SdPd/java Lab Exam 4

Objective: Container, RoRo and Tanker Cargo Ships

The Galway Cargo Ship company operates a variety of cargo ship fleet types. Design an inheritance based class structure to maintain a collection of ordinary, Container, RoRo (Roll On Roll Off) and Tanker cargo ships.

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 the **SurnameFirstNameTestShip** test/driver classes as per your name
      E.g. **AgnewGerryTestShip1, 2** and **3**
    – To be **verified** by your lab supervisor

2. Examine/verify the existing empty/partial class files provided to be coded/implemented
    – Add your **Program 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. **Insurer** class (embedded as an inner class)**:**

Member Variables	insurerName (String)	shipValue (double)
Member Methods	Default Constructor	Parameter Constructor
	setInsurer	toString
	setInsurerName	getInsurerName
	setShipValue	getShipValue
– setInsurer changes existing insurer object details		

5. **CargoShip** super class with inner **Insurer** class instance:

Member Variables	shipNumber (int) deadWeightTonnage (double)	shipName (String) insurer (Insurer)
Member Methods	Default Constructor	Parameter Constructor
		CargoShip Parameter Constructor
	setCargoShip	toString
	setShipNumber	getShipNumber
	setShipName	getShipName
	setDeadWeightTonnage (double)	getDeadWeightTonnage
	setDeadWeightTonnage (int)	
	setInsurer	getInsurer
– setCargoShip only changes existing cargo ship object details (excluding insurer info)		
– overloaded setDeadWeightTonnage (int) increases the dead weight tonnage by an integer percentage provided e.g. 20%		

6. Sub class **Container** is derived from the Super class **CargoShip**:

	No Member Variables	
Member	Default Constructor	Parameter Constructor
Methods		toString

7. Sub class **RoRo** is derived from the Super class **CargoShip**:

Member Variables	maxLorrys (int)	maxPassengers (int)
Member	Default Constructor	Parameter Constructor
Methods	setRoRo	toString
	setMaxLorrys	getMaxLorrys
	setMaxPassengers	getMaxPassengers
– setRoRo only changes existing RoRo ship object details (excluding insurer & cargo ship info)		

8. Sub class **Tanker** is derived from the Super class **CargoShip**:

Member Variables	maxCapacity (int)	DEFAULT_CAPACITY (int)
Member	Default Constructor	Parameter Constructor
Methods		toString
	setMaxCapacity	getMaxCapacity
– maxCapacity default value is 10000 if not provided which should be defined as a class constant		

9. **SurnameFirstNameTestShip1 driver class (without an object array):**

– Code a test driver class that creates 2 simple instances of each of the above classes (without object arrays) using the sample data provided
– Which calls both default and parameter descriptors and associated setInsurer/setCargoShip/ setRoRo/setMaxCapacity methods as appropriate and outputs the toString method contents
– Match the attached **Screenshot 1** output

10. **SurnameFirstNameTestShip2 driver class (with an object array):**

– Declare an object array of mixed ordinary, CargoShip, Container, RoRo & Tanker ship object instances using the same sample data provided
– Test/exercise/call the various methods using the sample data provided
– Interrogate each object and output it's class name in the first column of each line output
– Match the attached **Screenshot 2** output using a **for loop** and the toString ( ) method

11. **SurnameFirstNameTestShip3 driver class (with an object array and menu):**

– Declare an object array of mixed ordinary, CargoShip, Container, RoRo & Tanker ship object instances using the same sample data provided
– Display the Cargo Ship Menu (code provided) – see the attached **Screenshot 3**
– Call selected methods as required from the while loop/switch statement provided to

implement the below functionality

12. **Cargo Ship Menu Options –** 0/Quit

   1) List Cargo Ships   2) List Container Ships
   3) List RoRo Ships   4) List Tanker Ships
   5) Reset non CS DWT=0   6) RoRo Passengers doubled
   7) Rename Ship   8) Rename Tanker Insurer

