

# Casper's Vehicle Rentals

## Fare Calculator

### Before and after UML required.

We've been asked to design a fare calculator for Casper's Vehicle Rental Corporation. This calculator should mimic calculating rental costs for a group of vehicles. Casper's is a fully stocked vehicle rental business with automobiles and boats.

Every vehicle has an associated range, vin, base price, and the ability to display its information. Each type of vehicle has a unique way of determining range and how it displays its information.

Casper's has three different types of automobiles available to rent which include standard, electric, and diesel. They also have a specialization of a diesel automobile, a semi-truck! The semi-truck requires a special license to rent that puts restrictions on range, so it falls under Casper's *limitable* rule. This rule also applies to electric vehicles along with the renewable rule. The renewable rule adds no special features but signifies the car is special for tax purposes.

The standard automobile also needs to keep track of the date when it passed its emission test and how many seats it has. The electric vehicle needs to keep track of how many batteries are on board and if it is a Tesla or not. Lastly, the diesel automobile needs to keep track of the number of wheels and the amount of cylinders it has. All automobiles need to have an optional color (black is default) along with the manufacturer name (unchangeable).

The range of an automobile is calculated as follows. If the vehicle is a standard or a basic diesel any positive distance is allowed. However, if the vehicle falls under the limitable rule, then the range has to stay within 50-499. If the vehicle is requested at a range greater or less than that a vehicle out of range exception should occur.

Each car should be displayed as the following:

*"carType by manufacturer with VIN vin is available to rent in color. This beast has a range of range and only costs \$cost"*

However, if the car is limitable it should be displayed as:

*"carType by manufacturer with VIN vin is available to rent in color. This monster has a range of range and only costs \$cost unless range exceeded"*

Casper's also has a wide selection of boats. A boat is classified by its type which can only be barge, cargo, speed, or yacht (think enumeration). Each of these types have a different luxury tax associated with them. Otherwise, all boats are the exact same. A boat should display its information in the following format:

*"boatType with VIN vin is available to rent. This beauty has a range of range and only costs \$cost"*

*Boats do not have any restrictions on range, but whatever the range is set to initially should be multiplied by 7. This is due to the fact that boats are expensive and Casper is greedy. Casper wants this multiplier to act flawlessly and always increase the price - even if the range is zero!*

Casper's uses a fully state of the art algorithm for calculating the cost of a rental vehicle. The state of the algorithm is:

$$\text{cost} = [(basePrice * (vin/vehicleCode)) \div vehicleRange] + luxuryTax$$

Each vehicle should have a base price, vin, range, and a vehicle code. The next page contains relevant tables of these **standard** values.

Finally, Casper needs to make sure that this system is bullet-proof so he has given us sample data to use. He wants to calculate the cost of a business renting 2 electric cars, a speed boat, yacht, semi-truck, diesel, and standard vehicles. He would also like this information to be tested by listing out all the information for each car followed by a complete total.

Do not use the default package and make sure to test thoroughly.

**Default Car Values**

Vehicle Name	Base Price	Vehicle Code	Luxury Tax
Standard	3000	12	N/A
Electric	15000	76	153
Diesel	8000	54	50
Semi-Truck	20000	66	3000

**Default Boat Values**

Vehicle Name	Base Price	Vehicle Code	Luxury Tax
Yacht	985000	8047	60000
Speed	35000	123	2200
Barge	500000	893	5000
Cargo	750000	542	8500