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Guardian Directory

Introduction

Dictionaries in Python hold information that can be accessed using keys (Mastrodomenico, 2022). Python dictionaries are able to retrieve stored data quickly (Overland, 2017). Therefore, they are ideal in programmes that are specifically designed for record keeping such as phonebooks. With these in mind, a Python dictionary will be used to create a contact book called “Guardian Directory (GD)”. GD is intended to be a phonebook programme that can be used by early learning centers (ELC) such as nurseries, daycares, and preschools.

The GD can be used for the record management of the contact information of family members and guardians of students in ELCs. They can be used when ELC teachers and staff need to look for their contact information if there is a need to correspond with them regarding school announcements or for matters related to the student they are responsible for. These types of databases are helpful in early childhood learning centers.

Data Structure

The data structure that will be utilised for the GD is the associative array, also known as dictionaries. They are regarded as associative arrays due to their ability to plot associated values with their respective keys (Sturtz, 2018). According to Mastromatteo (2020), this is due to hash functions. He further explains that since values are set and hash yields identical results, the computing process is speedy.

We learn from Chris (2022) that CRUD, which is short for Create, Read, Update, and Delete, is a requirement in executing applications. He adds that they should contain a user interface, server, and database. The Guardian Directory partly applies the CRUD operations. We mentioned partly, since this programme currently does not have the option to update the contact information, only insert (create), search (read), and delete. In lieu of this, we have the sorting option, which would display the contact names alphabetically. Data that will be held in the database are the first name, last name, address, contact number, and e-mail of the guardians.

Algorithm Design

In order to better demonstrate how to use the GD, we will use Flode. Flode is designed to demonstrate flowcharts (Codio, 2023). Please note that Flode shows the start and end of each process. Start will always be the first step, while end will always be the last. Only the steps between the beginning and the end of the program will be explained in the step by step process in the flowcharts below.

We start with inserting the contacts. The programme will prompt the user to add a contact. Once selected, the user can insert the following information: first name, last name, address, contact number, and e-mail address of the new contact. The GD will display the message “Successfully added new contact” when the save option is select-ed.

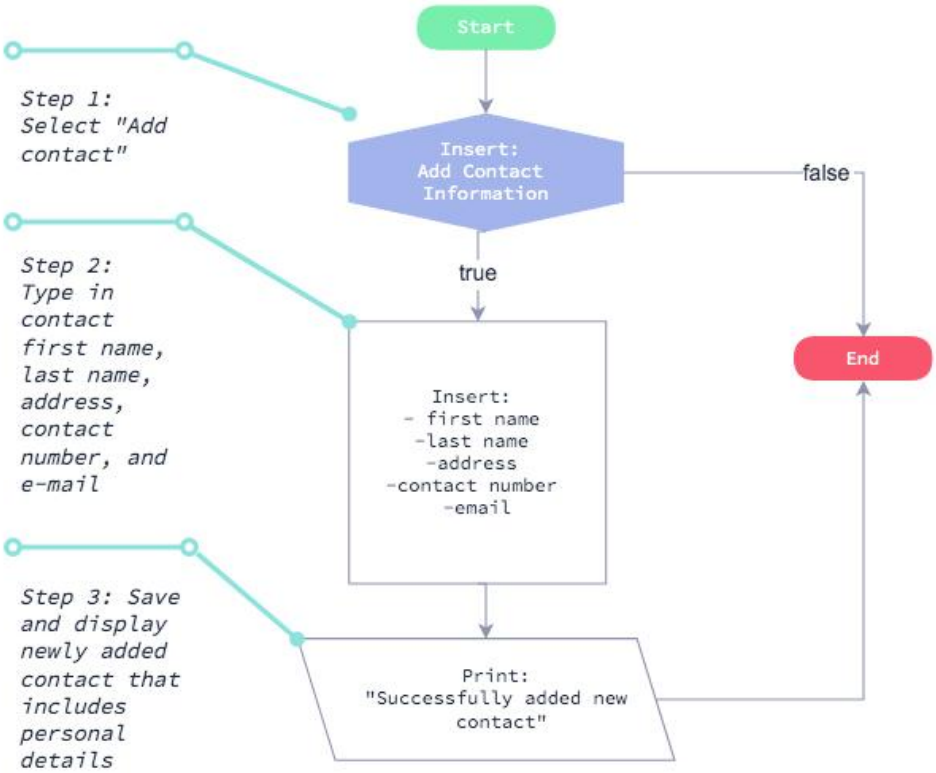

Figure 1: Adding a new contact

The next command is deleting a contact information in its entirety. The user can type in the name of the contact. When the contact is selected, there is an option to remove it together with all the details that are stored with it. Once this action is confirmed, and a

message that says ”Contact deleted” is displayed, they will be removed from the database.

