Week2 Take Away Journal Michael Connell

1) The simplest way to describe the steps computer programs perform would be a list.

Computer programs perform three main steps: input, processing, and output. (Gaddis et al., 2022)

**First- Input:** The program receives input from the user or another source.

**Second-Processing:** The program uses algorithms to process the input data. This step also contains Loop, error checking, and decision-making.

**Third-Output:** The program produces output by displaying results on the screen or storing them in a file, for example. This step also includes the end/termination part of the program.

Computer programs are a set of instructions executed by a computer to perform specific tasks. These instructions are written in a programming language designed to manipulate data and produce output. The process of creating a computer program involves several steps, but the main three steps that all computer programs perform are input, processing, and output. The input step involves receiving input from the user or another source, the processing step uses algorithms to manipulate the input data, and the output step produces the results of the processing step, which can be displayed on the screen, printed, or stored in a file. These three steps work together to ensure the program runs smoothly and produces the desired results.

Chapter 2 of our book “Starting out with Python” mentions these steps a few times. However, the most specific mention is found at 2.2 Input, Processing, and Output page 35. (Gaddis et al., 2022)

Source:

Gaddis, T. (2022). Chapter 2.3 Displaying Output with the print Function. In Starting out with Python (5th ed., p. 35). essay, Pearson.

2) A programmer usually starts first by gaining an understanding of the problem that needs to be solved by clearly defining the problem, analyzing it, breaking it down into smaller parts, and communicating with stakeholders. This approach allows the programmer to determine the best path for solving the problem and ensure the final solution meets the stakeholders' requirements. During our Live session, we went through how we can use flow charts to help with all the steps required to truly understand the problems and the steps needed to get the solution. Going through this exercise I remember a briefing I received working at the VA related to Lean Sigma 6. Many of these same ideas and principles are the same in ITIL 4 which Identify processes needed to not only understand the problem but create processes and solutions that efficiently achieve the desired outcomes and add value.

3) Python variables are used to store data. They are named storage locations in a computer's memory, which can hold values that can be manipulated and used by the program. Python uses a type system, meaning a variable's type must be specified when a value is assigned to it. Here are some examples of how variables are used in Python:

**Numbers:** Integers (whole numbers) and floating-point numbers (numbers with decimal points) are value data stored in variables.

x = 5 # x is an integer

y = 3.14 # y is a float

**Strings:** Text data can be stored in variables using string data types.

name = "John Doe" # name is a string

**Boolean:** A Boolean variable can hold the value of true or false.

is\_enabled = True # is\_enabled is a Boolean

**Lists:** A list is a collection of values stored in a single variable.

Numbers = [1, 2, 3, 4, 5] # numbers is a list

**Dictionaries:** A dictionary is a collection of key-value pairs stored in a single variable.

person = {'name': 'John', 'age': 30} # person is a dictionary

**Objects:** A variable can also store an object, which is an instance of a class, it contains both data and methods.

class Car:

def \_\_init\_\_(self, make, model):

self.make = make

self.model = model

my\_car = Car("Tesla", "Model S") # my\_car is an object of the Car class

In Python, variable names must start with a letter or an underscore (\_), they can contain letters, numbers, and underscores, but they can't start with a number. Python is case-sensitive, so variable names x and X would be considered different variables.

In summary, in Python, variables are used to store data, and the type of a variable must be specified when a value is assigned to it; this type could be a number, a string, a boolean, a list, a dictionary, or an object. Python also has naming conventions and naming rules for the variables that must be followed.

4) Using a named constant in a program, such as using the constant PI to represent the value 3.14159, has several advantages over using the actual value in each statement. First, it improves the clarity and readability of the code, making it more self-explanatory. Second, it ensures consistency throughout the program so that it can be done in one place if the value needs to be changed. Third, it makes the program more maintainable by reducing the number of items that need to be updated. Fourth, it can help prevent errors in the program by ensuring that the correct value is used consistently throughout the program. And fifth, it can make the code reusable if the same constant is used in multiple places in the program or across different programs. In short, using a named constant makes the code more readable, consistent, maintainable, error-free, and reusable.

5) As to what additional material I learned this past week. I learned how little I really know. I find myself going back to the material, repeatedly. But I need to accept that as my reality until I build more hands-on experience. I also realized that it’s ok to look things up. Part of being a professional in any field is both knowing where to find the data you need while not feeling ashamed having to look something up.