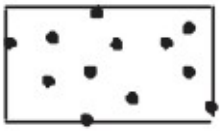
Experiment 8: Inheritance and Polymorphism

1. A bounding rectangle is the minimum rectangle that encloses a set of points in a two-dimensional plane, as shown in Figure. Write a method that returns a bounding rectangle for a set of points in a two-dimensional plane, as follows:

def getRectangle(points):

You defined the Rectangle2D class in Exercise 8.19. Write a test program that prompts the user to enter the points as x1 y1 x2 y2 x3 y3 ... in one line, and displays the bounding rectangle's center, width, and height.



2. Use the Account class created in Exercise 7.3 to simulate an ATM machine. Create ten accounts in a list with the ids 0, 1, ..., 9, and an initial balance of $100. The system prompts the user to enter an id. If the id is entered incorrectly, ask the user to enter a correct id. Once an id is accepted, the main menu is displayed as shown in the sample run. You can enter a choice of 1 for viewing the current balance, 2 for withdrawing money, 3 for depositing money, and 4 for exiting the main menu. Once you exit, the system will prompt for an id again. So, once the system starts, it won't stop.

3. Design a class named Location for locating a maximal value and its location in a two-dimensional list. The class contains the public data fields row, column, and maxValue that store the maximal value and its indexes in a two-dimensional list, with row and column as int types and maxValue as a float type. Write the following method that returns the location of the largest element in a two-dimensional list. def Location locateLargest(a): The return value is an instance of Location. Write a test program that prompts the user to enter a two-dimensional list and displays the location of the largest element in the list.