**SECTION 9: FINDING A CENTRAL LOCATION:**

import java.util.ArrayList;

import java.util.Scanner;

class Dorm {

private String name;

private int population;

private double x, y;

public Dorm(String name, double x, double y, int population) {

this.name = name;

this.population = population;

this.x = x;

this.y = y;

}

public double getX() {

return x;

}

public double getY() {

return y;

}

public int getPopulation() {

return population;

}

public void setPopulation(int population) {

this.population = population;

}

public void setLocation(double x, double y) {

this.x = x;

this.y = y;

}

public String getName() {

return name;

}

}

class Student {

private Dorm dorm;

public Student(Dorm dorm) {

this.dorm = dorm;

}

public double getX() {

return dorm.getX();

}

public double getY() {

return dorm.getY();

}

}

public class CampusMap {

private static ArrayList<Dorm> dorms = new ArrayList<>();

private static ArrayList<Student> studyGroup = new ArrayList<>();

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

// Adding dorms

dorms.add(new Dorm("Dorm A", 100, 200, 100));

dorms.add(new Dorm("Dorm B", 500, 300, 150));

dorms.add(new Dorm("Dorm C", 300, 500, 200));

// Adding students to the study group

studyGroup.add(new Student(dorms.get(0)));

studyGroup.add(new Student(dorms.get(1)));

studyGroup.add(new Student(dorms.get(2)));

while (true) {

System.out.println("Current Dorm Populations:");

for (Dorm dorm : dorms) {

System.out.println(dorm.getName() + ": " + dorm.getPopulation());

}

System.out.println("Enter dorm name to update population (or 'exit' to finish):");

String dormName = scanner.nextLine();

if (dormName.equals("exit")) break;

System.out.println("Enter new population:");

int newPopulation = Integer.parseInt(scanner.nextLine());

for (Dorm dorm : dorms) {

if (dorm.getName().equals(dormName)) {

dorm.setPopulation(newPopulation);

}

}

updateCenters();

}

scanner.close();

}

private static void updateCenters() {

double allX = 0, allY = 0, totalPopulation = 0;

for (Dorm dorm : dorms) {

allX += dorm.getX() \* dorm.getPopulation();

allY += dorm.getY() \* dorm.getPopulation();

totalPopulation += dorm.getPopulation();

}

double centerX = allX / totalPopulation;

double centerY = allY / totalPopulation;

System.out.println(String.format("Center of All Students: (%.2f, %.2f)", centerX, centerY));

// Update the study group center

double studyX = 0, studyY = 0;

for (Student student : studyGroup) {

studyX += student.getX();

studyY += student.getY();

}

double studyCenterX = studyX / studyGroup.size();

double studyCenterY = studyY / studyGroup.size();

System.out.println(String.format("Center of Study Group: (%.2f, %.2f)", studyCenterX, studyCenterY));

}

}