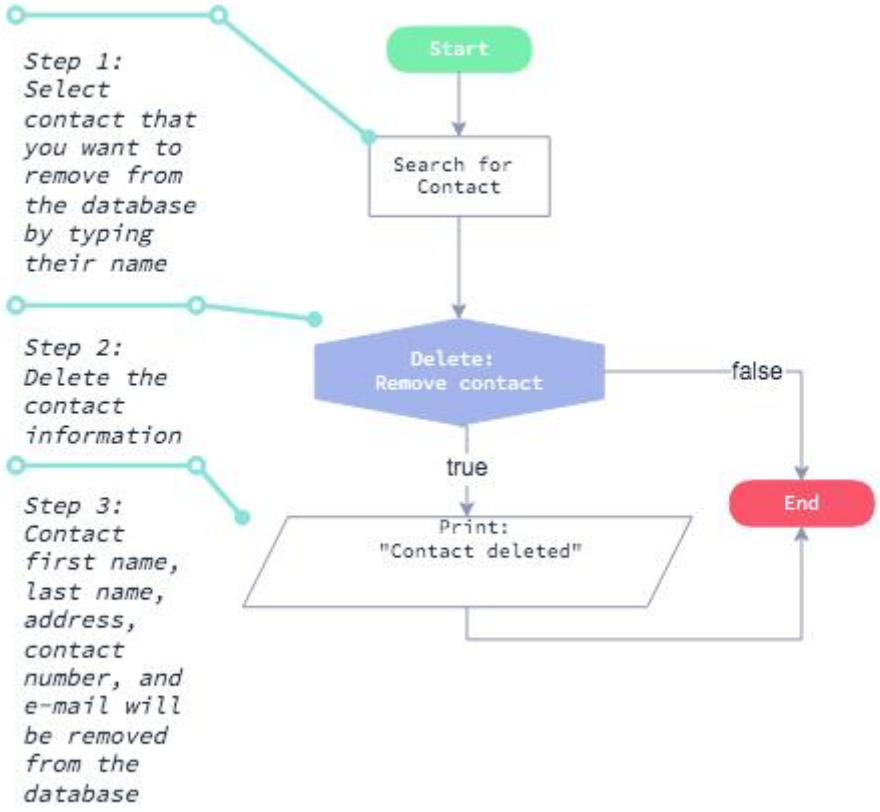

Figure 2: Deleting a contact

In order to search for a contact, the user should type in their name in the search bar. The GD will then display the contact information.

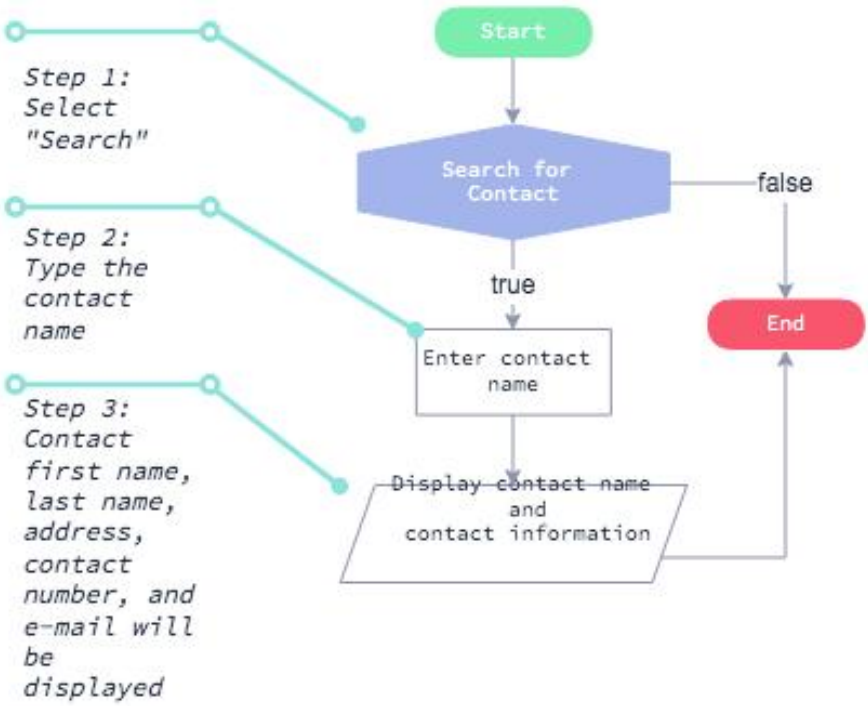

Figure 3: Searching for a contact

The last command that the GD can execute is sorting. The programme will display the “Sort Database” option, which would list the first names of the contacts in alphabetical order. This would enable the user to look through the contacts easily.

