Evaluation – LCC Use Case

LCC Use Case

❑ Dataset
  ➢ Confirmed by DIFE
  ➢ **Unsupervised**
  ➢ Consists of **11 examples and 15 results** with modified configuration
  ➢ Each **example** consists of **5x10, 3x15 and 3x20 TCN profiles**
  ➢ Each **TCN profile** consists of the following attributes and their domain:
    ▪ **Gender** – *{Male, Female}*
    ▪ **Nationality** – *{<nationality>}*
    ▪ **Course Progress Level** – *[0,100]*
    ▪ **Attendance information** – *{Yes, No}*
    ▪ **Gender preference** – *{Same, Mixed, Don't mind}*
    ▪ **Nationality preference** – *{Same, Mixed, Don't mind}*
  ➢ Course constraints → **Configuration 1**:
    o **Group size**: *minimum 2 maximum 5* → can be set dynamically by Teacher
    o **Attendance**: *maximum 1 TCN in a group who missed the previous lesson* → work going on to be set dynamically by Teacher
    o **Course Progress Level (CPL) vs Satisfaction of Preferences importance weights**: *0,75 vs 0,25* → can be set dynamically by Teacher
    o **Gender vs Nationality preferences importance weights**: *0,75 vs 0,25* → can be set dynamically by TCNs

LCC Use Case
Evaluation

Performance Measure:

1. **Customer Satisfaction Score** (CSAT) on a Likert scale since system already provides the exact solution.
    1. We provide the results for the approved dataset
    2. Users evaluate the results on a **Likert scale** (5: *Very Satisfied*, 4: *Satisfied*, 3: *Neither Satisfied nor Dissatisfied*, 2: *Dissatisfied*, 1: *Very Dissatisfied)*
    3. In case the **results are not satisfactory**, we try to improve the results based **on users' feedback**. i.e. to be answered by users:
        1. *If the example results are unsatisfactory, what is the better result?*
        2. *What makes the results unsatisfactory?*
        3. *How much does it take to compute such results manually?*

2. There are 11 examples and each example result requires a single CSAT score. I.e. 11 CSAT scores are required, one per example.

LCC Use Case
Results

Each example is described in 2 slides starting from next slide. First slide shows the dataset and second slide shows the grouping results for this specific dataset. Grouping results are ranked from best to worst.

LCC Example_1
Dataset

→ 10 TCNs
→ 4 Male and 6 Females
→ 4 different types of nationalities
→ CPL ranges between [25,95]
→ Only 2 TCNs missed previous lesson
→ 3 TCNs want Same gender groups
→ 5 TCNs want Mixed gender groups
→ 3 TCNs want Same nationality groups
→ 6 TCNs want Mixed nationality groups

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LCC Example_1 → 10 Agents
Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10
Gender	Male	Male	Female	Male	Female	Female	Female	Female	Female	Male
Nationality	A	A	B	C	D	B	C	C	D	C
Course Progress Level	72	84	73	53	25	44	89	57	95	60
Attendance	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Gender Preference	Don't mind	Mixed	Same	Mixed	Don't mind	Same	Mixed	Mixed	Same	Mixed
Nationality Preference	Same	Same	Mixed	Mixed	Mixed	Mixed	Don't mind	Mixed	Mixed	Same

LCC Example_1 → 10 Agents

→ Results computed with <u>Configuration 1</u>

Total Runtime: 141 seconds

Solution:

1. [[4, 8, 10], [5, 6], [2, 7, 9], [1, 3]] -> -11.648
2. [[4, 5, 6, 8, 10], [2, 7, 9], [1, 3]] -> -12.079
3. [[2, 7, 9], [4, 5, 6], [1, 3], [8, 10]] -> -12.501
4. [[1, 2, 3], [4, 8, 10], [5, 6], [7, 9]] -> -14.228
5. [[1, 2, 3, 7, 9], [4, 8, 10], [5, 6]] -> -14.619
6. [[4, 5, 6, 8, 10], [1, 2, 3], [7, 9]] -> -14.658
7. [[4, 5, 6, 8, 10], [1, 2, 3, 7, 9]] -> -15.049
8. [[1, 2, 3], [4, 5, 6], [7, 9], [8, 10]] -> -15.081
9. [[1, 2, 3, 7, 9], [4, 5, 6], [8, 10]] -> -15.472
10. [[1, 3, 4], [2, 7, 9], [5, 6], [8, 10]] -> -17.024
11. [[2, 4, 8, 10], [1, 3], [5, 6], [7, 9]] -> -17.32
12. [[1, 2, 3, 4], [5, 6], [7, 9], [8, 10]] -> -17.36
13. [[4, 5, 6, 10], [1, 3, 8], [2, 7, 9]] -> -17.58
14. [[1, 2, 7, 9], [3, 4, 8, 10], [5, 6]] -> -17.589
15. [[2, 7, 9, 10], [1, 3], [4, 8], [5, 6]] -> -17.714
16. [[1, 3, 9], [4, 8, 10], [2, 7], [5, 6]] -> -17.736
17. [[1, 3, 8], [2, 7, 9], [4, 10], [5, 6]] -> -17.861
18. [[1, 3, 7], [4, 8, 10], [2, 9], [5, 6]] -> -17.867
19. [[1, 2, 3, 7, 9], [5, 6, 10], [4, 8]] -> -18.073
20. [[4, 5, 6, 8, 10], [1, 3, 9], [2, 7]] -> -18.167
21. [[1, 2, 3, 8], [4, 5, 6, 10], [7, 9]] -> -18.172
22. [[4, 5, 6, 8, 10], [1, 3, 7], [2, 9]] -> -18.298
23. [[2, 7, 9], [6, 8, 10], [1, 3], [4, 5]] -> -18.331
24. [[1, 2, 3, 8], [4, 10], [5, 6], [7, 9]] -> -18.454
25. [[2, 7, 9, 10], [4, 5, 6, 8], [1, 3]] -> -18.466
26. [[1, 2, 7, 9], [3, 10], [4, 8], [5, 6]] -> -18.592
27. [[1, 4, 5, 6], [2, 3, 7, 9], [8, 10]] -> -18.745
28. [[1, 4, 5, 6, 8], [2, 7, 9], [3, 10]] -> -18.755
29. [[1, 2, 3, 7, 9], [5, 6, 8], [4, 10]] -> -18.823
30. [[1, 2, 7, 9], [3, 8, 10], [4, 5, 6]] -> -19.179

→ Results computed with Configuration 1 with the following modifications:
   → CPL vs Satisfaction weights: 0,1 vs 0,9

Total Runtime: 134 seconds

Solution:

1. [[4, 8, 10], [5, 6], [1, 2, 7], [3, 9]]->4,15
2. [[1, 2, 4, 7], [3, 9], [5, 6], [8, 10]]->4,063
3. [[2, 4, 8, 10], [1, 7], [3, 9], [5, 6]]->3,541
4. [[4, 5, 8, 10], [1, 2, 7], [3, 6, 9]]->3,455
5. [[1, 2, 4, 7], [3, 5, 6, 9], [8, 10]]->3,434
6. [[1, 2, 4, 8], [3, 9], [5, 6], [7, 10]]->3,366
7. [[2, 4, 8, 10], [3, 5, 6, 9], [1, 7]]->2,911
8. [[1, 2, 7, 8], [3, 6, 9], [4, 5, 10]]->2,815
9. [[1, 2, 4, 8], [3, 5, 6, 9], [7, 10]]->2,736
10. [[1, 4, 5, 8], [2, 7, 10], [3, 6, 9]]->2,597
11. [[1, 2, 4, 7], [3, 6, 9], [5, 8, 10]]->2,591
12. [[1, 4, 5, 8], [2, 7], [3, 9], [6, 10]]->2,451
13. [[1, 2, 3, 4], [5, 6], [7, 9], [8, 10]]->2,435
14. [[1, 2, 4, 7], [5, 6, 8, 10], [3, 9]]->2,434
15. [[2, 4, 8, 10], [1, 7, 9], [3, 5, 6]]->2,143
16. [[1, 2, 7, 8], [3, 9], [4, 5], [6, 10]]->1,766
17. [[1, 4, 7, 8], [2, 5, 10], [3, 6, 9]]->1,722
18. [[1, 2, 4, 8], [3, 6, 9], [5, 7, 10]]->1,711
19. [[1, 4, 5, 8], [2, 6, 7, 10], [3, 9]]->1,677
20. [[2, 4, 8, 10], [1, 5, 7], [3, 6, 9]]->1,645
21. [[1, 2, 4, 8], [5, 6, 7, 10], [3, 9]]->1,62
22. [[1, 4, 7, 8], [2, 5, 6, 10], [3, 9]]->1,618
23. [[1, 2, 4, 8], [3, 5, 6], [7, 9, 10]]->1,564
24. [[4, 7, 8, 10], [1, 2, 9], [3, 5, 6]]->1,515
25. [[1, 2, 7, 8], [3, 5, 9], [4, 6, 10]]->1,489
26. [[1, 4, 7, 8], [2, 9, 10], [3, 5, 6]]->1,448
27. [[4, 5, 6, 8, 10], [1, 2, 3, 7, 9]]->1,443
28. [[1, 2, 4, 7], [3, 9], [5, 10], [6, 8]]->1,413
29. [[1, 2, 4, 8], [3, 7, 9, 10], [5, 6]]->1,394
30. [[1, 2, 4, 8], [3, 7, 9], [5, 6, 10]]->1,357

