



Department of Computing
Faculty of computing and information Technology (FCIT)
Indus University, Karachi

CC-121
Software Project Management
ASSIGNMENT NO 3

To **demonstrate** the applications of encapsulation and data hiding, specifies, constructors and inheritance. **(CLO3, C3)**

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Inheritance Exercise

For this assignment you will create several small classes to demonstrate inheritance.

You will need to perform the following steps:

1. Create a class that contains data and methods for a ship. **Call this class Ship followed by your initials for your first and last name.** (for example: if your name is "Saad Sheikh", the name of your class should be ShipSS.)
 - The Ship class should contain the following data:
 - Name of the ship
 - Year the ship was built
 - Use the protected modifier for both data members
 - The Ship class should contain the following methods:
 - A constructor that sets the name of the ship and the year that it was built
 - Single `g` method to display the name and year
2. Create a second class that contains data and methods for a cruise ship. **This class will inherit data and methods from the Ship class. Call this class CruiseShip followed by your initials for your first and last name.** (for example: if your name is "Saad Sheikh", the name of your class should be CruiseShipSS.)
 - The CruiseShip class should contain the following (private) data:
 - The number of passengers
 - The CruiseShip class should contain the following methods:
 - A constructor that sets the name of the ship, the year that it was built and the number of passengers
 - Use the **super** reference to access the constructor from the Ship class (to set up the name and year of the cruise ship)
 - The passenger data should be set up in the same constructor as well.
 - Single `g` method to display the name, the year and the number of passengers the cruise can hold.
 - Use the **super** reference to access the name and year data from the ship class in the CruiseShip's `toString` method.
3. Create a third class that contains data and methods for a cargo ship. **This class will also inherit data and methods from the Ship class. Call this class CargoShip followed by your initials for your first and last name.** (for example: if your name is "Saad Sheikh", the name of your class should be CargoShipSS.)

- The CargoShip class should contain the following (private) data:
 - The number of tons it can hold
 - The CargoShip class should contain the following methods:
 - A constructor that sets the name of the ship, the year that it was built and the number of tons
 - Use the **super** reference to access the constructor from the Ship class (to set up the name and year of the cargo ship)
 - The tons data should be set up in the same constructor as well.
 - A toString method to display the name, the year and the number of tons the cargo ship can hold.
 - Use the **super** reference to access the name and year data from the ship class in the CargoShip's toString method.
4. Create a driver program called **ShipDriver** followed by your initials for your first and last name. The driver program should create and display a Ship, CruiseShip and CargoShip object. You are allowed to hardcode values when you create each object (so no Scanner classes or local variables are required).

Sample output is shown below:

```
Here is the Ship object's info:  
Name: Lollipop  
Year built: 1934
```

```
Here is the CruiseShip object's info:  
Name: Harmony of the Seas  
Year Built: 2015  
Maximum passengers: 6780
```

```
Here is the CargoShip object's info:  
Name: Osaka Express  
Year Built: 2007  
Maximum tons: 103800
```

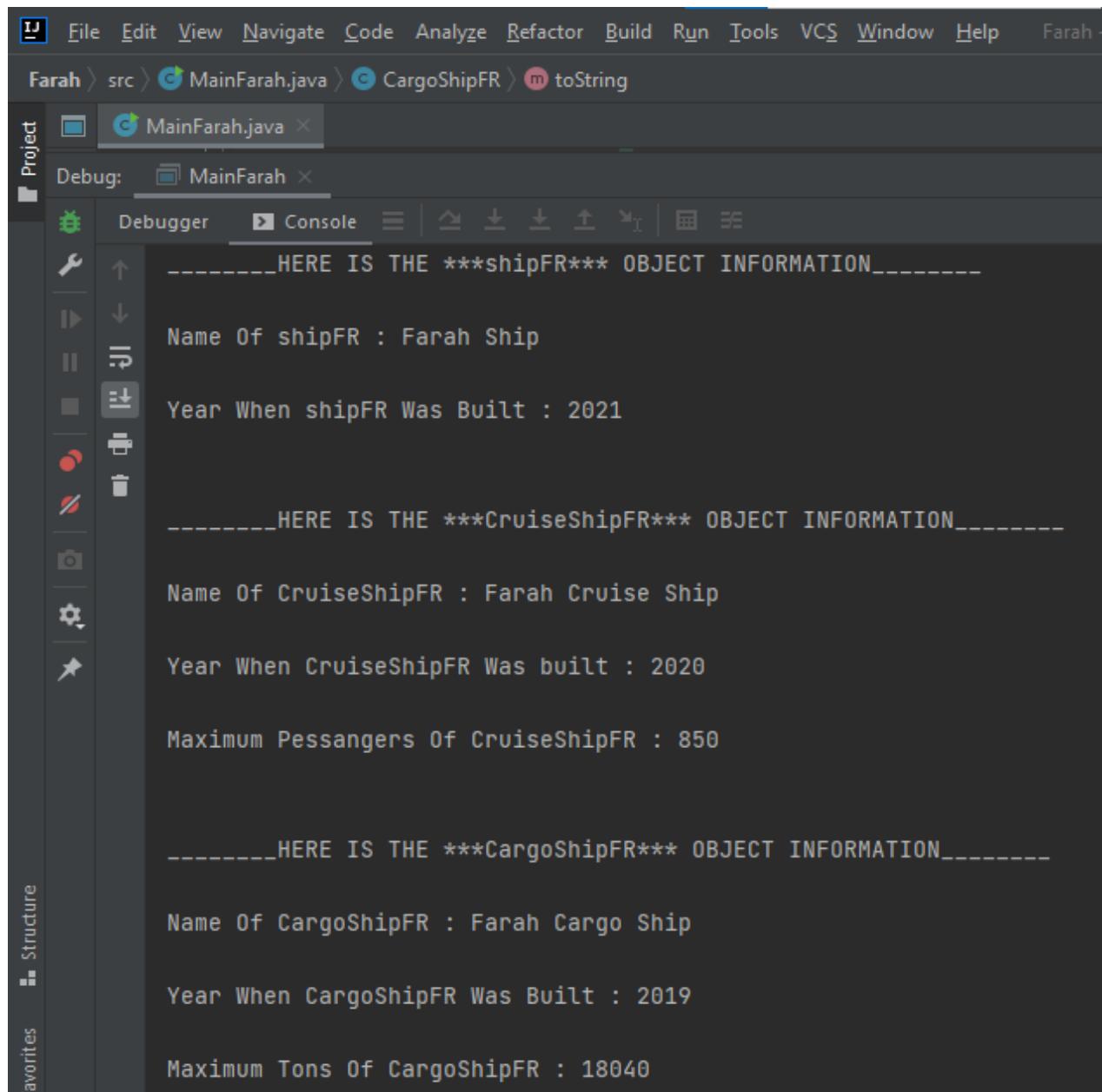
Answer:

