Adamson University
College of Engineering
Computer Engineering Department

Linear Algebra

Laboratory Activity No. 1

Getting acquainted with Python

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I. Objectives

This laboratory activity aims to implement the principles and techniques of basic python and using different functions.

II. Methods

The activity aims to practice the different functions and techniques in accessing and manipulating arrays. It implies that elements of an array can easily be accessed using their addresses or indices. It also teaches that an array have different functions that can be used to manipulate the array. One sample of which is the sort function that was used in one of the activities.

The deliverables of the activity are: To display the contents of an array; To get the first three elements of an array; and to insert elements into the array. I was able to achieve the first deliverable by directly accessing the values of the array using the indices. I was able to achieve the first deliverable by using the sort function to arrange the array from lowest to highest then using a for loop function to display the first three elements. Then for the third deliverable, I was able to achive it by using the append function of arrays to add elements into a newly declared array.

III. Results

In exercise one of the laboratory which the output is shown in Figure 1, it's simply used a two arrays with different values inside of it then called its different values using its index. The exercise must have an output of printing out series of sentences with different kinds of values. Array function is used to declare the array and so the integer array is available to call also once it will be show its outcome.

```
In [3]: import array as arr
        party = (['Charmander', 'Pidgey', 'Sandshrew', 'Rattata', 'Abra'])
        levels = arr.array('i', [15, 11, 18, 5, 14])
        print(party[0], "at level", levels[0])
        print(party[1], "at level", levels[1])
        print(party[2], "at level", levels[2])
        print(party[3], "at level", levels[3])
        print(party[4], "at level", levels[4])

        Charmander at level 15
        Pidgey at level 11
        Sandshrew at level 18
        Rattata at level 5
        Abra at level 14
```

Figure 1 Exercise 1

The next exercise is asking for the top three highest or lowest value or the pokemons to be specific, it should print out the top three pokemon as the outcome of the exercise which is shown in the Figure 2 below. In order to achieve it, declaring the pokemons as variables with their corresponding names and levels is the most easiest way to call them in both values. Using their variable names, create an array then call them inside of it. Create new variable name to sort out the array of pokemon then now use for loop in order and range it three in order to print out the top three pokemon that's been sorted out and the final output is ready.

```
In [8]: print("Pokemon Reserves")
        ##pokemon = ['Onix', 'Slowpoke', 'Dialga', 'Magikarp', 'Feebas', 'Swablu' 'Regigigas', 'Unown']
        a = 10, 'Onix'
        b = 18, 'Slowpoke'
        c = 2, 'Dialaga'
        d = 32, 'Magikarp'
        e = 22, 'Feebas'
        f = 19, 'Swablu'
        g = 3, 'Regigigas'
        h = 50,'Unown'
        pokemon = ([a, b, c, d, d, e, f, g , h])
        topthree = sorted(pokemon)
        for i in range(3):
            print(topthree[i])

        Pokemon Reserves
        (2, 'Dialaga')
        (3, 'Regigigas')
        (10, 'Onix')
```

Figure 2 Exercise 2

The last exercise in this laboratory asks to create a function in order to print out the given outcome of different pokemons that is shown in the Figure 3. Create a function, name it then create a variavle inside which you will call later on so the methods will run. After creating a main function, the array will follow which the variable name is same as what's inside the function since it will be called later then after, this where the analization of the program will follow which decisions will be made on how the program will print out the expected outcome and to do that, copying the first variable function in order duplicate the given names in the array then using append function, it allows to insert new value from the second variable and the use of return there is to return the value of the given variable name so duplication will not be created. Using the for loop in range three and creating new variable in calling the two array variable, this will allow to print out the desired outcome that ranged into three list of pokemons with different values at the end, that happens because of the copy and append function that's why duplication didn't occur on the last values of the given list.

```
In [7]: def create_party(party, candidates):
            suggested_party = party.copy()
            suggested_party.append(candidates)
            return suggested_party

        party = (['Charmander', 'Pidgey', 'Sandshrew', 'Rattata', 'Abra'])
        candidates = (['Unown', 'Magikarp', 'Feebas'])

        for i in range(3):
            new_party = create_party(party, candidates[i])
            print(new_party)

['Charmander', 'Pidgey', 'Sandshrew', 'Rattata', 'Abra', 'Unown']
['Charmander', 'Pidgey', 'Sandshrew', 'Rattata', 'Abra', 'Magikarp']
['Charmander', 'Pidgey', 'Sandshrew', 'Rattata', 'Abra', 'Feebas']
```

Figure 3 Exercise 3

IV. Conclusion

1. In your perspective, what is the difference between Python and C++ or other languages you have used before? (30 words)

Python is more defined language, has wider benefit, easy to manipulate and makes a program visualizable than a C++ that is more basic and other programming languages that is complex.

2. Enumerate and briefly discuss the functions you have used in the laboratory exercise, please cite their usage using their respective documentations. (200 words)

The laboratory exercises used an array to call the values insides that helps to easily print out the expected outcome of the exercises. The first function that can be noticed is the ‘arr.array’ function that is used to call or declare the list of values as an array which commonly used if the array is an integer. The first exercise has two arrays which are the ‘party’ and the ‘levels’ then it has to be printed out and call the values using its index so it can be printed consecutively. The next function that’s been used is the sort function of the array which sorts out the value into ascending order in order to determine the top there that’s been given in exercise two, also, it uses for loop with a range of three so it will only show the top three among the given values. In the third exercise, there’s a given function that needed to define and be called it as ‘party’ and ‘candidates’ then call it below for it to run the other functions above before it prints the final outcome. There’s also the copy function which intends to copy the whole value of an array and append function that allows adding new value to the list of the array then also used a for loop in range three to print out the defined functions three time with different values.

3. In your perspective, what is the advantages and disadvantages of using Python and Jupyter Notebooks? (100 words)

In my own opinion, using Jupyter Notebook in coding a program for Python is very efficient and easy to use because it made the language even more simple but well-defined so every method or functions can also be understandable. It benefits the users a lot and this also free for everyone, can also be used online if its not downloaded in desktop but the downside is the saving method since I found it kinda hard to manipulate in terms of saving the code or finding it after saving but the all in all performance of it Jupyter is very satisfying.

Code Link

https://github.com/cherrylyncanoza/Linear-Algebra

References

[1] D.J.D. Lopez. “Adamson University Computer Engineering Department Honor Code,” AdU-CpE Departmental Policies, 2020.