

Quiz 2 (a) Solution:

```
class Car
{
private:
    static int totalCars;
    char* name;
    bool isElectric;
    int topSpeed;

public:
    Car(const char* n = "honda", bool e = false, int s = 200)
    {
        int length = strlen(n);
        name = new char[length + 1];
        int i = 0;
        for (; i < length; i++)
            name[i] = n[i];
        name[i] = '\0';
        isElectric = e;
        topSpeed = s;

        totalCars++;
    }

    ~Car()
    {
        delete[] name;
        totalCars--;
    }

    Car(const Car& rhs) // Copy Constructor with deep copy
    {
        int length = strlen(rhs.name);
        name = new char[length + 1];
        int i = 0;
        for (; i < length; i++)
            name[i] = rhs.name[i];
        name[i] = '\0';
        isElectric = rhs.isElectric;
        topSpeed = rhs.topSpeed;

        totalCars++;
    }

    Car& operator=(const Car& rhs) // Assignment Operator with shallow copy
    {
        if (&rhs != this)
        {
            name = rhs.name;
            isElectric = rhs.isElectric;
            topSpeed = rhs.topSpeed;
        }
        return *this;
    }

    Car& operator+=(const Car& rhs)
    {
        topSpeed += rhs.topSpeed;
        return *this;
    }
}
```

```

bool operator>(const Car& rhs)
{
    if (topSpeed > rhs.topSpeed)
        return true;
    else
        return false;
}

void upgradeCar(const Car& rhs)
{
    if (rhs.topSpeed <= topSpeed)
        cout << "Error. Cannot upgrade!";
    else
        topSpeed = rhs.topSpeed;
}

void printInfo()
{
    cout << "Car name is " << name << "\n";
    if (isElectric)
        cout << "It is an electric car. \n";
    else
        cout << "It is not electric powered. \n";
    cout << "Its top speed is " << topSpeed << "\n";
    cout << endl << endl;
}

};

int Car::totalCars = 0;

```