

SdPd/java Lab Exam 4

Objective: MotorByke, Van and Lorry Vehicle Transport Fleet

Design an inheritance based class structure that is used to maintain a collection of ordinary, motorbyke, van and lorry vehicles.

1. **Download** the lab exam 4 starter **zip** file and extract the folder, **Save** on the desktop (**not** your Network account, local C drive or USB)
 - Rename the **SurnameFirstNameLabEx4** folder as per your own name
E.g. **AgnewGerryLabEx4** folder
 - Rename **SurnameFirstNameTestVehicle** classes as per your name
E.g. **AgnewGerryTestVehicle1, 2 and 3**
 - To be **verified** by your lab supervisor
2. Examine/verify the existing empty class files to be coded/implemented
 - Add your **Id, Name & Description** comments at the top of each class
3. **Warning:**
 - Marks will be deducted for **poor programming practices** such as:
 - Lacking meaningful variable names, white-space, indentation, etc.
 - Ensure redundant code is deleted prior to program submission
4. **Driver** class (embedded as an Inner class):

Member Variables	driverNumber (int)	driverName (String)
Member	Default Constructor	Parameter Constructor
Methods	setDriver	toString
	setDriverNumber	getDriverNumber
	setDriverName	getDriverName
– setDriver changes driver details		

5. **Vehicle** super class with inner **Driver** class instance:

Member Variables	regNumber (String) roadTax (double)	makeModel (String) driver (Driver)
Member	Default Constructor	Parameter Constructor
Methods	setVehicle	toString
	setRegNumber	getRegNumber
	setMakeModel	getMakeModel
	setRoadTax (double)	getRoadTax
	setRoadTax (int)	
	setDriver	getDriver
– setVehicle changes vehicle details (excluding driver info)		
– overloaded setRoadTax (int) increases the road tax by an integer percentage provided e.g. 10%		

6. Sub class **MotorByke** is derived from the Super class **Vehicle**:

	No Member Variables	
Member	Default Constructor	Parameter Constructor
Methods		toString

7. Sub class **Van** is derived from the Super class **Vehicle**:

Member Variables	maxPassengers (int)	maxDoors (int)
Member	Default Constructor	Parameter Constructor
Methods	setVan	toString
	setMaxPassengers	getMaxPassengers
	setMaxDoors	getMaxDoors
– setVan changes van details (excluding driver info)		
– maxDoors default value is 2		

8. Sub class **Lorry** is derived from the Super class **Vehicle**:

Member Variables	maxWeight (double)	
Member	Default Constructor	Parameter Constructor
Methods	setLorry	toString
	setMaxWeight	getMaxWeight
– setLorry changes lorry details (excluding driver info)		

9. **SurnameFirstNameTestVehicle1 driver class (without array):**

- Single TestDriver/TestVehicle/TestMotorByke/TestVan/TestLorry class
- Code a test class that creates 2 simple instances of each of the above classes (without arrays) using the sample data provided
- Which calls both default and parameter descriptors and associated setDriver/setVehicle/setMotorByke/setVan/setLorry methods and outputs the toString method
- See the attached screenshot

10. **SurnameFirstNameTestVehicle2 driver class (with array):**

- Declare an array of mixed ordinary, MotorByke, Van and Lorry vehicle object instances using the sample data provided
- Test/exercise/call the various methods using the sample data
- Match the attached Test Vehicle 2 screenshot using a for loop and the toString () method

11. **SurnameFirstNameTestVehicle3 driver class (with menu):**

- Declare an array of mixed ordinary, MotorByke, Van and Lorry vehicle object instances using the sample data provided
- Display the Vehicle Menu (code provided) – see the associated screenshot
- Add user defined methods to the while loop and switch statement provided to implement the following functionality

12. Vehicle Menu Options:

- 1) List Vehicles
- 2) List MotorBykes
- 3) List Vans
- 4) List Lorrys
- 5) Increase Van Road Tax by 10%
- 6) Reset Lorry Weight=22
- 7) Van Doors for Reg No
- 0) Quit

13. List Vehicles

- List the information for all Vehicle objects (as for Test Vehicle 2)
- See the associated screenshot

14. List MotorBykes

- List the information for all Motorbyke objects
- See the associated screenshot

15. List Vans

- List the information for all Van objects
- See the associated screenshot

16. List Lorrys

- List the information for all Lorry objects
- See the associated screenshot

17. Increase Van Road Tax by 10%

- Increase the road tax for all Vans by 10% by calling the overloaded (int) set method
- See the associated screenshot

18. Reset Lorry Weight=22

- Reset the max weight for all Lorrys to 22
- See the associated screenshot

19. Van Doors for Reg No

- Enter the vehicle registration number
- If a Van is found with that registration enter and update the max doors value
- Otherwise Vehicle Registration not found or not a Van error message
- See the associated screenshot

