CS 114 Tutorial 8

Nov 7 2025

Goals for this Week:

- Have assignment 04 started (due next friday)
- Understand the idea of masking

  where true, do something instead of ***if*** true, do something
- Recognize np.logical_and as &
- Recognize np.logical_or as |
- Be familiar with left hand slicing/ slice assignments
- Understand how to use left hand masking

Using masking, complete the following two tasks:

- Replace all positive numbers with 0 in an array
- Extract all numbers greater than 3 and less than 9

Write a function called clean(a: np.ndarray) that does the following:

-Replace all negative values in a with 0

-Reverses the order of the array (use slicing)

-Return the mutated array

Solutions found in Jupyter Notebook

Go to vevox.com

Sign in using the session ID: 188-657-711

Masking & Boolean

```
a = np.array([-1, 0, 2])
mask = a > 0
a[mask] = a[mask] - 1
print(a)
```

What does this code print?

A. [-2, -1, 0]

B. [1]

C. [-1, 0, 1]

D. Error, will not run

Masking & Boolean

```python
import numpy as np

a = np.array([-2, -1, 0, 1, 2])
mask = a < 0
a[a < 1] += 2
a[mask] *= -1
print(a)
```

What does this code print?

A. [0, 1, 2, 1, 2] B. [0, -1, 2, 1, 2] C. [2, 1, 0, 1, 2] D. [-2, -1, 0, 1, 2]

Masking with Logic

```
a = np.array([0, -1, 2, 13, -4, 5, 10, 9])
mask = np.logical_not((a >= 10) | (a <= 0))
print(a[mask])
```

What does this code print?

A. [0 2 5 10 9]

B. [-1 13 -4]

C. [0 -1 13 -4 10]

D. [2 5 9]

Masking Concept

Which of the following best describes what happens when you write b = a[a > 5] in NumPy?

A. It sets every value of a greater than 5 to True and every other value to False.
B. It creates a boolean array of the same shape as a, then uses it to select only the elements of a where the mask is True.
C. It modifies a so that only values greater than 5 remain.
D. It creates a mask, but b stores the mask rather than the values.

Left Slicing

```
import numpy as np
a = np.array([0, 1, 2, 3, 4])
a[1:3] = a[a > 3]
print(a)
```

What is printed?

A. [0, 4, 4, 4, 4] B. [4, 4, 4, 3, 4] C. [0, 4, 4, 3, 4] D. Error, will not run

The following temperature data is collected over 24 days:

Temps = [-3, -2, 0, -5, -3, 2, 5, 4, 8, 11, 15, 13, 9, 12, 7, 4, 5, 6, 3, -1, 0, -2, -5, -11]

Plot this as a line graph over the 24 day period.

Then using masking, plot each temperature as a coloured point ontop of the line graph.

Freezing should be blue, temp < 0

Cold should be green, 0 < = temp < 10

Warm should be red, temp > =10

Add all proper elements of a graph including a legend, labels, and a title.

Solutions found in Jupyter Notebook