21BCS052
10/3/23

INHERITANCE: BASE CLASSES AND DERIVED CLASSES

Objectives:
The objective of this lab assignment was to delve into the concepts of derived classes, access specifiers, constructors, and virtual functions in C++. This involved:

Derived Classes and Access Specifiers:

- Created a derived class **Location** from the base class **Point**, understanding the implications of public inheritance.
- Implemented a parameterized constructor in the derived class and called constructors in the base class using the '**:**' operator.
- Explored object instantiation with various constructors, observed which constructors get invoked based on different parameters provided during object creation.

Constructor Overriding and Function Overriding:

- Overrode constructors and a function (**distFrom**) in the **Location** class to calculate geodesic distances between locations instead of Euclidean distances.
- Computed total distance traveled by a delivery truck between multiple locations by considering the geodesic distances.

Abstract Classes and Virtual Functions:

- Declared an abstract class **Element** and created a pure virtual function **print**.
- Modified classes **Point** and **Vector** to inherit from **Element** and provided implementations for the **print** function.
- Speculated and tested calling the **print** function from an object of type **Location**, understanding why or why not it can be called.

Challenges:

- Understanding the inheritance and constructor calling sequence between base and derived classes required careful attention, especially when passing arguments from derived to base constructors.
- Implementing the geodesic distance calculation for the **distFrom** function involved complexities in handling geographical coordinates and distances on Earth's surface.

Key Notes:

- Public inheritance allows derived classes to access public members of the base class, enabling code reuse and extension.
- Overriding functions in derived classes can modify the behavior defined in the base class, allowing for specialized functionality in derived instances.

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Conclusion:

This lab assignment provided comprehensive insights into the utilization of derived classes, constructors, function overriding, and polymorphism in C++. It offered practical exposure to inheritance, abstract classes, and the implications of virtual functions in object-oriented programming.