TUGAS 4. Polymorphism

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Kerjakan soal-soal berikut ini. (Soal diambil dari buku Java How to Program 10th edition 2015, halaman 439-440)

10.13 (Project: Shape Hierarchy) Implement the Shape hierarchy shown in Fig. 9.3. Each TwoDimensionalShape should contain method getArea to calculate the area of the two-dimensional shape. Each ThreeDimensionalShape should have methods getArea and getVolume to calculate the surface area and volume, respectively, of the three-dimensional shape. Create a program that uses an array of Shape references to objects of each concrete class in the hierarchy. The program should print a text description of the object to which each array element refers. Also, in the loop that processes all the shapes in the array, determine whether each shape is a TwoDimensionalShape or a ThreeDimensionalShape. If it's a TwoDimensionalShape, display its area. If it's a ThreeDimensionalShape, display its area and volume.

10.14 (Payroll System Modification) Modify the payroll system of Figs. 10.4–10.9 to include an additional Employee subclass PieceWorker that represents an employee whose pay is based on the number of pieces of merchandise produced. Class PieceWorker should contain private instance variables wage (to store the employee's wage per piece) and pieces (to store the number of pieces produced). Provide a concrete implementation of method earnings in class PieceWorker that calculates the employee's earnings by multiplying the number of pieces produced by the wage per piece. Create an array of Employee variables to store references to objects of each concrete class in the new Employee hierarchy. For each Employee, display its String representation and earnings.

10.17 (CarbonFootprint Interface: Polymorphism) Using interfaces, as you learned in this chapter, you can specify similar behaviors for possibly disparate classes. Governments and companies worldwide are becoming increasingly concerned with carbon footprints (annual releases of carbon dioxide into the atmosphere) from buildings burning various types of fuels for heat, vehicles burning fuels for power, and the like. Many scientists blame these greenhouse gases for the phenomenon called global warming. Create three small classes unrelated by inheritance—classes Building, Car and Bicycle. Give each class some unique appropriate attributes and behaviors that it does not have in common with other classes. Write an interface CarbonFootprint with a getCarbonFootprint method. Have each of your classes implement that interface, so that its getCarbonFootprint method calculates an appropriate carbon footprint for that class (check out a few websites that explain how to calculate carbon footprints). Write an application that creates objects of each of the three classes, places references to those objects in ArrayList<CarbonFootprint>, then iterates through the ArrayList, polymorphically invoking each object's getCarbonFootprint method. For each object, print some identifying information and the object's carbon footprint.

Petunjuk Pengerjaan

1. Masing-masing soal dikerjakan dalam satu project (satu project satu soal).
2. Hapus folder bin di masing-masing project
3. Kompres seluruh folder project menjadi satu file menggunakan format ZIP

   (Gunakan hanya format ZIP, jangan gunakan format lain seperti RAR, 7z, dll).

4. Beri nama file dengan format sebagai berikut:

TUGAS4_PBO_KELAS_NRP.
Contoh: TUGAS4_PBO_H_051119100xxx.zip

5. Kirimkan melalui myITS Classroom sebelum batas waktu (keterlambatan dikenai pinalti). Jika tidak bisa login harap segera hubungi asisten

Happy Coding!