

Solution Review

This lesson gives a detailed solution review of the problem.

WE'LL COVER THE FOLLOWING ^

- Solution

Solution

Here's the merged solution to the problem that we discussed in the previous lesson. The solution also takes into account these two factors:

- Negative steps
- Multi-dimensional arrays

```
import numpy as np
import matplotlib.pyplot as plt

def find_index(base, view):
    """
    Given an array that is a `view` of a `base`, find an index such that
    `base[index]` is `view`
    """

    if not isinstance(view, np.ndarray):
        return "..."

    itemsize = view.itemsize

    # Find the start and end pointer of the arrays using the byte_bound method
    offset_start = (np.byte_bounds(view)[0] - np.byte_bounds(base)[0])//itemsize
    offset_stop = (np.byte_bounds(view)[-1] - np.byte_bounds(base)[-1]-1)//itemsize

    # Calculate the start and stop indices from the offsets
    index_start = np.unravel_index(offset_start, base.shape)
    index_stop = np.unravel_index(base.size+offset_stop, base.shape)

    # Use the strides property to find the No. of bytes to go from one element to the other
    index_step = np.array(view.strides)//np.array(base.strides)

    index = ""
    for i in range(len(index_step)):
```

```

start = index_start[i]
stop = index_stop[i]
step = index_step[i]

if stop == start:
    stop, step = None, None
else:
    if stop == base.shape[i] - 1:
        stop = None
    else:
        stop = stop
    if start == 0:
        start = None
if step is not None and stop is not None:
    if step < 0:
        start, stop = stop, start - 1
    else:
        start, stop = start, stop + 1

if start is not None:
    index += str(start)
if stop is not None:
    index += ":" + str(stop)
elif step is not None:
    index += ":"
if step is not None:
    index += ":" + str(step)
index += ','
index = index[:-1]

return index

```

```

if __name__ == '__main__':

```

```

    base = np.arange(8*8).reshape(8,8)

    # Sub-array
    Z = base[1:-1,1:-1]
    index = find_index(base,Z)
    print(np.allclose(Z, eval("base[%s]" % index)))

    # Every two items
    Z = base[:,::2,::2]
    index = find_index(base,Z)
    print(np.allclose(Z, eval("base[%s]" % index)))

    # First column
    Z = base[:,0]
    index = find_index(base,Z)
    print(np.allclose(Z, eval("base[%s]" % index)))

    # First row
    Z = base[0,:]
    index = find_index(base,Z)
    print(np.allclose(Z, eval("base[%s]" % index)))

    # Partial reverse
    Z = base[4:1:-1,6:2:-1]
    index = find_index(base,Z)
    print(np.allclose(Z, eval("base[%s]" % index)))

```

```
# # Full reverse
Z = base[::-1,::-1]

index = find_index(base,Z)
print(np.allclose(Z, eval("base[%s]" % index)))

# Random
Z = base[1:5:3,3:1:-1]
index = find_index(base,Z)
print(np.allclose(Z, eval("base[%s]" % index)))
```



Now that we have learned about the anatomy of an array, let's move on to the next chapter "Code Vectorization".