Q3

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Answer:

Step 1:

We go through the timetable of arrivals and departures, we find out how many trains arrive before midnight and depart after midnight. The number of these trains is the number of platforms at least due to the dwell time of these trains is incompatible. We make the same number timetables T_{1M} , each timetable contains one of these trains.

Step 2:

We can make a new timetable of arrivals and departures, but no trains arrive before midnight and depart after midnight. Then we sort this timetable in ascending order.

Step 3:

We compare the arrive time of the first train in sorted timetable with the departure time of the trains in timetables created in step 1.

If it is compatible, then

We take out the first train in sorted timetable and put it into the one of T_{1M} that the difference of the departure time of last train in the timetable between the arrival time of first train in sorted timetable is minimum. For example, there are two timetables T_1, T_2, we created in step 1. The departure time of the last train in T_1 is 00:05, another in T_2 is 00:15, and the arrival time of the f irst train in sorted timetable is 00:20, then we put it into T_2

If it is incompatible, then

We take out the first train in sorted timetable and put it into a new timetable same as step 1. Hence, the number of platforms increase by 1.

We do the same process till the sorted timetable is empty, and the number of timetables we created in step 1 and step 3 is the minimum number of platforms.