Semester: IV **Course Code:** 22UCSL403

Course Title: Object Oriented Programming Laboratory **Division:** A (A1, A2, A3)

Academic Year: 2023-24

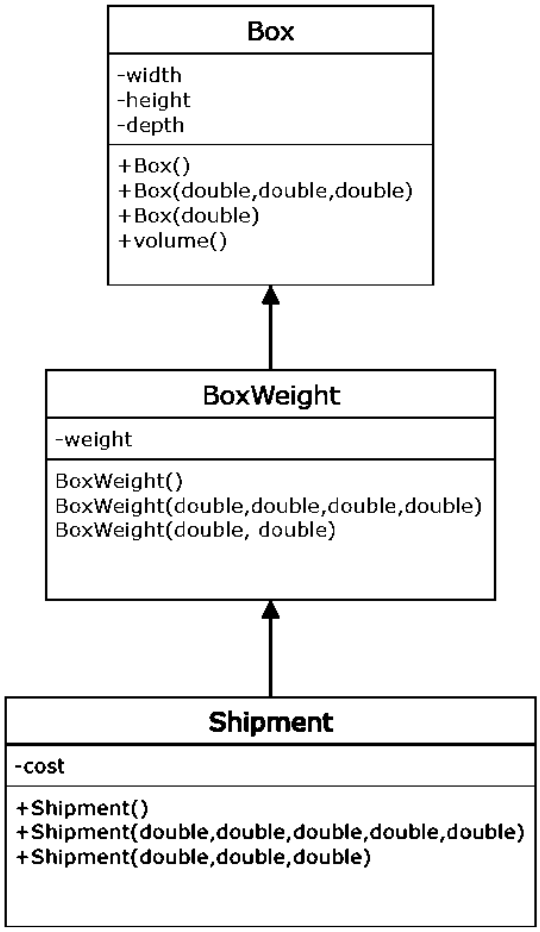
General instructions

- The programs must strictly follow the Java naming and coding conventions
- All the programs must use **object-oriented concepts** like classes, objects, methods, constructors, overloading, overriding, late binding, interfaces, etc. (wherever possible)
- Never write the business logic inside main() method

Practice Programs-1

1) Write a Java program that implements Simple Calculator.
2) Write a Java program that sorts the given array elements in ascending order (use any sorting technique of your choice). Use the following array elements:
   {98.87, 45.24, 39.71, 43.89, 10.09, 47.92, 47.84, 21.17, 38.51, 62.38, 71.39, 40.34, 28.54, 72.45, 59.31, 72.39, 87.34, 58.35, 71.21}
3) Write a Java program that implements a stack.
4) Write a Java program that implements a queue.
5) Write a Java program that takes IA-1, IA-2, IA-3 & CTA marks of 3 students in a course, and displays the CIE marks and the grade obtained.
6) A vehicle is identified by how many wheels it has. A car is identified by engine number, chassis number and manufacturer. A bike is identified by engine number, chassis number and manufacturer. Similarly, a truck is identified by engine number, chassis number and manufacturer. **Car is-a vehicle, bike is-a vehicle** and **Truck is-a vehicle**. Using this information, write a Java Program that displays all the information of vehicle, car, bike and truck. Also draw the class diagram for the above scenario.

7) Write a Java program that implements the following class diagram:



8) Using the concept of abstract class, write a Java program that calculates the area and perimeters of circle, triangle, square and rectangle.

9) Using the concept of packages, implement the following scenario:

   Create a package named "**basicMath**" inside "**sdmcet.cse.oop**" package. It has a class named **Basic** and provides following methods:

   i) Check if a number is prime or not

   ii) Finds sum of digits of a number

   Create another package called "**advancedMath**" inside "**sdmcet.cse.oop**" package. It has a class **Advanced** and provides following methods:

   i) Calculates sine, cosine & tan of a degree

   ii) Find the sum of primary and secondary diagonal elements of a 3X3 matrix

   Create a class named **MathTestDemo** defined inside "**sdmcet.cse.oop**" package. This class has main() method and must invoke all the methods of **Basic** and **Advanced** classes.

10) You are asked to develop a simple media player application that can play different types of media files such as MP3, MP4, WAV and WMA. All the listed media players must provide the common features to play, pause, stop, rewind and forward the media being streamed.
Using the feature of interfaces, write a Java program that provides the implementation for the above problem definition.
Note: No need to actually implement the above-mentioned common features, as these features require the implementation of drivers and codecs, and is beyond the scope of current discussion. Hence, it is sufficient to put relevant display statements inside the common features.

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