CSCD 211
Assignment 1

Introduction: This assignment will simulate the activities of a delivery truck transporting packages from one city to another. Certain simplifying assumptions have been made to allow you to concentrate on the programming concepts of Java rather than the "complete" realism of the simulation.

Requirements: Create Truck, Package(abstract), Letter, Box, Crate(abstract), MetalCrate, WoodCrate, LinkedList, Node, and TruckTester classes to simulate the long-distance transportation of packages by a truck.

Specifications: Your solution must conform to the following specifications:

- The Truck class should contain the driver's name, the number of packages and additional information about each package that it carries (via a LinkedList of Package references). Trucks will be assigned a driver, loaded with packages, then driven and unloaded. This class will contain the bulk of the code necessary for the tasks that must be performed in this program.
- The TruckTester class contains the main method and drives the execution of the program. It should:
  - instantiate a truck, then read in the driver name and the maximum number of packages the truck can carry
  - load the truck with packages, keeping track of how many packages were loaded and the total weight being carried
  - organize (sort) the packages
  - "drive" the truck to its destination and unload the truck (write to the log file each package unloaded) reporting the number of packages transported and the total weight of those packages.
- Package is the base class for a 'packages' hierarchy -- you will never have something that is just a Package. Each package has a tracking number and weight. The tracking number encodes the type of package. All packages are Comparable.
  - If the least significant digit of the tracking number is a 0, the package is a letter whose weight is given in ounces. The maximum allowable weight for a letter is 24 ounces. Letters have a length and width associated with them that is given in inches. The maximum length or width of a letter is 18 inches.
  - If the least significant digit of the tracking number is a 1, the package is a box, whose weight is given in pounds. The maximum weight of a box is 100 pounds. Boxes have length, width, and height associated with them. These values are represented in inches. The maximum length, width, or height is 36 inches.
  - If the least significant digit of the tracking number is a 2, the package is a metal crate, whose weight is given in pounds. The maximum weight of a metal crate is 500 pounds. Crates have length, width, and height associated with them (These will be stored in the base class of crate). These values are represented in inches. The maximum length, width, or height is 60 inches. Metal Crates are used

to ship cargo or live animals. You will need a designator in metal crate for what is being shipped.

- o If the least significant digit of the tracking number is a 3, the package is a wooden crate, whose weight is given in pounds. The maximum weight of a metal crate is 200 pounds. Crates have length, width, and height associated with them (These will be stored in the base class of crate). These values are represented in inches. The maximum length, width, or height is 48 inches. Wooden Crates are used to ship cargo which could be fragile or not. You will need to keep track if the cargo is fragile.
- o Any other least significant digit represents a package your truck does not carry. The package should not be loaded, but information about the unknown package type needs to be written to the log file (see below). For such packages, you are guaranteed there will be a weight, length, width, and height following the package number.
- o Package comparisons are done first by name, then by weight.
- Data to test your program should be stored in an input file called **manifest.txt** (hard-code this name into your program) whose format is specified as follows:
  Driver Name
  Maximum packages truck can carry (integer - guaranteed)
  Tracking Number (integer - guaranteed)
  Package Weight (integer)
  Package Length (integer)
  Package Width (integer)
  (possibly) Package Height (integer)

  You are guaranteed the driver name will be the on the first line of the input file. You are guaranteed the second line of the file will contain the maximum number of packages the truck can carry. You are also guaranteed there will be at least one tracking number followed by the information associated with that particular package.
- All actions taken in loading the truck should be written to an output file called **log.txt** (hard-code this name into your program). The log file should contain a record of everything that happened with the truck and its packages.
- As you read a tracking number and prepare to "load" that package on the truck, you must check for packages that are too heavy or too large. For such packages, write to the output file the problem (package type, tracking number, weight, and dimensions) along with why it was not loaded. Of course, don't load that package.
- If the truck is full, write the information to the log file (package type, tracking number, weight, and dimensions) along with why the package was not loaded.

--> NOTE: Your log file should essentially contain a history of what occurred during the execution of the program. It should specifically describe each thing that occurred

Here is a sample manifest file and the log file that might be produced from running a correct program on it:

manifest.txt

Big Dan Driver
5
123450
10
12
12
5555551
99
36
36
36
123890
20
10
10
656562
50
36
36
37
animal
3456543
50
5
5
5
fragile
879880
1
1
1

log.txt

Driver name: Big Dan Driver
Maximum packages truck can carry: 5

PACKAGE LOADING INFORMATION:

Package Type: letter
Tracking Number: 123450
Weight: 10 ounces
Length: 12 inches
Width: 12 inches

LOADED

Package Type: box
Tracking Number: 5555551
Weight: 99 pounds
Length: 36 inches
Width: 36 inches
Height: 36 inches
LOADED

…

Package Type: letter
Tracking Number: 879880
Weight: 2 ounces
Length: 2 inches
Width: 2 inches
NOT LOADED: TRUCK FULL

PACKAGE UNLOADING INFORMATION

Package Type: box
Tracking Number: 5555551
Weight: 99 pounds
Length: 36 inches
Width: 36 inches
Height: 36 inches

Package Type: letter
Tracking Number: 879880
Weight: 1 ounce
Length: 1 inch
Width: 1 inch

Package Type: letter
Tracking Number: 123450
Weight: 10 ounces
Length: 12 inches
Width: 12 inches

…

FINAL TRUCK INFORMATION

Packages Delivered: 5
Total weight of packages: XX pounds YY ounces

NOTE: you can combine the weight and make it all pounds if you wish (so you would report 99.6875 or 99.7 pounds)

To Turn In:

A zip file containing

- your source files
- the input file you used to test your program
- the output file created from running your program.

Strategies to achieve a timely and complete solution:

- get the Package class working first, then Truck and TruckTester
- stub out methods
- worry about problems (too big, over limit, etc) last
- keep code modular
- refrain from using static fields and static methods (the only static method you should have is the main method)
- get started right away