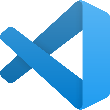
**CS506 Programming for Computing**

**HOP06B – Getting Started with NumPy - Optional**

06/06/2020 Created by Apiwat Chuaphan

11/08/2020 Revised by Kim Nguyen

Center for Information Assurance (CIAE) @City University of Seattle (CityU)

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**Before You Start**

* The directory path shown in screenshots may be different from yours.
* Some steps might not be explained in the tutorial.  If you are not sure what to do:
  + Consult the resources listed below.
  + If you cannot solve the problem after a few tries, ask a TA for help.

**Learning Outcomes**

* Understand array object in NumPy
* Understand array manipulation using NumPy’s functions

**Resources**

* NumPy Documentation: <https://numpy.org/doc/stable/>
* Stanford University. (2020). CS231n: Convolutional Neural Networks for Visual Recognition: NumPy.

**Numpy Extra Resources**

1. NumPy provides a numerous way to manipulate array. We will cover some in this step.

|  |  |
| --- | --- |
| reshape() | Gives a new shape to an array without changing its data |
| flat[] | iterator over the array turned into 1-D array. |
| flatten() | Collapse to 1-D array and return a copy of the array |
| transpose() | Permutes the dimensions of an array |
| broadcast() | Produces an object that mimics broadcasting |
| resize() | Returns a new array with the specified shape |
| unique() | Finds the unique elements of an array |

**Array manipulation:**

Add the following functions into separate cell under the same file **arrays.ipynb**.

**reshape()**

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**flat[]**

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**flatten()**

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**transpose()**

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**broadcast()**

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**resize()**

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**unique()**

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This brief hands-on has provided useful functionalities, but it is far from what NumPy can do. You may want to discover more functions from NumPy, check this [reference](https://numpy.org/doc/stable/reference/)