CT2106 Assignment 1

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# Overview

The project creates a **TestCar** – a **Car** with a certain specification of **Engine** and **Wheel**.

The project runs tests that calculate how far the **TestCar** will travel on a certain amount of fuel.

A record is kept of the total distance travelled and total amount of work the engine has performed.

## Sample Output

Text, letter

Description automatically generated

## Class Structure

Chart, box and whisker chart

Description automatically generated

## TestCar class

/\*\*

\*

\* @author Michael McC

\* @version 1

\*/

public class TestCar

{

/\*\*

\* main method

\* creates the test configuration

\* runs tests

\*/

public static void main(String[] args) {

// create test configuration

Car car = new Car("Donda Civic");

// add engine with specified name and turns per litre

Engine engine = new Engine("XXXCOMBUSTION", 43);

car.addEngine(engine);

// add wheel with specified name and radius

Wheel wheel = new Wheel ("Wheel Lotta Red", 0.15);

car.addWheel(wheel);

// Test 1

car.setFuel(100);

car.drive();

// Test 2

car.setFuel(50);

car.drive();

}

}

## Car class

/\*\*

\*

\* @author Michael McC

\* @version 1

\*/

public class Car

{

// instance variables

private String name;

private double totalDistance;

private double totalKm;

private double fuelLevel;

private Engine engine;

/\*\*

\* Constructor for objects of class Car

\*/

public Car(String name)

{

this.name = name;

}

/\*\*

\* addEngine method adds an engine to the car

\*/

public void addEngine(Engine engine) {

this.engine = engine;

}

/\*\*

\* addWheel method

\* calls on the engine to add a wheel

\*/

public void addWheel(Wheel wheel) {

this.engine.addWheel(wheel);

}

/\*\*

\* setFuel method

\* sets the fuel level then prints it

\*/

public void setFuel(int fuelLevel) {

this.fuelLevel = fuelLevel;

System.out.printf("Fuel level: %d\n",fuelLevel);

}

/\*\*

\* drive method

\* prints the car name, runs the car then reports the distance travelled

\*/

public void drive() {

System.out.printf("Car name: %s\n", name);

// get distance by running the engine

double tripDistance = engine.runEngine(fuelLevel);

// empty the tank as all fuel has been used by engine

setFuel(0);

// report distance travelled

System.out.printf("Distance travelled this trip: %.2f Km\n",tripDistance);

totalDistance += tripDistance;

System.out.printf("Total distance travelled: %.2f Km\n\n",totalDistance);

}

}

## Engine class

/\*\*

\*

\* @author Michael McC

\* @version 1

\*/

public class Engine

{

// instance variables

private String name;

private double tpl;

private double totalNumTurns;

private Wheel wheel;

/\*\*

\* Constructor for objects of class Engine

\*/

public Engine(String name, double tpl)

{

this.name = name;

this.tpl = tpl;

}

/\*\*

\* addWheel method adds a wheel to the engine

\*/

public void addWheel(Wheel wheel) {

this.wheel = wheel;

}

/\*\*

\* runEngine method

\* prints engine information

\* calculates amount of turns from given amount of fuel

\* adds to running total of turns performed

\* returns max distance travelled from given amount of fuel

\*/

public double runEngine(double fuelLevel) {

// print engine information

System.out.printf("Engine name: %s\n",name);

System.out.printf("Engine turns per litre: %.2f\n",tpl);

// calculate amount of turns per tank of fuel

double numTurns = (fuelLevel \* tpl);

// add to running total then print

totalNumTurns += numTurns;

System.out.printf("Engine's total turn count: %.2f\n",totalNumTurns);

// return the distance travelled

double distance = (numTurns \* wheel.turn());

return distance;

}

}

## Wheel class

/\*\*

\*

\* @author Michael McC

\* @version 1

\*/

public class Wheel

{

// instance variables

private double radius;

private String name;

private double circumference;

/\*\*

\* Constructor for objects of class Wheel

\*/

public Wheel(String name, double radius)

{

this.name = name;

this.radius = radius;

}

/\*\* turn method

\* essentially wheel's main method

\* prints wheel information

\* calculates wheel circumference, prints and returns it

\*/

public double turn() {

// print wheel information

System.out.printf("Wheel name: %s\n",name);

System.out.printf("Wheel radius: %.2f m\n",radius);

// calculate wheel circumference, print and return

double circumference = 2 \* Math.PI \* radius;

System.out.printf("Wheel circumference (distance per turn): %.2f m \n",circumference);

return circumference;

}

}