



[< Previous](#)

[Next >](#)

### 3.3.4 Finger Exercise: Practice using ndarrays

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Finger Exercises 2 due Aug 10, 2023 05:00 IST   Completed

MO2.3

In Section [3.1.3](#), we asked questions about using standard Python lists to represent and manipulate vectors and matrices. In this section, we now ask similar questions but using NumPy ndarray objects instead. We recommend looking back at the questions in Section [3.1.3](#) to contrast how Python lists versus NumPy ndarray objects work.

### Problem: Using ndarrays for vector manipulations

2/2 points (graded)

In these questions, we will look at some common vector manipulations and the results when using NumPy `ndarrays`.

To begin, let's consider addition of two vectors. Consider the following Python code:

```
import numpy as np

u = np.array([1, 2, 3])
v = np.array([4, 5, 6])
w = np.array([u[0]+v[0], u[1]+v[1], u[2]+v[2]]) # i.e. w = [5,7,9]

print( u+v == w )
```

What will this code print when run? If an error would occur at any point, select ERROR OCCURS.

☐ False

☐ True

☐ [False False False]

☒ [ True True True]

☐ ERROR OCCURS



And now let's consider multiplication of a vector by a scalar. Consider the following Python code:

```
import numpy as np

u = np.array([1, 2, 3])
v = np.array([2*u[0], 2*u[1], 2*u[2]]) # i.e. v = [2,4,6]

print( v == 2*u )
```

What will this code print when run?

☐ False

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☐ True☐ [False False False]☒ [ True True True]☐ ERROR OCCURS

**i** Answers are displayed within the problem

## Problem: Retrieving a matrix element using ndarray indexing

2/2 points (graded)

In these questions, we will look at how to retrieve an element of a matrix by indexing into an `ndarray`.

Consider the following Python code.

```
import numpy as np
A = np.array( [ [1,2,3], [4,5,6] ] )
```

What does `A[1][1]` evaluate to?

☐ 1☐ 2☐ 4☒ 5☐ ERROR OCCURS

What does `A[1,1]` evaluate to?


☐ 1☐ 2☐ 4☒ 5☐ ERROR OCCURS

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< Previous

Next >

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What does `A[0, :]` evaluate to?

- ☒ `array([1, 2, 3])`
- ☐ `array([4, 5, 6])`
- ☐ `array([1, 4])`
- ☐ `array([[1], [4]])`

☐ ERROR OCCURS



What does `A[:,0]` evaluate to?

☐ `array([1, 2, 3])`

☐ `array([4, 5, 6])`

☒ `array([1, 4])`

☐ `array([[1], [4]])`

☐ ERROR OCCURS



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