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Lab Report 4: Inheritance, Polymorphism and Abstract classes

This lab explores the concepts of Inheritance, Polymorphism and Abstract classes. These concepts are import to CS and Engineering when one makes programs larger than a single task. The idea of deriving classes is very convenient when trying to make or maintain larger projects. Making two similar classes with similar code is redundant, you end up having dozens of classes, you have many lines of similar code. Changing the code across classes is redundant and time consuming. Using base and derived classes and understanding the concepts associated with them, saves time and memory. Being able to make a base class that all derived classes can use means you only should write that code once. With that, understanding how member functions that are virtual and those that are not virtual is important to designing the base and derived classes.

Task 1

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Member functions and variables | age | getAge() | setAge() | name | getName() | setName() | Animal() | Animal(string name, float age) | eat() | move() |
| Access level | protected | Public | Public | protected | public | public | public | public | public | public |

Task 2

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Member functions and variables | age | Getters and setters for age | name | Getters and setters for name | eat() | move() | isMini | Getters and setters for isMini | freshWater | Getters and setters for freshWater |
| Derived Class- Horse | Base | Base | Base | Base | Derived | Derived | Derived | Derived | N/A | N/A |
| Derived Class- Fish | Base | Base | Base | Base | Derived | Derived | N/A | N/A | Derived | Derived |
| Base Class- Horse | Base | Base | Base | Base | Base | Derived | Derived | Derived | N/A | N/A |
| Base Class- Fish | Base | Base | Base | Base | Base | Derived | N/A | N/A | Derived | Derived |

Task 3