Data Structure and Algorithm

Laboratory Activity No. 4

Arrays

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# Objectives

Introduction

Array, in general, refers to an orderly arrangement of data elements. Array is a type of data structure that stores data elements in adjacent locations. Array is considered as linear data structure that stores elements of same data types. Hence, it is also called as a linear homogenous data structure.

This laboratory activity aims to implement the principles and techniques in:

* Writing algorithms using Array data structure
* Solve programming problems using dynamic memory allocation, arrays and pointers

# Methods

Jenna’s Grocery

A list of grocery items

AI-generated content may be incorrect.

Jenna wants to buy the following fruits and vegetables for her daily consumption. However, she needs to distinguish between fruit and vegetable, as well as calculate the sum of prices that she has to pay in total.

Problem 1: Create a class for the fruit and the vegetable classes. Each class must have a constructor, deconstructor, copy constructor and copy assignment operator. They must also have all relevant attributes (such as name, price and quantity) and functions (such as calculate sum) as presented in the problem description above.

Problem 2: Create an array GroceryList in the driver code that will contain all items in Jenna’s Grocery List. You must then access each saved instance and display all details about the items.

Problem 3: Create a function TotalSum that will calculate the sum of all objects listed in Jenna’s Grocery List.

Problem 4: Delete the Lettuce from Jenna’s GroceryList list and de-allocate the memory assigned.

# Results

A screen shot of a computer program

AI-generated content may be incorrect.

Figure 1 Screenshot of program

Please refer to this link:

[CPE-201L-DSA-2-A/DSA\_Lab\_Report\_4.ipynb at main · sebastianacebedo/CPE-201L-DSA-2-A](https://github.com/sebastianacebedo/CPE-201L-DSA-2-A/blob/main/DSA_Lab_Report_4.ipynb)

In this program, I created a grocery list system using Python and object-oriented programming. I made a base Grocery class with attributes for name, price, and quantity, along with methods to copy items, assign values, calculate the total price, and a destructor to show when an item is deleted. I also created two subclasses, Fruit and Vegetable, to represent different types of groceries. Then, I made a GroceryList class to store multiple grocery objects and added functions to add items, display them, calculate the total cost, and delete a specific item. In the main() function, I added different fruits and vegetables to the list, displayed the items and their total cost, deleted Lettuce from the list, and then showed the updated list with the new total cost.

# Conclusion

From what I learned in this activity, I can say that arrays are very useful for storing multiple values in a single variable, making it easier to manage and organize data. By using arrays, I can group related items together, access them using an index, and perform operations like adding, updating, or deleting elements efficiently. This allows me to handle large sets of data without creating multiple separate variables, making my code more organized, readable, and easier to maintain.

In this code, I learned how to apply the concept of arrays (or lists in Python) to store grocery items as objects, how to add new elements, display them, calculate the total cost, and delete a specific item like Lettuce. I also learned how destructors work to free memory when an object is deleted, making the program more efficient in handling resources.

**References**

[1] Co Arthur O.. “University of Caloocan City Computer Engineering Department Honor Code,” UCC-CpE Departmental Policies, 2020.