Python: NumPy Course Notes

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1 Learning Objectives

Concepts

- Creating and Saving NumPy ndarrays
- Using Built-in Functions to Create ndarrays
- Accessing, Deleting, and Inserting Elements Into ndarrays
- Slicing ndarrays
- Boolean Indexing, Set Operations, and Sorting
- Exercise: Manipulating ndarrays
- Arithmetic Operations and Broadcasting
- Exercise: Creating ndarrays with Broadcasting

Commands

- np.array
- .shape
- .size
- np.save and np.load
- np.zeros
- np.ones
- np.eye
- np.diag
- np.arange
- np.linspace
- np.reshape

- np.random
  - np.random.random
  - np.random.randint
  - np.random.normal
  - np.random.permutation
- np.delete
- np.append
- np.insert
- np.vstack
- np.hstack
- np.unique
- np.intersect1d
- np.setdiff1d
- np.union1d
- np.sort
- Mathematical Functions
  - np.add
  - np.subtract
  - np.multiply
  - np.divide
  - np.sqrt
  - np.exp
  - np.power
- Statistical Functions
  - mean
  - std
  - median
  - max
  - min

NumPy is useful in dealing with arrays of data, which can be thought of in a mathematical sense as vectors and matrices. NumPy is a powerful tool in itself, however an even more useful Python data tool, the Pandas library, is built on top of NumPy. A basic understanding of NumPy is necessary, and we'll cover some of the essential functions and uses in these notes.