Inheritance Lab

Due Dec 15 by 11:59pm   **Points** 30   **Submitting** a file upload

Ship, CruiseShip and CargoShip Classes

Design a Ship class that has the following members:

- A member variable for the name of the ship (a string)
- A member variable for the year that the ship was built (a string)
- A constructor and appropriate accessors and mutators
- A virtual print function that displays the ship's name and year it was built.

Design a CruiseShip class that is derived from the Ship class. The CruiseShip class should have the following members:

- A member variable for the maximum number of passengers (an int)
- A constructor and appropriate accessors and mutators
- A print function that overrides the print function in the base class. The CruiseShip class's print function should display only the ship's name and the maximum number of passengers

Design a CargoShip class that si derived from the Ship class. The CargoShip class should have the following members:

- A member variable for the cargo capacity in tonnage (an int).
- A constructor and appropriate accessors and mutators
- A print function that overrides the print function in the base class. The CargoShip class's print function should display only the ship's name and the ship's cargo capacity.

Demonstrate the classes in a program that has an array of Ship pointers. Your program will read in a list of Ship, CruiseShip and CargoShip objects from a comma delimited file (see below). The name of that file will be passed in as a command line argument. It will parse each line read and create the appropriate dynamically allocated Ship, cruiseShip or CargoShip objects.

The program should then sort the array by the name of the ship.

Then the program should step through the array three times, printing just the ships first, then the CargoShip's, then the CruiseShips.

Extra Credit. Modify your sort routine to sort by Ship Type first, then Ship Name. You cannot add any member variables to the classes, so you will have to be able to determine the type another way. If you take this route, you should only have to step through the array once.

Comma Delimited File. **Note: For a "Ship", the fourth field is not used. The 0 is included to simplify reading each line of the file.**

```
"CargoShip","Bubba Gump","1947",20000
"Ship","The Cod Father","1978",0
"CruiseShip","BullShip","1982",40328
"CargoShip","Pug Boat","2012",2
"Ship","Piece of Ship","2008",0
"CruiseShip","Yeah Buoy!","1982",33236
"Ship","Unsinkable II","2002",0
"CargoShip","Error 404, Fish Not Found","1971",404
"CruiseShip","Sotally Tober","1992",9873
```

1. Step 1. You need to open the file.
2. Step 2. You have to read a line
3. Step 3. You have to store the results into four strings

string shiptype;

string shipname;

string shipdate;

string tonnageCapacityString;

int tonnageCapacity;

Strip the double quotes off of each token

"CargoShip"

"Bubba Gump"

"1947"

20000

4. Strip the double quotes off of the first three strings

5. Convert the forth string to an integer

string shiptype = "CargoShip"

string shipname = "Bubba Gump"

string shipdate = "1947";

string tonnageCapacityString = "20000";

int tonnageCapacity = 200000;

Upload all four files, well documented.

while still lines of text {

 read one line of text

grab each of the four tokens and store them in temporary variables

strip the quotes off

convert the forth one to an integer

```
if (shiptype.compare("Ship") = 0) {

   // Create a new Ship Object

} else if (shiptype.compare("CargoShip") {

 // Create a new CaragoShip

} else {

  // Create a new CruiseShip

}
```

Notes:

- Every program should have a header with details on the program. Description should be a legit description
- Every method, even the main method, should have a description of what it does, what parameters and what return values
- Inline Comments should be well formed. Explain what is going on.
- Structure matters
- Your Print Statements must be quality print statements.
- Your output must be sorted apprpriately.

Inheritance Rubric

Criteria	Ratings		Pts
Documentation and Structure	**3.0 pts** Full Marks	**0.0 pts** No Marks	3.0 pts
Ship Class	**4.0 pts** Full Marks	**0.0 pts** No Marks	4.0 pts
CargoShip and CruiseShip Classes	**4.0 pts** Full Marks	**0.0 pts** No Marks	4.0 pts
Reads the name of the file through the arguments	**4.0 pts** Full Marks	**0.0 pts** No Marks	4.0 pts
Reads the data from a file and creates the objects	**8.0 pts** Full Marks	**0.0 pts** No Marks	8.0 pts
Sorts the data	**4.0 pts** Full Marks	**0.0 pts** No Marks	4.0 pts
Three Loops, printing each type of ship	**3.0 pts** Full Marks	**0.0 pts** No Marks	3.0 pts
			Total Points: 30.0