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1  /*****
   *
2  * Program Name:      Gas Mileage vEA (gmileage.exe)
3  * Course:           CIS-61, C++ Language Programming
4  * Instructor:       C. Polen
5  * Project:          Assignment 5
6  * Created Date:     November 02nd, 2010
7  * Due Date:         November 12th, 2010
8  * Created By:       Chad Philip Johnson
9  * Purpose:          Calculate gas mileage and costs for two cars based on the user's driving habits (in the city and on the
10                        highway)
11 * Editor/IDE:        Notepad++
12 * Resoluton:         1024x768
13 * Compiler:          MinGW C++
14 * Acknowledgements: None
15 *****/
16
17 #include <iostream>
18 #include <iomanip> //for setprecision
19 using namespace std;
20
21 class car
22 {
23     private:
24         double dblTankSize, dblCityMileage, dblHighwayMileage; //declare class private variables
25
26     public:
27         //default construct
28         car() : dblTankSize(0.0), dblCityMileage(0.0), dblHighwayMileage(0.0)
29             { /* empty */ }
30
31         //construct for assigned values (not currently used)
32         car(double cstrTankSize, double cstrCityMileage, double cstrHighwayMileage) :
33             dblTankSize(cstrTankSize), dblCityMileage(cstrCityMileage), dblHighwayMileage(cstrHighwayMileage)
34             { /* empty */ }
35
36         /*****
37         *
38         * Function Name:      fncCarInfo()
39         * Parameters:         None
40         * Return Value:      double
41         * Purpose:           Retrieve gas usage info about the user's car(s)
42
43         *****/
44         double fncCarInfo()
45         {
46             //prompt user for number of gallons for a full tank
47             cout << "How many gallons does it take to fill up your tank? ";

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45     cin >> dblTankSize;
46     cout << endl;
47
48     //prompt user for miles per gallon driving in the city
49     cout << "How many miles does the car get per gallon in the city? ";
50     cin >> dblCityMileage;
51     cout << endl;
52
53     //prompt user for miles per gallon driving on the highway
54     cout << "How many miles does the car get per gallon on the highway? ";
55     cin >> dblHighwayMileage;
56     cout << endl << endl;
57
58     //return the tank size to calling function
59     return dblTankSize;
60 }
61
62
63     /*****
64     *
65     * Function Name:      fncMaxTravelDistance()
66     * Parameters:       None
67     * Return Value:     double
68     * Purpose:          Calculate the travel distance on one tank of gas
69     *
70     *****/
71
72     */
73     double fncMaxTravelDistance()
74     {
75         return dblTankSize * ( (dblCityMileage + dblHighwayMileage) / 2);
76     }
77 };
78
79 class driver
80 {
81     private:
82         double    dblGasPrice; //declare class private variables
83         float     fltPercentCity, fltPercentHighway;
84
85     public:
86         //default construct
87         driver() : dblGasPrice(0.0), fltPercentCity(0.0), fltPercentHighway(0.0)
88             { /* empty */ }
89         //construct for assigned values (not currently used)
90         driver(double cstrGasPrice, float cstrPercentCity, float cstrPercentHighway) :
91             dblGasPrice(cstrGasPrice), fltPercentCity(cstrPercentCity), fltPercentHighway(cstrPercentHighway)
92             { /* empty */ }
93
94     /*****

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90     * Function Name:      fncDriverInfo()
91     * Parameters:       None
92     * Return Value:    double
93     * Purpose:         Retrieve info about the current price of gas and the amount of time spent driving on the highway
94
95     ****
96     */
97     double fncDriverInfo()
98     {
99         //prompt user for the current price of a gallon of gas
100        cout << "What is the current price for a gallon of gas? ";
101        cin >> dblGasPrice;
102        cout << endl;
103
104        //prompt user for the amount of time spent drive on the highway
105        cout << "How much of your driving time is spent on the highway? (in percent) ";
106        cin >> fltPercentHighway;
107        cout << endl << endl;
108
109        //calculate amount of time spent driving in the city (all time that is not the highway)
110        fltPercentCity = 100.0 - fltPercentHighway;
111
112        //return the current cost of a gallon of gas
113        return dblGasPrice;
114    }
115
116     /*****
117     *
118     * Function Name:      fncFullTankPrice()
119     * Parameters:       None
120     * Return Value:    double
121     * Purpose:         Calculate the amount of money it costs to fill up at the gas station
122
123     ****
124     */
125     float fncFullTankPrice(double dblTankSize)
126     {
127         //return amount of money it costs to fill up at the gas station to calling function
128         return dblGasPrice * dblTankSize;
129     }
130 };
131
132 int main()
133 {
134     //declare objects
135     car          vehicle01, vehicle02;
136     driver       stats01;

