100pts	Name 1: _	
	Name 2: _	
	Class Day / Time: _	
	Due Date: _	

Lab #16: Polymorphism

Create a class to track Farmer Pete's livestock, which are sheep & pigs. Using polymorphism, keep all animals in a single doubly-linked list.

For each animal the class should be able to track the

- -Name & age
- -Create methods to retrieve any of the attributes listed.
- -Overload the constructor such that all attributes can be initialized when an object is instantiated.
- -Define the destructor, display, displayTable, and speak methods of the base class to be virtual.
- -Display should Display an individual animal.
- -Display Table should be able to display in table format (see sample output)
- -Speak should allow the animal to speak in its own voice (return a string with the animal's sound).

Derive classes from the animal class: Sheep & Pig.

- -The sheep class should be extended to handle a wool type and wool color.
- -The pig class should be extended to account for a TailType.
- -Override all of the display methods in both classes to include the extended attributes.
- -Override the speak methods in both classes to speak the language of the animal specified (sheep baa, pigs oink)
- -Use enumerated types for the main menu, the WoolType, and TailType.

Wool Types: LONG, MEDIUM, FINE, CARPET

Tail Types: STRAIGHT, CORKSCREW, CURL UP, CURL RIGHT, CURL LEFT

Using Polymorphism, all animals should be stored in a single list using references to the base class. This class should also provide methods to:

- -Add an animal (Pig or Sheep) to the list (in alphabetical order)
- -Remove an animal by name
- -Display the first animal
- -Find and Display an animal
- -Return the list size
- -Display the list of animals in a table format
- -Clear the list

Provide the following menu and associated functionality.



1 - Add Animal

- 2 Remove Animal
- 3 Output 1st Animal
- 4 Find Animal
- 5 List Size
- 6 Display Table
- 7 Clear List
- 0 Exit

Enter a command: 1

The Display Table option for the Farmlist should Output a table formatted as follows:

ANIMAL	NAME	AGE	WOOL/TAIL TYPE	FOLLOWED BY
Pig	Babe	2	Straight	Maa
Sheep	Maa	9	Long (Black)	Nobody

There are 2 animals on the Farm!

All input values should be error checked (use generic functions).

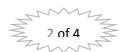
Sheep Max Age = 9

Pigs Max Age = 20

Test your code thoroughly.

Turn in (IN THIS ORDER - stapled)

- 1. The **first page** of this lab
- Output → cut and pasted to a txt file within eclipse and printed
- 3. **Header Files** (General header file then class header file)
- 4. Main
- 5. Implementation of Class Methods
- 6. Implementation of any necessary functions



```
Lab #16
                                   Polymorphism
* WELCOME TO THE ANIMAL LIST MANAGER *
***********
1 - Add Animal
2 - Remove Animal
3 - Output 1st Animal
4 - Find Animal
5 - List Size
6 - Display Table
7 - Clear List
0 - Exit
Enter a command: 1
ANIMAL TYPE:
(P) - Pig
(S) - Sheep
Selection (P/S): S
Sheep's Name: Dah Baa
Sheep's Age: 1
Sheep Wool Type:
(L) - Long
(M) - Medium
(F) - Fine
(C) - Carpet
Enter Choice (L/M/F/C): 1
Sheep Color:
(B) - Black
(W) - White
Enter Choice (B/W): b
The animal:
( My name is Dah Baa and I like to baa! )
( I have been baaing for 1 year(s)!
( I am the first in line...
I have Black wool and it is Long!
I have been added to the front of the list.
<redisplay menu>
Enter a command: 1
```

```
Pig's Age: 5
Pig Tail Type:
(S) - Straight
(C) - Corkscrew
(U) - Curls Up
(R) - Curls Right
(L) - Curls Left
Enter Choice (S/C/U/R/L): s
The animal:
( My name is Babe and I like to oink! )
( I have been oinking for 5 year(s)! )
( Dah Baa is following me!
     (_o_o_)'
I have a tail that goes Straight!
I have been added to the front of the list.
<redisplay menu>
Enter a command: 1
Enter the Pig's name: Petunia
Enter the Pig's age: 12
Pig Tail Type:
(S) - Straight
(C) - Corkscrew
(U) - Curls Up
(R) - Curls Right
(L) - Curls Left
Enter Choice (S/C/U/R/L): C
( My name is Petunia and I like to oink! )
( I have been oinking for 12 year(s)! )
( I am last in line...
       (( ,---. ))
( (_o_o_)' /
          [_] [_]
```

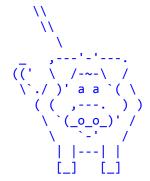
Pig's Name: Babe

I have a tail that Corkscrews!
I am at the front of the list.

<redisplay menu>
Enter a command: 4

Who are you looking for? Petunia

```
( My name is Petunia and I like to oink! )
( I have been oinking for 12 year(s)! )
( I am the last in line... )
```



<redisplay menu>
Enter a command: 5

There are 3 animals on the Farm!

<redisplay menu>
Enter a command: 6

ANIMAL	NAME	AGE	WOOL/TAIL TYPE	FOLLOWED BY
Pig Sheep	Babe Dah Bah		Straight Long (Black)	Dah Bah Petunia
Pig	Petunia	12	Corkscrew	Nobody

There are 3 animals on the Farm!

CS 1B

I have White wool and it is Long! <POOF> Dah Baa is no longer baaing on this farm!

<redisplay menu>
Enter a command: 7

Clearing the Farm:
removing Babe...
removing Petunia...
The list has been cleared!

<redisplay menu>
Enter a command: 0