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Question 3

Firstly, we need to traverse all arrival and departure times to find how many trains arrived before midnight and depart after midnight. This number is initial value of the counter. Secondly , we need to store all the arrival and departure times in a new list, then sort the list in ascending order. Set a variable max equal to the initial counter value, traverse the entire list, if this point is an arrival time counter++, then if counter is greater than max, then assign the current counter value to max. else counter--.Finally, the value of max that is the minimum number of platforms.

Sample code(Java)

class Period {

    int arrive;

    int depart;

    Period(int arrive,int depart) {

        this.arrive = arrive;

        this.depart = depart;

    }

}

class Time implements Comparable<Time> {

    // the value of time

    int value;

    // the type of time are arrive and depart

    String type;

    Time(int value,String type){

        this.value = value;

        this.type = type;

    }

    @Override

    public int compareTo(Time time){

        if(this.value == time.value) {

            return 0;

        }

        else if (this.value > time.value){

            return 1;

        }

        else {

          return -1;

        }

    }

}

int countMax(Period[] p){

    // the value of counter should be

    // how many trains arrive before midnight and depart after midnight

    int counter;

    int max = counter;

    Time [] times = new Time[p.length\*2];

    for (int i=0;i<p.length;i++){

        times[2\*i] = new Time(p[i].arrive,"arrive");

        times[2\*i+1] = new Time(p[i].depart,"depart");

    }

    Collections.sort(times);

    for(Time t: times){

        if(t.type.equals("arrive")) {

            counter++;

            max = Math.max(max,counter);

        }

        else {

          counter--;

        }

    }

    return max;

}