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133
134 //declare variables
135 unsigned long lngTotalMileage;
136 double       dblVehicle01TankSize, dblVehicle02TankSize;
137 double       dblTotalTravelDistance01, dblTotalTravelDistance02;
138 double       dblCostRefill01, dblCostRefill02;
139 double       dblCurrentGasPrice;
140
141 //clear some space
142 cout << endl << endl << endl << endl;
143
144 //program title
145 cout << "Gas Mileage Calculator vEA" << endl << endl;
146
147 //prompt input for car #1
148 cout << "Car #1:" << endl;
149 //return and assign tank size for car #1
150 dblVehicle01TankSize = vehicle01.fncCarInfo();
151
152 //prompt input for car #2
153 cout << "Car #2:" << endl;
154 //return and assign tank size for car #2
155 dblVehicle02TankSize = vehicle02.fncCarInfo();
156
157 //prompt input for driver info
158 cout << "Driver:" << endl;
159 //return and assign current gas price
160 dblCurrentGasPrice = stats01.fncDriverInfo();
161
162 //calculate cost for tank refill on car #1
163 dblCostRefill01 = stats01.fncFullTankPrice(dblVehicle01TankSize);
164 //calculate max travel distance on full tank of gas for car #1
165 dblTotalTravelDistance01 = vehicle01.fncMaxTravelDistance();
166
167 //calculate cost for tank refill on car #2
168 dblCostRefill02 = stats01.fncFullTankPrice(dblVehicle02TankSize);
169 //calculate max travel distance on full tank of gas for car #2
170 dblTotalTravelDistance02 = vehicle02.fncMaxTravelDistance();
171
172 //report travel distance and price for full tank for car #1
173 cout << "The maximum travel distance for Car #1 is "
174     << setiosflags(ios::fixed)
175     << setiosflags(ios::showpoint)
176     << setprecision(2)
177     << dblTotalTravelDistance01 << " miles." << endl;
178 cout << "The price for a full tank of gas is $"
179     << setiosflags(ios::fixed)
180     << setiosflags(ios::showpoint)
181     << setprecision(2)
182     << dblCostRefill01 << "." << endl;

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183
184     cout << endl;
185
186     //report travel distance and price for full tank for car #2
187     cout << "The maximum travel distance for Car #2 is "
188         << setiosflags(ios::fixed)
189         << setiosflags(ios::showpoint)
190         << setprecision(2)
191         << dblTotalTravelDistance02 << " miles." << endl;
192     cout << "The price for a full tank of gas is $"
193         << setiosflags(ios::fixed)
194         << setiosflags(ios::showpoint)
195         << setprecision(2)
196         << dblCostRefill02 << "." << endl;
197
198     cout << endl;
199
200     cout << "The total fuel cost for both vehicles' lifetimes..." << endl << endl;
201
202     //prompt input for a mileage total (for both cars)
203     cout << "Please enter a mileage total: ";
204     cin >> lngTotalMileage;
205
206     cout << endl;
207
208     //calculate total number of gas refills for car #1
209     cout << "Car #1 total number of gas refills is "
210         << setiosflags(ios::fixed)
211         << setiosflags(ios::showpoint)
212         << setprecision(2)
213         << (lngTotalMileage / dblTotalTravelDistance01) << endl;
214     //calculate total cost of gas for all refills on car #1
215     cout << "Car #1 total gas cost is $"
216         << setiosflags(ios::fixed)
217         << setiosflags(ios::showpoint)
218         << setprecision(2)
219         << ( (lngTotalMileage / dblTotalTravelDistance01) * dblCostRefill01) << endl;
220
221     cout << endl;
222
223     //calculate total number of gas refills for car #2
224     cout << "Car #2 total number of gas refills is "
225         << setiosflags(ios::fixed)
226         << setiosflags(ios::showpoint)
227         << setprecision(2)
228         << (lngTotalMileage / dblTotalTravelDistance02) << endl;
229     //calculate total cost of gas for all refills on car #2
230     cout << "Car #2 total gas cost is $"
231         << setiosflags(ios::fixed)
232         << setiosflags(ios::showpoint)

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233     << setprecision(2)
234     << ( (lngTotalMileage / dblTotalTravelDistance02) * dblCostRefill02) << endl;
235
236 cout << endl;
237
238 //courtesy message
239 cout << "Thank you for using Gas Mileage Calculator vEA." << endl;
240 }
241
```