20. Save – The End

- When finished Save and Exit TextPad
- Zip (R/click: Send Compressed) your **SurnameFirstNameLabEx4** folder
- Upload your **SurnameFirstNameLabEx4** zip file to the Moodle link provided
- To be **verified** by your supervisor **before** you **submit** the zip file
- Submit your named Method Overview form
- Sign the **attendance sheet** before you exit the lab

Test Vehicle 1 Screenshot

```

Reg      Make Model      Tax Driver      We-Pa-D
=====
drv1: 0 none
drv1: 345 Mary Murphy
drv2: 123 Gerry Agnew
veh1:           0.00 0 none
veh1: 12g-123  vehicle 1  99.99 100 Gerry Agnew
veh2: 04d-444  vehicle 2  99.99 444 D Dddd
byk1:           0.00 0 none
byk1: 05mo555  Byke 1    99.99 555 E Eeee
byk2: 01mo111  Byke 2    99.99 111 A Aaaa
van1:           0.00 0 none           P=0 D=2
van1: 06so666  Van 1     99.99 666 F Ffff           P=3 D=1
van2: 02so222  Van 2     99.99 222 B Bbbb           P=5 D=5
lor1:           0.00 0 none           W=0.0
lor1: 07g-777  Lorry 1    99.99 777 G Gggg           W=10.5
lor2: 03g-333  Lorry 2    99.99 333 C Cccc           W=10.5

```

Test Vehicle 2 Screenshot

```

Reg      Make Model      Tax Driver      We-Pa-Do
=====
12g-123  vehicle 1  99.99 101 Gerry Agnew
01mo111  Byke 1     99.99 111 A Aaaa
02so222  Van 1      99.99 222 B Bbbb           P=5 D=5
03g-333  Lorry 1    99.99 333 C Cccc           W=10.5
04d-444  vehicle 2  99.99 444 D Dddd
05mo555  Byke 2     99.99 555 E Eeee
06so666  Van 2      99.99 666 F Ffff           P=3 D=1
07g-777  Lorry 2    99.99 777 G Gggg           W=10.5
08d-888  vehicle 3  99.99 888 H Hhhh

```

Vehicle Menu Screenshot

```

              vehicle Menu Options
=====
1: List Vehicles      2: List MotorBykes
3: List Vans          4: List Lorries
5: Inc Van Tax: 10%   6: Reset Lorry weight=22
7: Van doors for Reg 0: Quit

Enter option:

```

Option 1: List all Vehicles Screenshot

```

Enter option: 1
Reg      Make Model      Tax Driver      We-Pa-Do
=====
12g-123  Vehicle 1      99.99 101 Gerry Agnew
01mo111  Byke 1          99.99 111 A Aaaa
02so222  Van 1           99.99 222 B Bbbb      P=5 D=5
03g-333  Lorry 1         99.99 333 C Cccc      W=10.5
04d-444  Vehicle 2       99.99 444 D Dddd
05mo555  Byke 2          99.99 555 E Eeee
06so666  Van 2           99.99 666 F Ffff      P=3 D=1
07g-777  Lorry 2         99.99 777 G Gggg      W=10.5
08d-888  Vehicle 3       99.99 888 H Hhhh

```

Option 2: List Motorcycles Screenshot

```

Enter option: 2
Reg      Make Model      Tax Driver      We-Pa-Do
=====
01mo111  Byke 1          99.99 111 A Aaaa
05mo555  Byke 2          99.99 555 E Eeee

```

Option 3: List Vans Screenshot

```

Enter option: 3
Reg      Make Model      Tax Driver      We-Pa-Do
=====
02so222  Van 1           99.99 222 B Bbbb      P=5 D=5
06so666  Van 2           99.99 666 F Ffff      P=3 D=1

```

Option 4: List Lorrys Screenshot

```

Enter option: 4
Reg      Make Model      Tax Driver      We-Pa-Do
=====
03g-333  Lorry 1         99.99 333 C Cccc      W=10.5
07g-777  Lorry 2         99.99 777 G Gggg      W=10.5

```

Option 5: Increase Van Tax by 10%

```
Enter option: 5
Reg      Make Model      Tax Driver      We-Pa-Do
=====
02so222  Van 1      109.99 222 B Bbbb      P=5 D=5
06so666  Van 2      109.99 666 F Ffff      P=3 D=1
```

Option 6: Reset Lorry Weight=22

```
Enter option: 6
Reg      Make Model      Tax Driver      We-Pa-Do
=====
03g-333  Lorry 1      99.99 333 C Cccc      W=22.0
07g-777  Lorry 2      99.99 777 G Gggg      W=22.0
```

Option 7: Van Doors for Reg No

```
Enter option: 7

Enter Reg No: 06so666

Enter doors: 6

Reg      Make Model      Tax Driver      We-Pa-Do
=====
06so666  Van 2      109.99 666 F Ffff      P=3 D=6
```