Numpy

Libraries Used:

Import numpy as np (more)

- Great library when working with arrays, matrices, and numerical data

Numpy Functions:

np.array() (more)

- Converts a python list into an array
- Can be multi-dimensional if a list of lists is passed through

np.arange() (more)

- Creates a numpy array with evenly spaced values given the step size (default is 1)
- np.arange(start val, end val, step size)

np.linspace() (more)

- Creates a numpy array with evenly spaced values given the number of values in the array
- np.linspace(start val, end val, number of points)

np.empty() (more)

- Creates an empty array in the specified shape that is passed through using (rows, columns)

np.full() (more)

- Creates an array in the specified shape that is passed through with the value passed through
  - np.full((rows, columns), value)
- Alternatively, no value needs to be specified if the functions np.ones() or np.zeros() is used bc these arrays will be filled with ones or zeroes

.dtype (more)

- Creates a data type object

.shape (more)

- Returns the shape of an array

np.sum() (more)

- Returns the sum of an array

np.mean() (more)

- Returns the mean of an array

np.std() (more)

- Returns the standard deviation of an array

.T (more)

- Returns the transpose of a function (the rows are the columns and the columns are the rows)

np.linalg.norm() (more)

- Returns the magnitude of a vector which can be a full matrix or just one row

np.dot() (more)

- Returns the dot product of two arrays

np.matmul() (more)

- Multiplies two matrices and returns the outcome
- Important: you need the same number of rows in matrix 1 as the number of columns in matrix 2 in order to use this function

np.argmin() (more)

- Returns the index of the minimum value in the matrix
- If axis = 1 is passed through, a list containing the indices of the minimum value in each row will be returned

np.min() (more)

- Returns the minimum value in the matrix
- If axis = 1 is passed through, a list containing the minimum values in each row will be returned

np.reshape() (more)

- Reshapes an array to the shape that is specified when you run the function
- If you do not know the needed number of rows or columns, you can substitute the missing number with -1 and numpy will still be able to create the new array

Indexing and Slicing Arrays:

Indexing Arrays (more)

- We can index one-row arrays the same way as lists
- If an array has multiple rows, we can index it using a list
  - [1,3] finds the fourth element in the second row

Slicing Arrays (more)

- We can slice one-row arrays the same as lists
  - Start val is inclusive, End val is exclusive
- If an array has multiple rows, we can slice using lists
  - [:,1] gives us the second element in each row

More Numpy Features and Syntax:

Creating random arrays (more)

- We can use np.random.randint(start, end, size = (rows, columns)) to create an array with our choice of size and random integers in each cell

Mathematical operations and arrays (more)

- We can do mathematical operations on two matrices
- Operators: + (addition), - (subtraction), * (multiplication), / (division), // (integer division), ** (raising to the power of)