13. **List Cargo Ships** (option 1/**Screenshot 4)**
   – List details for all Cargo Ship objects:

14. **List Container Ships (**option 2/**Screenshot 5)**
   – List details for all Container Ship objects

15. **List RoRo Ships (**option 3/**Screenshot 6)**
   – List details for all RoRo Ship objects

16. **List Tanker Ships (**option 4/**Screenshot 7)**
   – List details for all Tanker Ship objects

17. **Reset non CS DWT=0 (**option 5/**Screenshot 8)**
   – Reset the Dead Weight Tonnage to 0 for all non Cargo Ships i.e. reset Container, RoRo and Tanker ship Dead Weight Tonnage to 0 but **not** for ordinary Cargo Ships

18. **RoRo Passengers Doubled (**option 6/**Screenshot 9)**
   – Double the number of RoRo passengers (i.e. * 2)

19. **Rename Ship (**option 7/**Screenshot 10)**
   – Enter the Ship number and search for that number using a While loop
   – If a Ship is found with that number then enter and update a new ship name
   – Otherwise Ship Number not found – try again error message

20. **Rename Tanker Insurer (**option 8/**Screenshot 11)**
   – Enter the Ship number and search for that number using a While loop
   – If a Tanker Ship is found with that number then enter and update a new ship insurer name (may use 0 Ship Value or alternatively introduce a new getShipValue method)
   – Otherwise: Ship Number not found – try again error message
   – Otherwise: Ship not a Tanker – try again error message

21. **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
   – Sign the **attendance sheet** before you exit the lab

1) Test Ship 1 Screenshot

```
      Ship Name of Ship   Weight Insurer       Value
=====================================================================
ins1: no insurer         0
ins1: Murphy Ins    100001
ins2: Agnew Ins     123457

shp1: 0     no ship               0 no insurer          0
shp1: 1000 Red ship 1         30000 Agnew Ins       12346
shp2: 2000 Green ship 2       10000 Murphy Ins       9789
shp3: 2500 Navy ship 3         7778 no insurer          0
shp3: 2500 Navy ship 3         7778 Wally Ins       22222

con1: 0     no ship               0 no insurer          0
con1: 3000 Blue con 1         10000 Ins 34           3434
con2: 4000 Yellow con 2      997900 Agnew Ins       12346
ror1: 0     no ship               0 no insurer          0 Lorry: 0 Pass: 0
ror1: 5000 Grey ror 1          1240 Reilly Ins       3434 Lorry: 345 Pass: 678
ror2: 6000 White ror 2       997900 Agnew Ins       12346 Lorry: 11 Pass: 22

tnk1: 0     no ship               0 no insurer          0 Capacity: 1000
tnk1: 7000 Purple tnk 1       12940 Ins 34           3434 Capacity: 99999
tnk2: 8000 Black tnk 2       997900 Agnew Ins       12346 Capacity: 4567
```

2) Test Ship 2 Screenshot

```
          Ship Name of Ship   Weight Insurer       Value
=====================================================================
CargoShip 1000 Red ship 1       30000 Agnew Ins       12346
CargoShip 2000 Green ship 2     10000 Murphy Ins       9789
CargoShip 2500 Navy ship 3       7778 Wally Ins       22222
Container 3000 Blue con 1       10000 Zulu Ins         3434
Container 4000 Yellow con 2    997900 Agnew Ins       12346
RoRo      5000 Grey ror 1        1240 Reilly Ins       3434 Lorry: 345 Pass: 678
RoRo      6000 White ror 2      997900 Agnew Ins       12346 Lorry: 11 Pass: 22
Tanker    7000 Purple tnk 1     12940 Zulu Ins         3434 Capacity: 99999
Tanker    8000 Black tnk 2      997900 Agnew Ins       12346 Capacity: 4567
```

