Intro to Python – Lesson 25 and 26

Today we want to look at an introduction to lists. Lists are basically collections of data elements under a single name. Other programs may refer to these as arrays. Look at the following videos – the first two introduce lists and operations on lists and the third looks at processing a list using a for loop – note that you can also use a while loop.

https://www.youtube.com/watch?v=tw7ror9x32s
https://www.youtube.com/watch?v=LUoKlnK5wcc
https://www.youtube.com/watch?v=YT6ldZuBW4Y

Write the following program using functions. The program will display the following menu for the user and allow them to enter a choice.

Mo's TODO List - Main Menu

1. Display list.
2. Add item to list.
3. Delete item from list.
4. Add numbers to a list and display.
5. Validate using a list.
6. Quit

   Enter choice (1-6):

Display list will display all the values in the list with numbers at the beginning as shown below – **BONUS** is to put the numbers in front of each item. If the list is empty (the length of the list is 0) display an appropriate message

1. Buy Maurice a tea
2. Study Essentials
3. Write Python program

Add item to list will prompt the user to enter a new item for the list and add it to the end.

Delete item from list will prompt the user for the item to delete and remove that value.

Add numbers to a list and display will ask the user to input numbers until they enter a -1 to end. Once the list has been entered, display the list with one number on each line, and again with all the numbers on the same line, separated with commas.

Validate using a list will ask the user to enter a province (must be a valid two-character value), a marital status (must be S, M, W, D, O), and an item code (must ne 2, 5, 7, or 9).

Here a few examples to show different ways you can include a list in your programs. The first two exercises use lists to return multiple values from a function, and finally, exercises 3 -5 use list to store and process data.

1. Write a function that accepts the total sales for a salesperson and returns their bonus. The bonus is based on 1% of sales. If sales are less than $5000.00, the bonus will be reduced by 17% of the amount under $5,000.00, but if the sales are greater than $100,000.00, then an extra $500.00 is added to the bonus value. Also construct a Status message that reads "Under" if they are under 5000, "Normal" if they are between 5000 and 100000, and "Extraordinary" if the sales are greater than 100000. Return the Bonus and the Status.

2. Your boss has asked you to take a break from your current program and write a function that is required to perform the following. After the function, write a statement that shows how the function could be used in a calculation. The function will ask the user for a product name and a product cost. The employee discount is based on the price of the item and is calculated at 30% for items under $1,000.00, and 40% for items at $1,000.00 or more. The HST is calculated on the price before the employee discount at 15%, and the environmental tax is calculated at 2% of the discounted price. The Total cost of the item is calculated as the price less the discount, plus all taxes. The returned values from the function will be the name and cost of the item along with the discount, environmental tax, and the total cost of the item.

3. Write a program for a real estate agent to record information on home listings. Include the Listing number (9-digit number), street address, number of bedrooms, number of bathrooms, total square footage, the listing price and the date – note that a home can have multiple prices – so store the date and price for each. Finally enter the status – must be one of Open, Offer Pending, or Sold.

4. Billy Bob is a number and sorting enthusiast; he loves to play with numbers all day long. We are going to write a program to help Billy Bob in his number endeavors. We want to write a program that takes in a series of numbers, one after the other, until we input the number -1. Once we enter the number -1 into the program, the program will stop accepting inputs. At this point, the program should print all the numbers we have entered so far in the order that we entered them. It will then take all the number, sort them, and print the numbers to the screen in sorted order. Also determine and find the total of all the numbers, the average of all the numbers, the maximum value, the minimum value, and a list of duplicate values in the list. Display each with an appropriate heading. This will no doubt save Billy Bob many hours per day of manually sorting using pen and paper.

5. Write a program that allows the user to enter a customer order for tech services with multiple items. The invoice number will start at 10367 and the invoice date is the current system date.

   Start by entering the customer's name (Must be entered), and phone number (Must be 10 digits and all digits).

   Now allow the user to enter multiple items on the order including the item description, item price, and the quantity purchased. Calculate the subtotal as the item price by the quantity. Continue to add items until the user enters an ending value for the item desc. Add each item to lists for further processing.

   Once all items have been entered, enter the payment method (Must be Cash, Debit, Visa, or Mastercard). Validate that one of these values are entered using a list.

   Print the invoice to appear as follows:

```
            1         2         3         4         5         6
   123456789012345678901234567890123456789012345678901234567890 12

   Tech Services Inc.                        Invoice No:      #####
   Customer Invoice                          Invoice Date: dd-Mon-yy

   Customer: XXXXXXXXXXXXXXXXXXXX  (XXX) XXX-XXXX

   Item Description          Item Price    Quantity Purchased    Subtotal
   -------------------------------------------------------------------------------
   XXXXXXXXXXXXXXXXXXXX        $###.##              ##            $#,###.##
                                 :
                                 :
   XXXXXXXXXXXXXXXXXXXX        $###.##              ##            $#,###.##
   -------------------------------------------------------------------------------
   Total items / services ordered: ##                           $##,###.##

   Payment Method: XXXXXXXXXX               Payment Due: dd-Mon-yy
```

   Use the len() and sum() methods on the lists to determine the Total services ordered and the total. The Payment Due is calculated based on 20 days or the first day of the next month, whichever is later. Calculate both and compare the dates to find which is further in the future.

See you at 1.