Lab 2 Notes

February 11, 2024

1 Data Structure Types:

1.1 Integers:

-Integers are whole numbers, use these for constants that are whole numbers because they make the code run faster.

1.2 Floats:

-We use this data type for non-integer numbers or those that cannot be written as whole numbers.

1.3 Strings:

-Strings are an ordered and immutable data type, meaning their data cannot be changed once declared. There are a lot of functions associated with this data type, such as .upper(), which converts all of the characters in the string to uppercase, .lower(), which converts all of the characters to lowercase, and .split(), which splits a string into different parts using a set separator value. This can be useful when you want to make each letter in a sentence its string, where the separator value is ” ”.

1.4 Boolean:

-This data type has two values, True or False. They are mainly used in if statements, for loops, while loops, and logical operators (and, or, not).

1.5 Complex Numbers:

-The imaginary number i, or $\sqrt{-1}$, is denoted as j. Has many uses in high-level math and physics, like the Fourier Transform and Signal Processing. The functions .real and .imag can access the real and imaginary parts of the complex number. The absolute value of a complex number outputs the magnitude of the vector. For example, abs(1 + 2j) will produce $\sqrt{5}$.

1.6 Lists:

-Contrary to strings, this data type is ordered and mutable, meaning we can make changes to the variable. To create the variable and access different items inside of it, you use square brackets, []. There are multiple different functions, such as append, which adds an extra value to the end of the list.

1.7 Sets:

-A mutable, unordered collection of unique items, meaning that you cannot have duplicate terms in them. Declared with curly brackets, {}. Mostly used for removing duplicates.

1.8 Tuples:

-Like strings, they are ordered and immutable, and are declared with parentheses. They are good for storing fixed data, important for memory efficiency.

1.9 Dictionaries:

-Unordered collections of key-value pairs, where the keys are unique and immutable. This is very useful for storing information about one overarching item. For example, you can define a variable called student, and using dictionaries, include information about them through keys such as their name, their age, their major, ect. Very useful for storing data under one overarching idea. For declaring these, we use {}, and we use : for each value of each key.

For the rest of class after learning about these data types, we worked on three separate problems. My favorite of the three was the third problem, as it was the one that challenged me the most. I ended up having to call back on some previous Python knowledge, and I used for loops and if statements in order to solve the problem in the way that made the most sense to me. The actual math itself wasn't very complex, but figuring out how to sort through the list of planet dictionary objects I made was difficult but fun.

[ ]: