

Challenge July 2023

Rules as Preferences (Miss Manners Advanced)

A solution with [Optaplanner](#) by Thierry Guerin (t.guerin@groupeonepoint.com)

This month's challenge (July 2023) must incorporate rules that cannot all be satisfied and therefore must be considered as preferences.

The goal is to place the guests around a table and the desired distribution of seats is based on:

- A “man-woman-man-woman” alternation while the number of men and women is different.
- Each guest has someone left or right with a hobby in common.

A generic approach to problems of rules treated as preferences is to introduce SOFT and HARD levels of rules. While HARD rules cannot be violated, SOFT rules can.

Hard level constraints determine a feasible solution, and soft level constraints determine how well the solution meets the objectives.

- “Hard”: strong constraints, those which cannot be transgressed. Eg: a seat can only be assigned to one guest.
- “Soft”: weak constraints (preferences or wishes), used to optimize the positioning of a guest.

Usually, a penalty or reward is associated with these rules and the final result must find a solution that minimizes or maximizes the sum of the rules penalties/rewards.

For the Miss Manners problem, 3 constraints were needed (1 Hard + 2 Soft). The first constraint (Hard) controls that all guests must occupy different seats. The other constraints (Soft) determine preferences such as the “man-woman-man-woman” alternation by assigning a penalty if the gender of the 2 guests located side by side is identical. The last constraint (Soft) assigns a reward if the 2 guests located side by side have a hobby in common. This reward is equal to the number of hobbies in common, so the more you have in common with the other guest, the more likely you are to be placed next.

Business Decision Model

For each Guest, the properties are a technical id, a name, a gender, a list of Hobbies and the allocated seat.

```
@PlanningEntity
public class Guest {

    @PlanningId
    public Long id;

    String name;
    String gender;
    List<Integer> hobby;

    @PlanningVariable(valueRangeProviderRefs = "seatRange")
    public Integer allocatedSeat;
    ...
}
```

Solution Model

```

@PlanningSolution
public class Solution {

    @ProblemFactCollectionProperty
    @ValueRangeProvider(id = "seatRange")
    private List<Integer> seatList;

    @PlanningEntityCollectionProperty
    private List<Guest> guestList;

    @PlanningScore
    private HardSoftScore score;
    ...

```

Constraints

```

public class Constraints implements ConstraintProvider {

    @Override
    public Constraint[] defineConstraints(ConstraintFactory constraintFactory) {
        return new Constraint[] {
            // -- Hard constraints
            seatConflict(constraintFactory), //

            // -- Soft constraints
            genderPreference(constraintFactory), //
            hobbyPreference(constraintFactory), //
        };
    }

    // ----- Hard constraints -----

    Constraint seatConflict(ConstraintFactory constraintFactory) {
        return constraintFactory
            // For each guest pair ...
            .forEachUniquePair(Guest.class,
                // ... with the same seat ...
                Joiners.equal(Guest::getAllocatedSeat))
            // ... then penalize each pair with a hard weight.
            .penalize(HardSoftScore.ONE_HARD).asConstraint("Seat conflict");
    }

    // ----- Soft constraints -----

    Constraint genderPreference(ConstraintFactory constraintFactory) {
        return constraintFactory
            // For each guest ...
            .forEach(Guest.class)
            // ... join with another guest ...
            .join(Guest.class,
                // ... with same gender ...
                Joiners.equal(Guest::getGender),
                // ... on the next seat ...
                Joiners.filtering((guest1, guest2) -> guest1.getAllocatedSeat().equals(
guest2.getAllocatedSeat() + 1)))
            // ... then penalize with a soft weight.
            .penalize(HardSoftScore.ofSoft(10)).asConstraint("Same gender");
    }

    Constraint hobbyPreference(ConstraintFactory constraintFactory) {
        return constraintFactory
            // For each guest ...
            .forEach(Guest.class)
            // ... join with another guest ...
            .join(Guest.class,
                // ... on the next seat ...
                // ... and with at least one same hobby ...
                Joiners.filtering((guest1, guest2) -> guest1.getAllocatedSeat()
.equals(guest2.getAllocatedSeat() + 1)
                && guest1.getHobby().stream().filter(guest2.getHobby()::contains)
.collect(Collectors.toSet()).size() > 0))
            // ... then reward with a soft weight.

```

```

        .reward(HardSoftScore.ONE_SOFT,
            // with the count of the same hobbies
            (guest1, guest2) -> guest1.getHobby().stream().filter(guest2.getHobby()::contains)
        ).collect(Collectors.toSet()).size())
        .asConstraint("Same hobby");
    }
}

```

Results which give and prove optimality:

----- Sheet **Data-16: this took 0.917 seconds**

```

Guest [name=Guest16, gender=f, hobby=[2, 3], seat=1]
Guest [name=Guest13, gender=f, hobby=[2, 3], seat=2]
Guest [name=Guest3, gender=f, hobby=[3, 2], seat=3]
Guest [name=Guest10, gender=m, hobby=[3, 2, 1], seat=4]
Guest [name=Guest15, gender=f, hobby=[2, 3, 1], seat=5]
Guest [name=Guest4, gender=m, hobby=[3, 2, 1], seat=6]
Guest [name=Guest9, gender=f, hobby=[2, 3, 1], seat=7]
Guest [name=Guest12, gender=f, hobby=[3, 1, 2], seat=8]
Guest [name=Guest2, gender=f, hobby=[2, 1, 3], seat=9]
Guest [name=Guest5, gender=m, hobby=[2, 1, 3], seat=10]
Guest [name=Guest11, gender=f, hobby=[1, 3, 2], seat=11]
Guest [name=Guest1, gender=f, hobby=[2, 1, 3], seat=12]
Guest [name=Guest8, gender=m, hobby=[3, 1], seat=13]
Guest [name=Guest6, gender=f, hobby=[2, 3, 1], seat=14]
Guest [name=Guest7, gender=f, hobby=[1, 2, 3], seat=15]
Guest [name=Guest14, gender=f, hobby=[1, 2], seat=16]

```

----- Sheet **Data-32: this took 8.069 seconds**

```

Guest [name=alex, gender=f, hobby=[1, 3], seat=1]
Guest [name=l, gender=m, hobby=[1, 3], seat=2]
Guest [name=pam, gender=f, hobby=[1, 3], seat=3]
Guest [name=chuck, gender=m, hobby=[1, 3], seat=4]
Guest [name=g, gender=f, hobby=[3, 1], seat=5]
Guest [name=tim, gender=m, hobby=[3, 1], seat=6]
Guest [name=r, gender=f, hobby=[1, 3], seat=7]
Guest [name=s, gender=m, hobby=[3, 1], seat=8]
Guest [name=p, gender=f, hobby=[2, 1, 3], seat=9]
Guest [name=doug, gender=m, hobby=[3, 1, 2], seat=10]
Guest [name=m, gender=f, hobby=[2, 1, 3], seat=11]
Guest [name=e, gender=m, hobby=[3, 1, 2], seat=12]
Guest [name=j, gender=f, hobby=[2, 1, 3], seat=13]
Guest [name=dave, gender=m, hobby=[1, 3, 2], seat=14]
Guest [name=ann, gender=f, hobby=[2, 1, 3], seat=15]
Guest [name=k, gender=m, hobby=[1, 2], seat=16]
Guest [name=f, gender=f, hobby=[2, 1], seat=17]
Guest [name=n, gender=f, hobby=[1, 2], seat=18]
Guest [name=john, gender=m, hobby=[1, 2], seat=19]
Guest [name=jane, gender=f, hobby=[2, 1], seat=20]
Guest [name=h, gender=m, hobby=[2, 3], seat=21]
Guest [name=hope, gender=f, hobby=[2, 1, 3], seat=22]
Guest [name=scott, gender=m, hobby=[2, 3], seat=23]
Guest [name=carol, gender=f, hobby=[2, 1, 3], seat=24]
Guest [name=d, gender=m, hobby=[1, 3, 2], seat=25]
Guest [name=jill, gender=f, hobby=[1, 2], seat=26]
Guest [name=q, gender=m, hobby=[1, 3], seat=27]
Guest [name=kate, gender=f, hobby=[3, 1], seat=28]
Guest [name=o, gender=m, hobby=[2, 3], seat=29]
Guest [name=i, gender=f, hobby=[3, 2], seat=30]
Guest [name=dan, gender=m, hobby=[2, 3], seat=31]
Guest [name=sue, gender=f, hobby=[3, 2], seat=32]

```

----- Sheet **Data-64: this took 27.583 seconds**

```

Guest [name=Guest16, gender=f, hobby=[2, 3], seat=1]
Guest [name=Guest3, gender=m, hobby=[3, 2], seat=2]
Guest [name=Guest38, gender=f, hobby=[1, 3, 2], seat=3]
Guest [name=Guest31, gender=m, hobby=[1, 2, 3], seat=4]
Guest [name=Guest12, gender=f, hobby=[3, 1, 2], seat=5]

```

Guest [name=Guest14, gender=m, hobby=[1, 2], seat=6]
 Guest [name=Guest23, gender=f, hobby=[1, 2], seat=7]
 Guest [name=Guest28, gender=m, hobby=[1, 2], seat=8]
 Guest [name=Guest56, gender=f, hobby=[2, 1, 3], seat=9]
 Guest [name=Guest57, gender=f, hobby=[3, 2, 1], seat=10]
 Guest [name=Guest52, gender=m, hobby=[1, 2, 3], seat=11]
 Guest [name=Guest35, gender=f, hobby=[2, 3], seat=12]
 Guest [name=Guest21, gender=m, hobby=[2, 3], seat=13]
 Guest [name=Guest62, gender=f, hobby=[2, 3], seat=14]
 Guest [name=Guest22, gender=m, hobby=[2, 3], seat=15]
 Guest [name=Guest64, gender=f, hobby=[3, 2], seat=16]
 Guest [name=Guest36, gender=m, hobby=[2, 1], seat=17]
 Guest [name=Guest63, gender=f, hobby=[3, 1, 2], seat=18]
 Guest [name=Guest43, gender=m, hobby=[1, 3, 2], seat=19]
 Guest [name=Guest60, gender=f, hobby=[3, 1], seat=20]
 Guest [name=Guest8, gender=m, hobby=[3, 1], seat=21]
 Guest [name=Guest59, gender=f, hobby=[1, 2, 3], seat=22]
 Guest [name=Guest26, gender=m, hobby=[2, 1, 3], seat=23]
 Guest [name=Guest34, gender=f, hobby=[2, 1, 3], seat=24]
 Guest [name=Guest1, gender=m, hobby=[2, 1, 3], seat=25]
 Guest [name=Guest30, gender=f, hobby=[2, 1, 3], seat=26]
 Guest [name=Guest42, gender=m, hobby=[3, 1], seat=27]
 Guest [name=Guest7, gender=f, hobby=[1, 2, 3], seat=28]
 Guest [name=Guest39, gender=m, hobby=[3, 1, 2], seat=29]
 Guest [name=Guest5, gender=f, hobby=[2, 1, 3], seat=30]
 Guest [name=Guest32, gender=m, hobby=[1, 2], seat=31]
 Guest [name=Guest24, gender=f, hobby=[3, 1, 2], seat=32]
 Guest [name=Guest37, gender=m, hobby=[2, 1], seat=33]
 Guest [name=Guest48, gender=f, hobby=[3, 2], seat=34]
 Guest [name=Guest13, gender=m, hobby=[2, 3], seat=35]
 Guest [name=Guest55, gender=f, hobby=[1, 2, 3], seat=36]
 Guest [name=Guest41, gender=m, hobby=[2, 1, 3], seat=37]
 Guest [name=Guest25, gender=f, hobby=[3, 1, 2], seat=38]
 Guest [name=Guest50, gender=m, hobby=[2, 3], seat=39]
 Guest [name=Guest54, gender=f, hobby=[1, 2, 3], seat=40]
 Guest [name=Guest47, gender=m, hobby=[1, 2], seat=41]
 Guest [name=Guest53, gender=f, hobby=[2, 1], seat=42]
 Guest [name=Guest45, gender=m, hobby=[1, 2], seat=43]
 Guest [name=Guest51, gender=f, hobby=[2, 1, 3], seat=44]
 Guest [name=Guest6, gender=m, hobby=[2, 3, 1], seat=45]
 Guest [name=Guest46, gender=f, hobby=[1, 2, 3], seat=46]
 Guest [name=Guest9, gender=m, hobby=[2, 3, 1], seat=47]
 Guest [name=Guest20, gender=f, hobby=[1, 3, 2], seat=48]
 Guest [name=Guest15, gender=m, hobby=[2, 3, 1], seat=49]
 Guest [name=Guest61, gender=f, hobby=[3, 2, 1], seat=50]
 Guest [name=Guest4, gender=f, hobby=[3, 2, 1], seat=51]
 Guest [name=Guest44, gender=m, hobby=[3, 1, 2], seat=52]
 Guest [name=Guest27, gender=f, hobby=[2, 3, 1], seat=53]
 Guest [name=Guest58, gender=f, hobby=[3, 1, 2], seat=54]
 Guest [name=Guest10, gender=m, hobby=[3, 2, 1], seat=55]
 Guest [name=Guest17, gender=f, hobby=[3, 2], seat=56]
 Guest [name=Guest49, gender=m, hobby=[3, 2], seat=57]
 Guest [name=Guest2, gender=f, hobby=[2, 1, 3], seat=58]
 Guest [name=Guest33, gender=m, hobby=[2, 3, 1], seat=59]
 Guest [name=Guest40, gender=f, hobby=[1, 2, 3], seat=60]
 Guest [name=Guest18, gender=m, hobby=[1, 3, 2], seat=61]
 Guest [name=Guest29, gender=f, hobby=[2, 3, 1], seat=62]
 Guest [name=Guest11, gender=m, hobby=[1, 3, 2], seat=63]
 Guest [name=Guest19, gender=f, hobby=[3, 1], seat=64]

----- Sheet **Data-128: this took 113.22 seconds**

Guest [name=Guest11, gender=m, hobby=[2, 4, 5, 1], seat=1]
 Guest [name=Guest79, gender=f, hobby=[1, 3, 4, 2, 5], seat=2]
 Guest [name=Guest1, gender=m, hobby=[2, 3, 1, 4, 5], seat=3]
 Guest [name=Guest121, gender=f, hobby=[4, 2, 3, 5], seat=4]
 Guest [name=Guest21, gender=m, hobby=[4, 3, 2, 1], seat=5]
 Guest [name=Guest37, gender=f, hobby=[4, 2, 1], seat=6]
 Guest [name=Guest22, gender=m, hobby=[1, 2, 4], seat=7]
 Guest [name=Guest75, gender=f, hobby=[4, 2], seat=8]
 Guest [name=Guest45, gender=m, hobby=[2, 4], seat=9]
 Guest [name=Guest40, gender=m, hobby=[2, 3], seat=10]
 Guest [name=Guest111, gender=f, hobby=[3, 2], seat=11]
 Guest [name=Guest5, gender=m, hobby=[2, 5, 3], seat=12]
 Guest [name=Guest41, gender=f, hobby=[5, 3], seat=13]
 Guest [name=Guest8, gender=m, hobby=[3, 5], seat=14]
 Guest [name=Guest7, gender=f, hobby=[1, 2, 3, 5], seat=15]

