There is an exam room with n seats in a single row labeled from 0 to n - 1.When a student enters the room, they must sit in the seat that maximizes the distance to the closest person. If there are multiple such seats, they sit in the seat with the lowest number. If no one is in the room, then the student sits at seat number 0.Design a class that simulates the mentioned exam room. Implement the ExamRoom class: ExamRoom (int n) Initializes the object of the exam room with the number of the seats n. int seat () Returns the label of the seat at which the next student will set. Void leave (int p) indicates that the student sitting at seat p will leave the room. It is guaranteed that there will be a student sitting at seat p.

CODE:

import java.util.TreeSet;

class ExamRoom {

private int n;

private TreeSet<Integer> students;

public ExamRoom(int n) {

this.n = n;

this.students = new TreeSet<>();

}

public int seat() {

// If no students in the room, seat the first student at seat 0

if (students.isEmpty()) {

students.add(0);

return 0;

}

int maxDistance = students.first(); // Distance to the first student

Integer prev = null;

int seat = 0;

// Iterate through the students to find the maximum distance between students

for (int curr : students) {

if (prev != null) {

int distance = (curr - prev) / 2;

if (distance > maxDistance) {

maxDistance = distance;

seat = prev + distance;

}

}

prev = curr;

}

// Check distance from the last seat

if (n - 1 - students.last() > maxDistance) {

seat = n - 1;

}

// Add the student to the TreeSet

students.add(seat);

return seat;

}

public void leave(int p) {

students.remove(p);

}

}

public class SeatingArrangement {

public static void main(String[] args) {

// Initialize the exam room with 10 seats

ExamRoom examRoom = new ExamRoom(10);

// Seat some students

System.out.println("Seat: " + examRoom.seat()); // Seat the first student

System.out.println("Seat: " + examRoom.seat()); // Seat the second student

examRoom.leave(0); // First student leaves

System.out.println("Seat: " + examRoom.seat()); // Seat the third student

}

}

OUTPUT:

C:\javap>javac SeatingArrangement.java

C:\javap>java SeatingArrangement

Seat: 0

Seat: 9

Seat: 0

