Data Analysis Framework

Data Types

A **data type** indicates how a computer system should interpret a piece of data. The concept of a data type is used in programming to describe a variable's value, size taken by that variable in the computer memory space and the mathematical, relational, or logical operation it can undergo without causing an error.
Understanding data types will ensure that data is collected in the preferred format and that each property's value is expected.

Basic Data Types

Integer: Integer data types are identified by the keyword *int*. It typically takes 4 bytes to store an integer and ranges from -2147483648 to 2147483647.
Example: **0, 52, -52, 10, 100, -2**

Character: Character data types are used to store characters. The keyword *char* identifies a character data type. Characters usually require 1 byte of memory space ranging from -128 to 127 or 0 to 255.
Example: **'S', 'a', 'z', 'A', 'C', 'N'**

Boolean: This data type is used for storing logical values. A Boolean variable can hold either True or False. The keyword used for the Boolean data type is *bool*.
Example: **True, False**

Floating Point/ Float: The Floating Point data type stores floating or decimal values. A floating-point data type's keyword is float. This variable requires 4 bytes of memory. The keyword used for this data type is *float*.
Example: **3.15, 9.06, 0.13, 1.2, 2.567**

String: String data type is the most common type used to store text (sequence of characters). A string can also include symbols, digits, and special characters; however, it is always treated as text.
Example: **"hello world", "Bob123", 'data_@type'**

Array: A list, or array, is a data type that holds a collection of elements (same datatype) in a specific order. An array stores multiple elements or values, so the structure of data stored in an array is called an array data structure.
Example: **arr = {1,2,3,4}; arr_c = {'c', 'o', 'D', 'i', 'n', 'g'}**

Enumerated type (enum): It contains a small set of predefined unique values (also known as elements or enumerators) assigned to an enumerated data type variable. Enumerated types can have numerical or textual values. The Boolean data type is a predefined enumeration of values true and false. The enumerated type allows values to be stored and retrieved as numeric indices (0, 1, 2) or strings.
Example: **Compass directions (values of NORTH, SOUTH, EAST, and WEST), The days of the week.**

Date: Date data type typically stores date in the YYYY-MM-DD format.
Example: **2020-08-30, 1989-05-20**

Time: Time data types store a time in hh:mm:ss format. In addition to the time of day, it can also keep the elapsed time or the distance between two events which might be greater than 24 hours.
Example: **12:45:12, 20:15:42**

DateTime: DateTime datatype keeps value with date and time together (YYYY-MM-DD hh:mm:ss format).
Example: **2023-02-06 13:10:10, 1000-01-01 00:00:00, 9999-12-31 23:59:59**