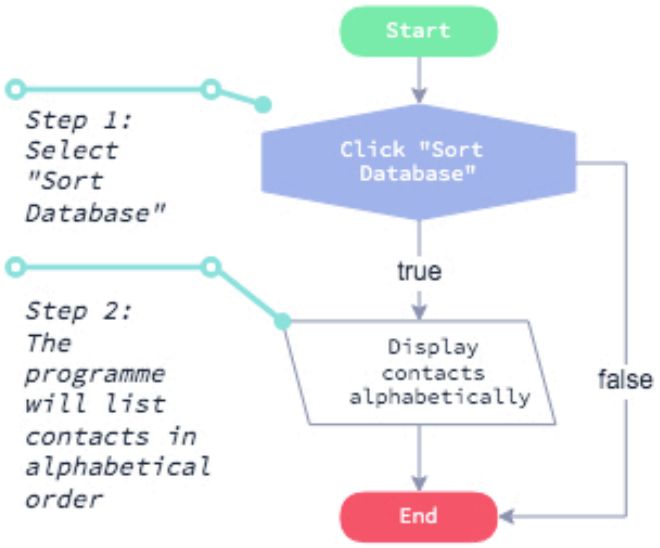

Figure 4: Sorting contacts

Testing

Testing would be crucial in determining whether the commands in the programme will run smoothly. In order to check whether the plan for the Guidance Directory is viable and executable, we will run a Unit Test using unittest. The unittest is an automated Python built-in which is designed to run tests, where an OK result will come out if it works, while Fail (F) if it does not (Pajankar, 2017). Chng (2022) states that Unit Testing examines each software unit to check whether they are working or not. We can therefore use this testing method to run each command in the GD, as shown in the table below.

	Test will pass if:	**Else:**
Insert	Programme saves contact: 1) First name 2) Last name 3) Address 4) Contact num 5) E-mail **Result: OK**	Test will **Fail (F)** if conditions are not met
Delete	Programme removes contact: 1) First name 2) Last name 3) Address 4) Contact num 5) E-mail **Result: OK**	
Search	Programme displays contact : 1) First name 2) Last name 3) Address 4) Contact num 5) E-mail **Result: OK**	
Sort	Program arranges contacts in database in alphabetical order **Result: OK**	

Figure 5: Test checkpoints using Unit Testing

Conclusion

Python dictionaries, also known as associative arrays, are useful in creating programmes that would execute like a database, such as this Guardian Directory. Since

dictionaries are executed through hash functions, adding, deleting, sorting, and searching for keys become straightforward once connected to their related value. In order to make sure that the programme would run smoothly, a Unit Test can be run to check whether the GD can execute their intended function. The CRUD method can guide developers when designing python dictionaries. Since this programme is in its initial stages, further complexities in its execution can be developed in the future, such as completing the Update (U) method in CRUD wherein users can update contact details. Other testing methods, such as Quality Testing, can also be run in order to ensure the efficiency of the programme.

References:

Chng, Z. M. (2022) A Gentle Introduction to Unit Testing in Python. Available from: https://machinelearningmastery.com/a-gentle-introduction-to-unit-testing-in-python/ [Accessed 27 September 2023].

Chris, K. (2022) CRUD Operations- What is CRUD? Available from: https://www.freecodecamp.org/news/crud-operations-explained/ [Accessed 27 September 2023].

Codio (2023) Flode. Available from: https://docs.codio.com/instructors/setupcourses/resources/resourcetools/flode.html# [Accessed 27 September 2023].

Mastrodomenico, R. (2022) *The Python Book.* New Jersey: Wilden. Available from: https://learning.oreilly.com/library/view/the-python-book/9781119573319/ [Accessed 26 September 2023].

Mastromatteo, D. (2020) Python Hashtables: Understanding Dictionaries. Available from: https://thepythoncorner.com/posts/2020-08-21-hash-tables-understanding-dictionaries/ [Accessed 1 October 2023].

Overland, B. (2018) *Python Without Fear.* Boston: Addison-Wesley. Available from: https://learning.oreilly.com/library/view/python-without-fear/9780134688251/ [Accessed 26 September 2023].

Pajankar, A. (2017) *Python Unit Test Automation: Practical Techniques for Python Developers and Testers.* New York: Apress. Available from: https://learning.oreilly.com/library/view/python-unit-test/9781484226766/ [Accessed 27 September 2023].

Sturtz, J. (2018) Dictionaries in Python. Available from: https://realpython.com/python-dicts/ [Accessed 27 September 2023].

Bibliography:

Alwayswin, J. (2017) CRUD System Flowchart. Retrieved from: https://code-schart.blogspot.com/2017/02/crud-system-flowchart.html [Accessed 26 September 2023].

Monk, S. (2014) *Raspberry Pi Cookbook.* California: O'Reilly. Available from: https://learning.oreilly.com/library/view/raspberry-pi-cookbook/9781449365288/ [Accessed 26 September 2023].

Oliveira, B. (2018) pytest Quick Start Guide. Birmingham: Packt Publishing. Available from https://learning.oreilly.com/library/view/pytest-quick-start/9781789347562/.

Pajankar, A. (2022) *Python Unit Test Automation: Automate, Organize, and Execute Unit Tests in Python.* New York: Apress. Available from: https://learning.oreilly.com/library/view/python-unit-test/9781484278543/ [Accessed 26 September 2023].