Week 5 - Lecture Notes

Welcome to Week 5!

Last week, we introduced the idea of an algorithm. Continuing with this topic, this week, we will primarily be focusing on data structures. Once again, just like last week, this material could cover an entire course, so this will be a brief overview of what you need to know about data structures.

A data structure is a way of storing data and functionality in such a way as to help us solve common problems. You already have some experience with the built-in data types used in Python, like tuples, lists and dictionaries. We use different data types to do different tasks and one of the most important skills you will need in programming is knowing when to use which data structure for the task at hand. Using the wrong data structure for solving a problem can lead to poorly written code, poorly performing code or code that simply that does not work. Object oriented programming, which we will start to review in the coming weeks, extends this concept by allowing you to create your own custom data structures.

An important concept when dealing with data types, or really anything in computer science, is the difference between an abstract data type and a data type. An abstract data type simply defines an *interface*, or how one uses the data type. It specifies no exact details on how the data type actually works. This is an important distinction you will see throughout your programming careers; sometimes it is called *information-hiding* or *encapsulation*.

This week's reading will introduce you to some important data types, including stacks, queues and dequeues.