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Results

→ **Results computed with Configuration 1 with the following modifications:**
> → **CPL vs Satisfaction weights: 0,1 vs 0,9**
> → **Gender vs Nationality weights: 0,5 vs 0,5**

Total Runtime: 134 seconds

Solution:

1. [[4, 5, 6, 8], [7, 10], [1, 2], [3, 9]]->2,816
2. [[4, 8, 10], [5, 6], [3, 7, 9], [1, 2]]->2,635
3. [[4, 5, 8, 10], [1, 2, 7], [3, 6, 9]]->2,105
4. [[1, 2, 7, 8], [3, 6, 9], [4, 5, 10]]->1,465
5. [[4, 5, 6, 8, 10], [1, 2, 3, 7, 9]]->1,443
6. [[1, 4, 5, 8], [2, 7, 10], [3, 6, 9]]->1,247
7. [[2, 4, 8, 10], [1, 7, 9], [3, 5, 6]]->1,243
8. [[1, 2, 4, 7], [3, 6, 9], [5, 8, 10]]->1,241
9. [[4, 5, 6, 10], [1, 2, 8], [3, 7, 9]]->1,154
10. [[4, 5, 6, 10], [1, 3, 8], [2, 7, 9]]->1,106
11. [[4, 8, 9, 10], [1, 2, 7], [3, 5, 6]]->1,035
12. [[3, 4, 8, 10], [1, 2, 7], [5, 6, 9]]->0,981
13. [[4, 5, 6, 10], [1, 2, 7], [3, 8, 9]]->0,916
14. [[1, 2, 4, 8], [3, 7, 9], [5, 6, 10]]->0,907
15. [[2, 7, 8, 10], [1, 4, 5], [3, 6, 9]]->0,866
16. [[1, 3, 4, 8], [2, 7, 9], [5, 6, 10]]->0,833
17. [[3, 6, 7, 9], [1, 2, 8], [4, 5, 10]]->0,808
18. [[2, 3, 7, 9, 10], [1, 4, 5, 6, 8]]->0,807
19. [[1, 4, 5, 6], [2, 7, 9], [3, 8, 10]]->0,764
20. [[2, 4, 7, 10], [1, 5, 8], [3, 6, 9]]->0,721
21. [[1, 4, 5, 6], [2, 8, 10], [3, 7, 9]]->0,671
22. [[1, 2, 4, 8], [3, 5, 6], [7, 9, 10]]->0,664
23. [[3, 4, 5, 6, 10], [1, 2, 7, 8, 9]]->0,64
24. [[1, 4, 5, 7], [2, 8, 10], [3, 6, 9]]->0,627
25. [[1, 2, 7, 8], [3, 5, 9], [4, 6, 10]]->0,589
26. [[1, 4, 7, 9], [2, 8, 10], [3, 5, 6]]->0,583
27. [[3, 5, 8, 9], [1, 2, 7], [4, 6, 10]]->0,581
28. [[1, 4, 7, 8], [2, 9, 10], [3, 5, 6]]->0,548
29. [[1, 2, 3, 7], [4, 8, 10], [5, 6, 9]]->0,535
30. [[1, 4, 8, 9], [2, 7, 10], [3, 5, 6]]->0,514

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Agent ID	4	8	10		5	6		2	7	9		1	3
Gender	Male	Female	Male		Female	Female		Male	Female	Female		Male	Female
Nationality	C	C	C		D	B		A	C	D		A	B
Course Progress Level	53	57	60		25	44		84	89	95		72	73
Attendance	Yes	Yes	No		Yes	Yes		Yes	Yes	Yes		No	Yes
Gender Preference	Mixed	Mixed	Mixed		Don't mind	Same		Mixed	Mixed	Same		Don't mind	Same
Nationality Preference	Mixed	Mixed	Same		Mixed	Mixed		Same	Don't mind	Mixed		Same	Mixed

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 2
- Nationality preference: 4

Likert scale: 4. No better results given the parameters provided, as course progress level and attendance are also part of the formula. Necessary to test it during in a real life pilot.

