

Read the following given very carefully before start writing the code:

Create a class called *Car*. Each object of this class represents a car at a car dealer. Data members should include the car's name (string), car plate number (string), car manufacturing date (Date), car price (float), and a counter (int) that is used to record the number of cars. You should include the appropriate constructor(s), destructor, access methods (set and get functions), a static function that returns the number of cars (the number of objects created), and a *friend* print() function that prints the car name, the car plate number, the car manufacturing date and the car price. Use const with member functions when necessary. Demonstrate the use of *this* pointer with the set functions in your class to enable cascading.

Create three non member functions, a function called fillarray that accepts an array of objects of type car and fills it up with values form the keyboard, a function called sortarray() that sorts the array of objects by car name, and a function called printarray() that is used to print the list of all cars.

Your class should check for the validity of the car manufacturing date by applying composition. Assume that the class date has already been implemented (Don't write the class Date. (15 points will be deducted if you write the class date))

The Date class includes functions that check for day, month, year, and a const print()

objects of type car and fills it up with values from the keyboard, a function called `sortarray()` that sorts the array of objects by car name, and a function called `printarray()` that is used to print the list of all cars.

Your class should check for the validity of the car manufacturing date by applying composition. Assume that the class date has already been implemented (Don't write the class Date. (15 points will be deducted if you write the class date))

The date class includes functions that check for day, month, year, and a `const print()` function that prints the date.

Write only one driver program to test your class that performs the following:

- 1- Create two dynamic objects with their corresponding initial values and then display the number of objects created.
- 2- After creating two dynamic objects, create one automatic object without initial values. Demonstrate the use of cascading when setting the values of the automatic object, and then call the friend print function separately to print the values of the automatic object only.
- 3- Create an array of `n` objects, the number of objects must be input from the keyboard at run time. Call the functions `fillarray`, `sortarray()`, and `printarray()` respectively.
- 4- Make sure that the dynamic objects, and dynamic arrays are released from the ram after exiting the `main()` function.

Question #2 (15 points)

Develop a class called `PhoneNumber` with three data members of type `char`: `areacode[4]`, `exchange[4]` and `line[5]`. Then implement only the following:

1. Overload the input, `>>`, operator to be able to enter the phone number in the form

(123) 456-7890

2. Overload the output, `<<`, operator to be able to display the phone number in the same format as that shown above.

Question #3 (15 points)

- a) What are the operators that can not be overloaded?
- b) Can the `this` pointer be used in nonmember functions? Why?
- c) Can the `this` pointer be used with static member function? Why?

Question #4 (10 points)