Study Guide for Midterm - 10/9/2023 at 6:00 PM on Zoom

Module 1 - Python

Know that python is a comparatively slow language

How to get help on an object in Python

- Know the different ways to get help in Python
- Remember simple strategies on how to figure out your errors

Data Types:

1. Numeric data types (floats and ints) and their operations
2. Booleans and their operations
3. Sequences (lists, tuples, ranges, strings, don't worry about bytes or bytearrays)
4. Other containers (sets, dictionaries)

- Know how to *create, index, and slice* into all of the container types.
- Know which containers can be changed using indexing notation.

Indexing in Python:

- Know where python starts indexing.
- You can reverse a sequence using the bracket notation with a negative step. [::-1]

Type Conversions:

- Implicit conversions will change less complicated types into more complicated types.
- Know the truth values of different data types
- Understand the use of different data types in control flow statements

Control flow:

- Know how to use the keywords *if, while, for*
- Know the order of evaluation in *if* statements
- Be able to discern when an infinite while loop will occur
- Know that the range() function commonly used in for loops is exclusive of the end
- Know how to use enumerate() in a for loop

Functions:

- Understand the different motivations behind why we use them
- Be able to define your own function
- Know that functions are objects in python
- Understand the difference between global and local variables
- Know what the difference is between a function and a method

Packages

- Know what packages we use and why.

Module 2 - Pandas (Data Structures and Manipulation)

Data Structures in Pandas

1. **Indexes**

- Know what can be stored in indexes
- Know what they are used for
- Know what happens under different scenarios of index alignment

2. **Series**

- Know how to create, index, slice, and filter Series
- Know how to use the properties and methods listed on your notes for Series
- Be able to anticipate what occurs during series operations - e.g. Know what happens when you operate using two indexes of different sizes

3. **DataFrames**

- Know how to create, index, slice, and filter DataFrames
- Know how to use the properties and methods listed on your notes for DataFrames
- Know how and when to use groupby
- Know how to use the .apply() method on a DataFrame
- Know what joins are and the different types of joins
- Don't need to know about rolling and expanding windows

Module 3 - Visualizations (Plotting)

Plotting

Matplotlib:

- Know that there are two main plotting objects from the matplotlib package
- Know the common types of graphs and what they show (i.e. bar plots show numerical vs categories/strings)
- Know how to be able to create a basic plot with labels and titles using matplotlib

Pandas

- Know the basics of plotting using pandas

Seaborn

- Know that seaborn can easily create plots that would take a long time to make using solely matplotlib commands

Chronological Order of Material

1. Week 1 - (Module 1) - Python Programming Language
2. Week 2 - (Module 2) - Pandas (Data Structures)
3. Week 3 - Labor Day, No Class
4. Week 4 - (Module 2) DataFrame Manipulation
5. Week 5 -
    a. (Module 2) Module 2 Continuation - Short Notes on Joins
    b. (Module 3) Introduction to Plotting
6. Week 6 - (Module 2) Advanced Topics in Data Manipulation

Module Order of Material

Module 1 - Python as a Language

- Week 1 - Python Programming Language

Module 2 - Pandas (Data Structures and Manipulation)

- Week 2 - Module 2 - Pandas (Data Structures)
- Week 4 - DataFrame Manipulation
- Week 5 - Module 2 Continuation - Short Notes on Joins
- Week 6 - Advanced Topics in Data Manipulation

Module 3 - Plotting with Matplotlib, Pandas and Seaborn

- Week 5 - Plotting with Matplotlib, Pandas and Seaborn