing functionality. To select the fifth row, we can use `Matrix[4:5]`, where the index 4 refers to the fifth row since indexing starts from 0 and the range is exclusive of the ending index. To compute the sum of the first and third rows, we can simply add `Matrix[0] + Matrix[2]`. Therefore, to replace the fifth row with the sum of the first and third rows, we use `Matrix[4:5] = Matrix[0] + Matrix[2]`

So 5th row = `[[146,140,131,81]]`

Step3:

```
[8]: matrix[5:6]= matrix[1] + matrix[3]

[9]: print(matrix[5:6])

[[159 134  41  67]]
```

To replace the sixth row of the matrix as the sum of the second and fourth rows, we can use NumPy's slicing functionality. To select the sixth row, we can use `Matrix[5:6]`, where the index 5 refers to the sixth row since indexing starts from 0 and the range is exclusive of the ending index. To compute the sum of the second and fourth rows, we can simply add `Matrix[1] + Matrix[3]`. Therefore, to replace the sixth row with the sum of the second and fourth rows, we use `Matrix[5:6] = Matrix[1] + Matrix[3]`, so 6th row = `[[159,134,41,67]]`.

Step4:

```
[[159 134 41 67]]  
  
[17]: print(matrix)  
[[ 78  40  41  11]  
 [ 89  88   0  21]  
 [ 68 100  90  70]  
 [ 70  46  41  46]  
 [146 140 131  81]  
 [159 134  41  67]]
```

Now we printed matrix , as you can see above the 5th and 6th rows are changed from the original matrix , so the modified matrix would be like as follow:

Modified matrix :

```
[[ 78  40  41  11]  
 [ 89  88   0  21]  
 [ 68 100  90  70]  
 [ 70  46  41  46]  
 [146 140 131  81]  
 [159 134  41  67]]
```

Whole Code:

```
nt2.2.ipynb Python 3 (ipykernel)

import numpy as np
matrix = np.random.randint(0, 101, size=(6, 4))
print(matrix)

[[ 78  40  41  11]
 [ 89  88   0  21]
 [ 68 100  90  70]
 [ 70  46  41  46]
 [ 72  33  55  23]
 [  2  30  11  55]]

matrix[4:5] = matrix[0] + matrix[2]

print(matrix[4:5])

[[146 140 131  81]]

print(matrix)

[[ 78  40  41  11]
 [ 89  88   0  21]
 [ 68 100  90  70]
 [ 70  46  41  46]
 [146 140 131  81]
 [  2  30  11  55]]

matrix[5:6] = matrix[1] + matrix[3]

print(matrix[5:6])

[[159 134  41  67]]

print(matrix)

[[ 78  40  41  11]
 [ 89  88   0  21]
 [ 68 100  90  70]
 [ 70  46  41  46]
 [146 140 131  81]
 [159 134  41  67]]
```

Original matrix =

```
[[ 78  40  41  11]
 [ 89  88   0  21]
 [ 68 100  90  70]
 [ 70  46  41  46]
```

```
[ 72 33 55 23]
[  2 30 11 55]]
```

Modified matrix=

```
[[ 78 40 41 11]
 [ 89 88  0 21]
 [ 68 100 90 70]
 [ 70 46 41 46]
 [146 140 131 81]
 [159 134 41 67]]
```