



# NumPy Set Operations

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## What is a Set

A set in mathematics is a collection of unique elements.

Sets are used for operations involving frequent intersection, union and difference operations.

## Create Sets in NumPy

We can use NumPy's `unique()` method to find unique elements from any array. E.g. create a set array, but remember that the set arrays should only be 1-D arrays.

### Example

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Convert following array with repeated elements to a set:

```
import numpy as np

arr = np.array([1, 1, 1, 2, 3, 4, 5, 5, 6, 7])

x = np.unique(arr)

print(x)
```



# Finding Union

To find the unique values of two arrays, use the `union1d()` method.

## Example

Find union of the following two set arrays:

```
import numpy as np

arr1 = np.array([1, 2, 3, 4])
arr2 = np.array([3, 4, 5, 6])

newarr = np.union1d(arr1, arr2)

print(newarr)
```

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# Finding Intersection

To find only the values that are present in both arrays, use the `intersect1d()` method.

## Example

Find intersection of the following two set arrays:

```
import numpy as np

arr1 = np.array([1, 2, 3, 4])
arr2 = np.array([3, 4, 5, 6])
```



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**Note:** the `intersect1d()` method takes an optional argument `assume_unique`, which if set to True can speed up computation. It should always be set to True when dealing with sets.

## Finding Difference

To find only the values in the first set that is NOT present in the second set, use the `setdiff1d()` method.

### Example

Find the difference of the set1 from set2:

```
import numpy as np

set1 = np.array([1, 2, 3, 4])
set2 = np.array([3, 4, 5, 6])

newarr = np.setdiff1d(set1, set2, assume_unique=True)

print(newarr)
```

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# Finding Symmetric Difference

To find only the values that are NOT present in BOTH sets, use the `setxor1d()` method.

## Example

Find the symmetric difference of the set1 and set2:

```
import numpy as np

set1 = np.array([1, 2, 3, 4])
set2 = np.array([3, 4, 5, 6])

newarr = np.setxor1d(set1, set2, assume_unique=True)

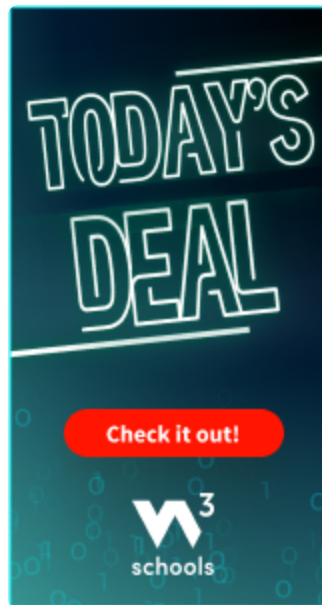
print(newarr)
```

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**Note:** the `setxor1d()` method takes an optional argument `assume_unique`, which if set to True can speed up computation. It should always be set to True when dealing with sets.

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