Data Structure (2028C) - Spring 2022 – Lab 4

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Lab Submission:

a. *A description of the objectives/concepts explored in this assignment including why you think they are important to this course and a career in CS and/or Engineering.*

The objective of this lab is to examine the concept of Inheritance, Polymorphism, and Abstract classes. These concepts are important, they are part of the OOP concept which we would see every day in professional work. It is the basis of all complicated programs/app of which we use in our daily life. This lab helps us to develop and have a chance to practice declaring and using the base and derived in efficient way, before we move to those Linked-list, Stack and Queue, etc. which are more complicated to go through by using proper base and derived classes.

b. *The sections from each task:*

Task 1: How each member will be available in derived classes (i.e. not available, available, available if not overridden, etc...)?

Those members of the base class will be available in the derived classes, but we do not need to initialize it again. Also, we can override those functions in the base class to fit the need of our derived classes as well as adding more attributes to the derived classes.

Task 2: What version of the derived class members will be available in instances of the derived class and in instance of the derived class declared as the base class type?

In the instance of the derived class of TV Show, the members that will be available will be the int's seasons and episodes, as well as a show pointer to an array of episodes, functions details(int, int), Play(), and setters and getters for Seasons, Episodes, and an array of episodes.

In the instance of the derived class of Movie, we have access to the protected string credits, as well as a getter function for credits, setter for credits, and the function Play().

As for the derived classes declared as base class type, the base class is allowed to access the public functions of the derived classes, but not the protected or private. So, for TVShow it can access all its functions but not its protected episodes, seasons, and seArray. For the movie class, it will be able to access all its functions, but cannot directly access its string variable credits.

Overall, if we just call the derived class itself, it would be able to use the attributes as well as the function inherited from the base class. However, when we use the base class to declare the instance for the derived class, the instance will then be used mostly in the base class. It will not be able to use some functions in its derived class. And as for the derived classes declared as base class

type, the base class is allowed to access the public functions of the derived classes, but not the protected or private.

Task 3: A discussion of how actual results compared with the expected results from Task 2.

When we were originally crafting our task two, we consistently produced issues and confusions of how to deal with the declaration of the derived classes Movie and TVshow as shows, as well as how to deal with the declaration and output of the array seArray(Seasons and episodes). When going through task three, we found initially that the output of a TVshow resulted in an array successfully made, but completely empty. We eventually were able to troubleshoot this by producing sample episodes and seasons and allowing the user to choose from those. As for the output of Movies and TVShows declared as Show, we made pointers of type Show that pointed at new objects of TVShow and Movie, which then outputs as whatever derived class it was pointing at.

Screenshot of Outputs:

The program was coded and executed using Repl.it (I have changed some of the cout, so the description would be different from what below)

```
-------------------------------------------------
List of action for running program
1. For an instance of Show.
2. For an instance of Movie.
3. For an instance of TV Show.
4. For an instance of Movie declared as Show.
5. For an instance of TV Show declared as Show.
6. Exit

Your choice: 1

The show is now showing ...

Title: Sword Art Online
Description: A teenager being a trap in a deathly game
```

```
------------------------------------------------
List of action for running program
1. For an instance of Show.
2. For an instance of Movie.
3. For an instance of TV Show.
4. For an instance of Movie declared as Show.
5. For an instance of TV Show declared as Show.
6. Exit

Your choice: 2

Now showing a movie:

Opening Credits:
Hollywood

Title: Avatar
Description: A blue guy on a planet
```

```
------------------------------------------------
List of action for running program
1. For an instance of Show.
2. For an instance of Movie.
3. For an instance of TV Show.
4. For an instance of Movie declared as Show.
5. For an instance of TV Show declared as Show.
6. Exit

Your choice: 3

Looking for a TV show ...

Which season are you looking for?
Enter: 3

Which episode would you like?
Enter: 3

Title: Sex Education
Description: A teenager learn how to have safe sex

Now showing season 3, episode 3
```

```
------------------------------------------------
List of action for running program
1. For an instance of Show.
2. For an instance of Movie.
3. For an instance of TV Show.
4. For an instance of Movie declared as Show.
5. For an instance of TV Show declared as Show.
6. Exit

Your choice: 4

Now showing a movie ...

Title: How to train your dragon
Description: A kid try learn how to train a dragon and then change the mi
ndset of his people
```

```
------------------------------------------------
List of action for running program
1. For an instance of Show.
2. For an instance of Movie.
3. For an instance of TV Show.
4. For an instance of Movie declared as Show.
5. For an instance of TV Show declared as Show.
6. Exit

Your choice: 5

Looking for a TV show ...

Which season are you looking for?
Enter: 3

Which episode would you like?
Enter: 3

Title: Sex Education
Description: A teenager learn how to have safe sex

Now showing season 3, episode 3
```