MSc Artificial Intelligence Python Primer

Unit 3 Worksheet

**Aims and Objectives**

1. Learn how to create and use Python Lists
2. Learn how to create and use Python Tuples
3. Learn how to create and use Python Sets
4. Learn how to create and use Python Dictionaries
5. Learn about the different types of data that can be stored in variables
6. Learn about strings and how they can be format constructed and formatted
7. Learn how to convert mathematical expressions into Python code

**Introductory Tasks**

* Download the ***Unit 3 Jupyter Notebook*** to your local drive. The Notebook can be found on Blackboard (in Python Primer >> Unit 3 – Python Data Structures)
  + Once you have downloaded this Notebook, open the *Anaconda Navigator* and launch the *Jupyter Notebook* application and open the downloaded Notebook file
  + There are exercises for you to complete throughout the Notebook. These are clearly marked Worksheet Exercises
* Read the following three chapters of the ***Beginners Guide to Python 3 Programming*** core text-book:
  + Collections, Tuples and Lists
  + Sets
  + Dictionaries

NOTE: .pdf versions of these chapters can be found on Blackboard (in Python Primer >> Unit 3 – Python Data Structures)

**Optional Extra Tasks**

* In the ***Unit 3 Jupyter Notebook*** we briefly look at List Comprehensions. Comprehensions can also be used with Tuples, Sets and Dictionaries.
  + Find the syntax of these different forms of comprehension
  + Experiment with these forms to increase your coding options
* All the Python collection Data Types have a comprehensive set of methods as part of their API. Take a look at all the methods available for each:
  + List: <https://python-reference.readthedocs.io/en/latest/docs/list/>
  + Tuple: <https://python-reference.readthedocs.io/en/latest/docs/tuple/>
  + Set: <https://python-reference.readthedocs.io/en/latest/docs/sets/>
  + Dictionary (dict): <https://python-reference.readthedocs.io/en/latest/docs/dict/>
* Review the module reading list for other sources of information to supplement your understanding of Python Data Structures.

**Advanced Tasks**

* There are many built-in functions that act on sequences, containers, and built-in data types (such as bool, string, integer, and float). Become familiar with the options you have available to you as you begin to develop algorithmic solutions to problems:
  + <https://python-reference.readthedocs.io/en/latest/docs/functions/>
  + <https://docs.python.org/3/library/functions.html>
* Converting between these four data structures is a common occurrence in Python development. You should familiarise yourself with the different options available. The following link provides a starting point: <https://towardsdatascience.com/python-data-structures-conversions-ec9d56649e3b>

**Assessment Details**

* In the ***Unit 3 Jupyter Notebook***, you will see several exercises that are written in ***bold italic*** type. These exercises are to be formatively assessed by the module team.
* In fact, the following units have assessed exercises embedded within them: 1-3 & 5-6
* Exercises are worth 2, 3 or 4 marks. There are 50 marks available for all assessed exercises.
* You are expected to provide solutions to these exercises in the **Python\_Primer\_Submission** **Jupyter Notebook** (available on Blackboard in the Python Primer folder)
* Once completed you should submit this Jupyter Notebook to the Blackboard link provided in the Python Primer folder on Blackboard
* The module team will mark your solutions at regular intervals during the first two weeks of term.

**Useful Links and Resources**

* List Comprehension Tutorial: <https://www.datacamp.com/community/tutorials/python-list-comprehension>
* Python Data Types: <https://docs.python.org/3/library/stdtypes.html>
* Advanced Comprehensions: <https://petamind.com/advanced-python-comprehension/>
* Python List API reference: <https://python-reference.readthedocs.io/en/latest/docs/list/>
* Python Tuple API reference: <https://python-reference.readthedocs.io/en/latest/docs/tuple/>
* Python Set API reference: <https://python-reference.readthedocs.io/en/latest/docs/sets/>
* Python Dictionary (dict) List API reference: <https://python-reference.readthedocs.io/en/latest/docs/dict/>
* Built-in Python Functions: <https://docs.python.org/3/library/functions.html> and <https://python-reference.readthedocs.io/en/latest/docs/functions/>
* Python Data Structure Conversions: <https://towardsdatascience.com/python-data-structures-conversions-ec9d56649e3b>