Guest [name=Guest27, gender=m, hobby=[3, 5, 2], seat=16]
Guest [name=Guest12, gender=f, hobby=[3, 5, 2], seat=17]
Guest [name=Guest9, gender=m, hobby=[3, 5, 2, 4], seat=18]
Guest [name=Guest59, gender=f, hobby=[2, 3, 5], seat=19]
Guest [name=Guest50, gender=m, hobby=[2, 4, 3], seat=20]
Guest [name=Guest93, gender=f, hobby=[3, 1, 2], seat=21]
Guest [name=Guest123, gender=m, hobby=[2, 3, 1, 5], seat=22]
Guest [name=Guest91, gender=f, hobby=[2, 3, 5, 1, 4], seat=23]
Guest [name=Guest120, gender=m, hobby=[5, 1, 3, 2, 4], seat=24]
Guest [name=Guest107, gender=f, hobby=[3, 1, 2, 5, 4], seat=25]
Guest [name=Guest10, gender=m, hobby=[2, 3, 4, 5, 1], seat=26]
Guest [name=Guest92, gender=f, hobby=[3, 1, 2, 5], seat=27]
Guest [name=Guest19, gender=m, hobby=[5, 2], seat=28]
Guest [name=Guest94, gender=f, hobby=[2, 5], seat=29]
Guest [name=Guest13, gender=m, hobby=[5, 1], seat=30]
Guest [name=Guest74, gender=f, hobby=[1, 4, 2, 5, 3], seat=31]
Guest [name=Guest49, gender=m, hobby=[1, 5, 4, 3, 2], seat=32]
Guest [name=Guest29, gender=f, hobby=[3, 5], seat=33]
Guest [name=Guest98, gender=m, hobby=[5, 4], seat=34]
Guest [name=Guest106, gender=f, hobby=[4, 5, 1], seat=35]
Guest [name=Guest122, gender=m, hobby=[1, 2, 5], seat=36]
Guest [name=Guest89, gender=f, hobby=[5, 2, 4, 1], seat=37]
Guest [name=Guest39, gender=m, hobby=[5, 2], seat=38]
Guest [name=Guest16, gender=m, hobby=[2, 5, 4], seat=39]
Guest [name=Guest2, gender=f, hobby=[3, 2, 1, 4, 5], seat=40]
Guest [name=Guest96, gender=m, hobby=[1, 4, 2, 5, 3], seat=41]
Guest [name=Guest118, gender=f, hobby=[2, 4, 3], seat=42]
Guest [name=Guest84, gender=m, hobby=[3, 4], seat=43]
Guest [name=Guest67, gender=f, hobby=[1, 4], seat=44]
Guest [name=Guest42, gender=m, hobby=[5, 4], seat=45]
Guest [name=Guest33, gender=f, hobby=[5, 4], seat=46]
Guest [name=Guest34, gender=m, hobby=[4, 5, 2], seat=47]
Guest [name=Guest99, gender=f, hobby=[2, 5], seat=48]
Guest [name=Guest81, gender=m, hobby=[4, 1], seat=49]
Guest [name=Guest127, gender=f, hobby=[5, 1], seat=50]
Guest [name=Guest77, gender=m, hobby=[1, 5], seat=51]
Guest [name=Guest66, gender=f, hobby=[5, 3, 4], seat=52]
Guest [name=Guest90, gender=m, hobby=[2, 4, 5], seat=53]
Guest [name=Guest6, gender=f, hobby=[1, 4, 2, 5, 3], seat=54]
Guest [name=Guest78, gender=m, hobby=[5, 1], seat=55]
Guest [name=Guest115, gender=m, hobby=[2, 1, 5, 4], seat=56]
Guest [name=Guest97, gender=f, hobby=[4, 2, 5], seat=57]
Guest [name=Guest116, gender=m, hobby=[3, 4, 5, 1], seat=58]
Guest [name=Guest126, gender=f, hobby=[2, 3, 1, 4], seat=59]
Guest [name=Guest80, gender=m, hobby=[5, 1, 2, 4], seat=60]
Guest [name=Guest125, gender=f, hobby=[3, 5, 2, 4], seat=61]
Guest [name=Guest3, gender=m, hobby=[5, 4, 2], seat=62]
Guest [name=Guest100, gender=m, hobby=[2, 3, 5, 4], seat=63]
Guest [name=Guest60, gender=f, hobby=[4, 2, 3, 5], seat=64]
Guest [name=Guest86, gender=m, hobby=[3, 4], seat=65]
Guest [name=Guest85, gender=f, hobby=[4, 1], seat=66]
Guest [name=Guest43, gender=m, hobby=[3, 4, 5], seat=67]
Guest [name=Guest53, gender=f, hobby=[5, 1, 4, 2, 3], seat=68]
Guest [name=Guest61, gender=m, hobby=[1, 2, 4, 3], seat=69]
Guest [name=Guest57, gender=f, hobby=[2, 1, 4], seat=70]
Guest [name=Guest103, gender=m, hobby=[2, 1, 4, 3, 5], seat=71]
Guest [name=Guest35, gender=f, hobby=[3, 1, 4, 5, 2], seat=72]
Guest [name=Guest68, gender=m, hobby=[4, 2, 1, 5], seat=73]
Guest [name=Guest28, gender=f, hobby=[4, 1, 3, 2, 5], seat=74]
Guest [name=Guest15, gender=m, hobby=[5, 2, 1, 3, 4], seat=75]
Guest [name=Guest76, gender=f, hobby=[5, 4, 3, 2, 1], seat=76]
Guest [name=Guest24, gender=m, hobby=[4, 3, 2, 1, 5], seat=77]
Guest [name=Guest108, gender=f, hobby=[4, 5, 1, 2, 3], seat=78]
Guest [name=Guest114, gender=m, hobby=[3, 5, 1, 4], seat=79]
Guest [name=Guest112, gender=f, hobby=[4, 3, 5, 2, 1], seat=80]
Guest [name=Guest36, gender=m, hobby=[1, 4, 2, 3], seat=81]
Guest [name=Guest73, gender=f, hobby=[4, 1, 3], seat=82]
Guest [name=Guest72, gender=m, hobby=[4, 3, 1], seat=83]
Guest [name=Guest48, gender=f, hobby=[3, 1], seat=84]
Guest [name=Guest30, gender=m, hobby=[2, 1], seat=85]
Guest [name=Guest109, gender=f, hobby=[1, 2], seat=86]
Guest [name=Guest114, gender=m, hobby=[3, 2], seat=87]
Guest [name=Guest128, gender=f, hobby=[2, 4, 1, 3], seat=88]
Guest [name=Guest4, gender=m, hobby=[3, 2, 1, 4], seat=89]
Guest [name=Guest38, gender=f, hobby=[3, 1, 2, 4], seat=90]
Guest [name=Guest56, gender=m, hobby=[2, 3], seat=91]
Guest [name=Guest63, gender=f, hobby=[2, 3, 4, 1, 5], seat=92]

