**Coding Challenge #006 10/08/2019**

**Data Structures and Algorithms**

Learning Data Structures (the way we are able to store and retrieve data) & Algorithms (how data is transformed into something a program can effectively use), is the foundation to software development.

There is a lot to cover in this area (typically taught in Computer Science degree modules over months) however today, we’ll be working through some introduction exercises to get started. If you are completely new to these concepts, we recommend grabbing a coffee and taking some time to read the following articles:

<http://codedad.co.uk/best-way-learn-data-structures-algorithms/>

<https://medium.com/swlh/introduction-to-data-structures-9134b7d064a6>

*As we are focusing today on Data Structures & Algorithms in Python, you can spend some time on the following Python resources or go ahead* [*set up*](#e3isndayrsrk) *and try the exercises in* [***Part 1 Data Structures.***](#nabj7rtaabxw)

**Brushing up or completely new to Python**

[Python Fundamentals on pythonprogramming.net](https://pythonprogramming.net/python-fundamental-tutorials/)

[Google's Python Class](https://developers.google.com/edu/python/)

[The Python Tutorial from the Documentation](https://docs.python.org/3/tutorial/)

[Python Tutorial on Codecademy](https://www.codecademy.com/learn/learn-python)

**Setup**

We will be using Google Colab to complete the exercises. [What is Google Colab](https://research.google.com/colaboratory/faq.html)

Feel free to work on the exercises and challenges with a partner. Paired programming in awesome. Mob programming is cool too!

**Part 1 Data Structures**

Save a copy of the Data Structures notebook so you can edit your own version of the file.

[**https://colab.research.google.com/drive/1ASWPAYu3z4gmWIsRYYj4BX4Wjk4Q9GiZ**](https://colab.research.google.com/drive/1ASWPAYu3z4gmWIsRYYj4BX4Wjk4Q9GiZ)

In this notebook, you will find a brief summary on the built in python data structures and also some other data structures. Throughout the notebook, there are exercises that you can complete.

Here are some more data structures exercises to help with your learning!

[**Data Structures Exercises**](https://colab.research.google.com/drive/1Iy-tT_B5pqdX0ZP0DVAKBHXaS8LWZDfO)

**Part 2 Algorithms**

Save a copy of the Data Structures notebook so you can edit your own version of the file.

[**https://colab.research.google.com/drive/1VT3tf7piv2ycX1bQnMGcPTqisz1strES**](https://colab.research.google.com/drive/1VT3tf7piv2ycX1bQnMGcPTqisz1strES)

In this notebook, you will find a brief summary on the built in python algorithms and also some other algorithms. Throughout the notebook, there exercises that you can complete.

Here some more algorithms exercises to help with your learning!

[**Algorithms Exercises**](https://colab.research.google.com/drive/1wTp2bsvd3PwJdoOSdBtk9-XuIf-KsvWm)

**Just for Fun**

**Tic Tac Toe Game**

Some things to think about

* What is tic tac toe (x’s and o’s)
* Player input
* Valid input
* Determining the winner

**Resources to help with Tic Tac Toe**

**Link to tic tac toe colab - currently in progress**

[**https://www.geeksforgeeks.org/python-implementation-automatic-tic-tac-toe-game-using-random-number/**](https://www.geeksforgeeks.org/python-implementation-automatic-tic-tac-toe-game-using-random-number/)

**Battleships**

Some things to think about

* What is battleships

**Resources to help with Battleships**

**Link to battleships colab -currently in progress**