

ITSE 1302 – Assignment 10

General Points

- Use the course material located at:
 - [Python Data Science Handbook](#)
- Assignment 10 can be completed using previously covered material and content from the following chapters:
 - 00.00-Preface *through* 02.09-Structured Data NumPy
- After completing requirements, test to ensure all cells run correctly in the .ipynb file.
- Include appropriate markdown cells to identify the requirements below by number. See this [example](#).
- Produce an .html file that shows the .ipynb after a *successful test run*.
 - by File | Download as | HTML (.html) .
- Test the .html file by opening it in a browser and ensure the content is produced correctly from the run in Jupyter Notebook.
- Submit **BOTH** the .ipynb and .html files to the appropriate link in Blackboard | Assignments. Submit the .html file as a .zip file to pass security settings. Submit other files individually.
- Submit any additional files required to complete the assignment.

Requirements

(Ensure that all Requirements are complete)

1. Using Jupyter Notebook (or similar tool), create a file named:
 - assignment-10.ipynb
2. Add an H1 markdown: “This is Assignment 10 - <yournamehere>”
3. Create a one-dimensional NumPy array named one_d_array of 20 random numbers with values between 1 – 10. Demonstrate the following comparison operators as universal functions:
 - <, >, <=, >=, !=, and ==

ITSE 1302 – Assignment 10

4. Create a two-dimensional NumPy array named `two_d_array` size = (4,5) with values between 11 – 34. Demonstrate the following comparison operators as universal functions:
 - `<`, `>`, `<=`, `>=`, `!=`, and `==`
 - count the values `< 15`
 - sum the values `> 20`
 - count the values `>= 9` in each row
 - determine if *any* values `< 12`
 - determine if *all* values `> 12`
 - determine if *all* values in each column `> 14`
5. Using the *inches* array from Chapter 02.06, determine the number of values where:
 - `0.15 <= value <= 1.15`
 - Use `~` and `|` to return the same number as `&` above
6. Using the *inches* array from Chapter 02.06, show the following:
 - Number of days without rain
 - Number of days with rain
 - Days with `>= 1` inch of rain
7. Use Boolean masking on `two_d_array` to:
 - return a Boolean array where `< 15`
 - return an array of values `< 15`
8. Using the *inches* rain data and the following definition (`pouring = (inches > 0.5)`), output the following data:
 - Median precip on `pouring` days in 2014 (inches):
 - Median precip on summer days in 2014 (inches):
 - Maximum precip on summer days in 2014 (inches):
 - Median precip on non-summer `pouring` days in 2014 (inches):
9. In your own words, explain the difference between the keywords *and* and *or* and the operators `&` and `|`. When are the keywords used and when are the operators used?
10. Demonstrate fancy indexing with:

ITSE 1302 – Assignment 10

- one_d_array
 - two_d_array
11. Demonstrate combined indexing with:
- two_d_array and slicing
 - two_d_array and masking
12. Demonstrate the following using two_d_array:
- sort each row
 - sort each column
 - partition the array such that the first three values in each column are the lowest values in that column
13. Produce a k-nearest neighbor plot using:
- a 25 X 2 array
 - K = 3
14. Create a structured array named super_heroes using:
- the dictionary method
 - NumPy data types for the element names
 - with the following element names:
 - i. name
 - ii. age
 - iii. birthplace
 - iv. super power
15. Use markdown to include a statement at the end of assignment-10.ipynb explaining your experiences with Assignment 10. Make this authentic (minimum of 2-3 sentences).
-

ITSE 1302 – Assignment 10

TEST – TEST – TEST your .ipynb file to ensure all requirements are met.

Produce an .html file from a *successful test run* of the .ipynb file. Ensure that the .html is produced correctly by opening it in a browser.

- Use the list above as a confirmation checklist.
- Not meeting all requirements = 0 points for the assignment.