Guest [name=Guest82, gender=m, hobby=[3, 4, 1, 2, 5], seat=93]
Guest [name=Guest113, gender=f, hobby=[1, 3, 5, 2], seat=94]
Guest [name=Guest58, gender=m, hobby=[5, 3, 2, 1, 4], seat=95]
Guest [name=Guest101, gender=f, hobby=[2, 1, 5, 3, 4], seat=96]
Guest [name=Guest51, gender=m, hobby=[1, 2, 5, 4], seat=97]
Guest [name=Guest44, gender=f, hobby=[2, 4, 3, 1], seat=98]
Guest [name=Guest71, gender=m, hobby=[3, 1, 4], seat=99]
Guest [name=Guest102, gender=f, hobby=[2, 1, 5, 3, 4], seat=100]
Guest [name=Guest104, gender=m, hobby=[5, 3, 4, 1, 2], seat=101]
Guest [name=Guest64, gender=f, hobby=[2, 4, 1, 5, 3], seat=102]
Guest [name=Guest88, gender=m, hobby=[2, 5, 3, 1, 4], seat=103]
Guest [name=Guest70, gender=f, hobby=[3, 5, 1, 4, 2], seat=104]
Guest [name=Guest69, gender=m, hobby=[3, 4, 1], seat=105]
Guest [name=Guest54, gender=f, hobby=[1, 3], seat=106]
Guest [name=Guest20, gender=m, hobby=[2, 3], seat=107]
Guest [name=Guest124, gender=f, hobby=[2, 3, 4], seat=108]
Guest [name=Guest17, gender=m, hobby=[4, 3], seat=109]
Guest [name=Guest25, gender=m, hobby=[4, 5], seat=110]
Guest [name=Guest23, gender=f, hobby=[4, 5, 2], seat=111]
Guest [name=Guest119, gender=m, hobby=[5, 3], seat=112]
Guest [name=Guest95, gender=f, hobby=[3, 4], seat=113]
Guest [name=Guest31, gender=m, hobby=[3, 1, 4], seat=114]
Guest [name=Guest83, gender=f, hobby=[1, 3, 4], seat=115]
Guest [name=Guest46, gender=m, hobby=[4, 1, 5], seat=116]
Guest [name=Guest52, gender=f, hobby=[5, 3, 1, 4], seat=117]
Guest [name=Guest110, gender=m, hobby=[5, 4, 1, 2], seat=118]
Guest [name=Guest32, gender=f, hobby=[2, 1, 5], seat=119]
Guest [name=Guest47, gender=m, hobby=[2, 5, 4], seat=120]
Guest [name=Guest117, gender=f, hobby=[4, 5, 2], seat=121]
Guest [name=Guest87, gender=m, hobby=[5, 4, 2, 3], seat=122]
Guest [name=Guest62, gender=f, hobby=[3, 2, 5, 4, 1], seat=123]
Guest [name=Guest65, gender=m, hobby=[5, 3, 2, 1, 4], seat=124]
Guest [name=Guest18, gender=f, hobby=[2, 4, 5, 1], seat=125]
Guest [name=Guest26, gender=m, hobby=[1, 2], seat=126]
Guest [name=Guest105, gender=f, hobby=[4, 2], seat=127]
Guest [name=Guest55, gender=m, hobby=[2, 4], seat=128]