CSE 112 : Object Oriented Programming Lab
Lab - 11

Intake 52
Section - 4

May 6, 2024

Lab Tasks

Task 1

- **Abstract Class Animal:**
  - Define an abstract class `Animal`.
  - Include pure virtual functions:
    - `makeSound()`: Makes the animal's sound (e.g., meow, bark, moo).
    - `getName()`: Returns the animal's name (optional).
- **Concrete Derived Classes:**
  - Implement derived classes like `Dog`, `Cat`, and `Cow` inheriting from `Animal`.
  - Implement `makeSound()` in each class to produce the specific animal sound.
  - Optionally, implement `getName()` in derived classes to store and return the animal's name.
- **Abstraction Implementation:**
  - Utilize the `Animal` class in the `main()` function.
  - Demonstrate the idea of abstraction by using pointers of type `Animal` to refer to objects of the derived classes.
  - Use the base pointer to call the `makeSound()` and `getName()` function, letting the actual implementation details be hidden behind the abstraction.

Task 2

- Write a generic function named `findMaximum` that takes an array of the same data type and returns the maximum value.
  - The generic function is designed to work with arrays of any data type.
  - It iterates through the array to find and return the maximum value.
- In the `main()` function, use the generic function to find the maximum of arrays containing integers, doubles, and characters.
  - For integers: `intArray[] = {5, 10, 3, 8, 2}`
  - For doubles: `doubleArray[] = {3.14, 2.718, 1.618, 2.22, 0.99}`
  - For characters: `charArray[] = {'A', 'B', 'Z', 'D', 'C'}`
- Display the results to show the maximum values for each array type.

Task 3

- Create a generic class named `Container` capable of storing elements of any data type.
  - The class utilizes templates to provide flexibility for different data types.
  - Member functions include:
    - `addElement`: Adds elements to the container.
    - `displayElements`: Displays the elements stored in the container.
    - `getSize`: Determines the size of the container.
- In the `main()` function, create objects of the `Container` class for different data types (e.g., `int`, `double`, `char`).
  - Demonstrate the usage of these objects by adding elements, displaying the elements, and finding the size of the containers.