3) Cargo Ship Menu Screenshot

```
           Cargo Ship Menu Options - 0/Quit
=====================================================================
1: List Cargo Ships       2: List Container Ships
3: List RoRo Ships        4: List Tanker Ships
5: Reset non CS DWT=0      6: RoRo Passengers doubled
7: Rename Ship            8: Rename Tanker Insurer


Enter option:
```

```
Enter option: 1

Ship Name of Ship      Weight Insurer        Value
===================================================================
1000 Red ship 1         30000 Agnew Ins       12346
2000 Green ship 2       10000 Murphy Ins       9789
2500 Navy ship 3         7778 Wally Ins       22222
3000 Blue con 1         10000 Zulu Ins         3434
4000 Yellow con 2      997900 Agnew Ins       12346
5000 Grey ror 1          1240 Reilly Ins       3434 Lorry: 345 Pass: 678
6000 White ror 2       997900 Agnew Ins       12346 Lorry: 11 Pass: 22
7000 Purple tnk 1       12940 Zulu Ins         3434 Capacity: 99999
8000 Black tnk 2       997900 Agnew Ins       12346 Capacity: 4567
```

```
Enter option: 2

Ship Name of Ship      Weight Insurer        Value
===================================================================
3000 Blue con 1         10000 Zulu Ins         3434
4000 Yellow con 2      997900 Agnew Ins       12346
```

```
Enter option: 3

Ship Name of Ship      Weight Insurer        Value
===================================================================
5000 Grey ror 1          1240 Reilly Ins       3434 Lorry: 345 Pass: 678
6000 White ror 2       997900 Agnew Ins       12346 Lorry: 11 Pass: 22
```

```
Enter option: 4

Ship Name of Ship      Weight Insurer        Value
===================================================================
7000 Purple tnk 1       12940 Zulu Ins         3434 Capacity: 99999
8000 Black tnk 2       997900 Agnew Ins       12346 Capacity: 4567
```

8) Option 5: Reset non CS DWT=0 Screenshot

```
Enter option: 5
Ship Name of Ship      Weight Insurer        Value
===============================================================
3000 Blue con 1            0 Zulu Ins         3434
4000 Yellow con 2          0 Agnew Ins       12346
5000 Grey ror 1            0 Reilly Ins       3434 Lorry: 345 Pass: 678
6000 White ror 2           0 Agnew Ins       12346 Lorry: 11 Pass: 22
7000 Purple tnk 1          0 Zulu Ins         3434 Capacity: 99999
8000 Black tnk 2           0 Agnew Ins       12346 Capacity: 4567
```

9) Option 6: RoRo Passengers doubled Screenshot

```
Enter option: 6

Ship Name of Ship      Weight Insurer        Value
===============================================================
5000 Grey ror 1          1240 Reilly Ins       3434 Lorry: 345 Pass: 1356
6000 White ror 2       997900 Agnew Ins       12346 Lorry: 11 Pass: 44
```

10) Option 7: Rename Ship Screenshot

```
Enter option: 7

  Enter Ship No: 1111

Ship No not found - try again
  Enter Ship No: 4000

Ship Name of Ship      Weight Insurer        Value
===============================================================
4000 Yellow con 2      997900 Agnew Ins       12346

  Enter new Ship Name: New Ship Name

4000 New Ship Name       997900 Agnew Ins        12346
```

11) Option 8: Rename Tanker Insurer Screenshot

```
Enter option: 8

  Enter Ship No: 1234

Ship No not found - try again
Enter option: 8

  Enter Ship No: 4000

Ship No:4000 not a Tanker - try again
Enter option: 8

  Enter Ship No: 8000
Ship Name of Ship      Weight Insurer        Value
===============================================================
8000 Black tnk 2       997900 Agnew Ins       12346 Capacity: 4567

  Enter new Insurer Name: Wally Ins
8000 Black tnk 2       997900 Wally Ins           0 Capacity: 4567
```