**Name:**

**Advanced Programming in Java**

**Lab Exercise 12.12.2023**

1. A line in a plane can be specified in various ways:

* By giving a point (x, y) and a slope m
* By giving two points (x1, y1) and (x2, y2)
* As an equation in slope-intercept form y = mx + b
* as an equation x = a if the line is vertical

Implement a class Line with 4 constructors, corresponding to the four cases above. Implement methods.

boolean intersect(Line other)

boolean equals(Line other)

boolean isParallel(Line other)

Implement a LineTester class to test the Line class.

1. Implement a PermutationLock class. A permutation lock has a dial with 26 positions labeled A to Z. The dial needs to be set 3 times in the correct order. If it is set to the correct permutation, the lock is opened. When the lock is closed again, the permutation can be entered again. Write a LockTester class to test the PermutationLock class.

Note: A permutation is a sequence where order matters. A combination is a sequence where order does not matter. The traditional combination lock is really a permutation lock.

1. Create a Delivery class for a delivery service. The class contains fields that holds the following:

* A delivery number that contains 8 digits. The first four digits represent the year, and the last four digits represent the delivery number. For example, the 76th delivery in 2011 has a delivery number of 20110076.
* A code representing the delivery area. A local delivery is code 1 and a long-distance delivery is code 2.
* A weight, in pounds, of the item to be delivered.
* The fee for the delivery as follows:

|  |  |  |
| --- | --- | --- |
| Distance | Weight | Fee($) |
| 1 | Under 5 pounds | 12.00 |
| 1 | 5 to 20 pounds | 16.50 |
| 1 | Over 20 pounds | 22.00 |
| 2 | Under 5 pounds | 35.00 |
| 2 | 5 pounds or more | 47.95 |

Create a constructor for the Delivery class that accepts arguments for the year, delivery number within the year, delivery distance code, and weight of the package. The constructor determines the eight-digit delivery number and delivery fee. Also include a method that displays every Delivery object field.

Next, create an application that prompts the user for data for a delivery. Keep prompting the user for each of the following values until they are valid:

* A four-digit year between 2001 and 2025 inclusive
* A delivery number between 1 and 9999 inclusive
* A package weight between 0.1 pounds and 100 pounds inclusive
* A delivery distance code that is either 1 or 2

When all of the data entries are valid, construct a Delivery object and then display it’s values.