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

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)
```

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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])

newarr = np.intersect1d(arr1, arr2, assume_unique=True)
```

```
print(newarr)
```

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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 seconds 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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Note: the `setdiff1d()` 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 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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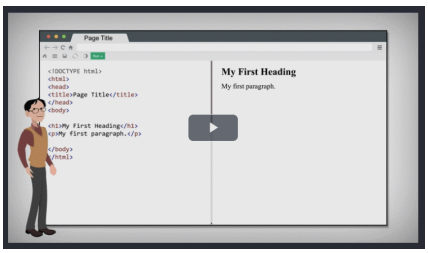

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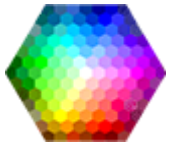

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