CODE:

```
package com.company;
//Written BY Farah Riaz;
class shipFR{
    protected String Name;
    protected int YearBuilt;
    shipFR(String a,int b){
        Name=a;
        YearBuilt=b;
    }
    void Display(){
        System.out.println("\n_____ HERE IS THE ***shipFR*** OBJECT
INFORMATION_____");
        System.out.println("\nName Of shipFR : "+ Name);
        System.out.println("\nYear When shipFR Was Built : "+ YearBuilt);
    }
}
class CruiseShipFR extends shipFR{
    private int Passenger;
    CruiseShipFR(int p){
        super("",0);
        super.Name="Farah Cruise Ship";
        super.YearBuilt=2020;
        Passenger=p;
    }
    void Displayn(){
        System.out.println("\nMaximum Pessangers Of CruiseShipFR : "+
Passenger);
    }
    public String toString(){
        System.out.println("\n\n_____ HERE IS THE ***CruiseShipFR*** OBJECT
INFORMATION_____");
        return "\nName Of CruiseShipFR : "+super.Name+"\n\nYear When
CruiseShipFR Was built : "+super.YearBuilt;
    }
}
class CargoShipFR extends shipFR{
    private int Tons;
    CargoShipFR(int T){
        super("",0);
        super. Name="Farah Cargo Ship";
        super.YearBuilt=2019;
        Tons=T;
    }
    void Displayr(){
        System.out.println("\nMaximum Tons Of CargoShipFR : "+ Tons);
    }
    public String toString(){
        System.out.println("\n\n_____ HERE IS THE ***CargoShipFR*** OBJECT
INFORMATION_____");
        return "\nName Of CargoShipFR : "+super.Name+"\n\nYear When
CargoShipFR Was Built : "+super.YearBuilt;
    }
}
```

```
public class MainFarah {  
    public static void main(String[] args) {  
        shipFR sn=new shipFR("Farah Ship",2021);  
        CruiseShipFR sr=new CruiseShipFR(850);  
        CargoShipFR sv=new CargoShipFR(18040);  
  
        sn.Display();  
        System.out.println(sr);  
        sr.Displayn();  
        System.out.println(sv);  
        sv.Displayr();  
    }  
}
```

OUTPUT:



The screenshot shows the IntelliJ IDEA interface with the following details:

- File Bar:** File, Edit, View, Navigate, Code, Analyze, Refactor, Build, Run, Tools, VCS, Window, Help, Farah.
- Project Bar:** Farah > src > MainFarah.java > CargoShipFR > toString
- Toolbars:** Standard toolbar with icons for file operations, search, and help.
- Left Sidebar:** Project (selected), Favorites, Structure, and Favorites.
- Central Area:** Shows the output of the `toString` method for three ship objects:
 - shipFR:** Name Of shipFR : Farah Ship
Year When shipFR Was Built : 2021
 - CruiseShipFR:** HERE IS THE ***CruiseShipFR*** OBJECT INFORMATION
Name Of CruiseShipFR : Farah Cruise Ship
Year When CruiseShipFR Was built : 2020
Maximum Pessangers Of CruiseShipFR : 850
 - CargoShipFR:** HERE IS THE ***CargoShipFR*** OBJECT INFORMATION
Name Of CargoShipFR : Farah Cargo Ship
Year When CargoShipFR Was Built : 2019
Maximum Tons Of CargoShipFR : 18040