Other comments: necessary to allow users to determine different ranges of groups (e.g. [groups of 2, groups of 2-3, groups of 2-4, groups of 2-5, groups of 3, groups of 3-4, etc.]. <- Comment 1.1

Agent ID	4	8	10	5	6			2	7	9		1	3
Gender	Male	Female	Male	Female	Female			Male	Female	Female		Male	Female
Nationality	C	C	C	D	B			A	C	D		A	B
Course Progress Level	53	57	60	25	44			84	89	95		72	73
Attendance	Yes	Yes	No	Yes	Yes			Yes	Yes	Yes		No	Yes
Gender Preference	Mixed	Mixed	Mixed	Don't mind	Same			Mixed	Mixed	Same		Don't mind	Same
Nationality Preference	Mixed	Mixed	Same	Mixed	Mixed			Same	Don't mind	Mixed		Same	Mixed

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 3
- Nationality preference: 3

Likert scale: 4.

Other comments: As all the other sets, these results are valid since they are based on a predetermined formula that looks for the most optimal outcome. Still, this formula is static, and each teachers' preferences may vary. This should be further tested with teachers in real life situations, and check to what extent this formula can be dynamic to adapt to each professor's preference. In any case, this evaluation must count first with the possibility of grouping depending on ranges. <- Comment 1.2

LCC Example_2
Dataset

→ 10 TCNs
→ 6 Male and 4 Females
→ 5 different types of nationalities
→ CPL ranges between [57, 92]
→ Only 1 TCN missed previous lesson
→ 3 TCNs want Same gender groups
→ 3 TCNs want Mixed gender groups
→ 3 TCNs want Same nationality groups
→ 3 TCNs want Mixed nationality groups

LCC Example_2 → 10 Agents
Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10
Gender	Male	Male	Female	Male	Female	Male	Female	Male	Female	Male
Nationality	C	E	D	A	B	D	E	B	A	C
Course Progress Level	72	67	85	78	66	80	75	57	90	92
Attendance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Gender Preference	Mixed	Same	Same	Mixed	Same	Don't mind	Mixed	Don't mind	Don't mind	Don't mind
Nationality Preference	Same	Mixed	Same	Same	Mixed	Don't mind	Don't mind	Don't mind	Mixed	Don't mind

LCC Example_2 → 10 Agents

→ **Results computed with Configuration 1**

Total Runtime: 140 seconds

Solution:

1. [[1, 3, 4, 6, 7], [2, 5, 8], [9, 10]] -> -6.443
2. [[2, 5, 8], [3, 4, 6], [1, 7], [9, 10]] -> -6.456
3. [[1, 2, 5, 8], [3, 4, 6, 7], [9, 10]] -> -6.536
4. [[1, 2, 5, 7, 8], [3, 4, 6], [9, 10]] -> -6.572
5. [[1, 2, 5, 8], [3, 6], [4, 7], [9, 10]] -> -6.681
6. [[1, 4, 7], [2, 5, 8], [3, 6], [9, 10]] -> -6.71
7. [[1, 2, 5, 8], [3, 9, 10], [4, 6, 7]] -> -6.805
8. [[2, 5, 8], [3, 9, 10], [1, 7], [4, 6]] -> -6.831
9. [[1, 4, 6, 7], [2, 5, 8], [3, 9, 10]] -> -6.854
10. [[1, 2, 5, 7, 8], [3, 9, 10], [4, 6]] -> -6.947
11. [[3, 4, 6, 9, 10], [2, 5, 8], [1, 7]] -> -7.578
12. [[1, 2, 5, 8], [3, 6, 9, 10], [4, 7]] -> -7.674
13. [[3, 4, 6, 9, 10], [1, 2, 5, 7, 8]] -> -7.694
14. [[3, 6, 9, 10], [1, 4, 7], [2, 5, 8]] -> -7.703
15. [[1, 4, 6, 7, 8], [3, 9, 10], [2, 5]] -> -7.705
16. [[3, 4, 6, 7], [1, 2], [5, 8], [9, 10]] -> -7.855
17. [[1, 4, 7, 8], [2, 5], [3, 6], [9, 10]] -> -7.933
18. [[1, 2, 5, 6, 8], [3, 9, 10], [4, 7]] -> -7.997
19. [[1, 3, 4, 6], [2, 5, 7, 8], [9, 10]] -> -8.027
20. [[1, 2, 4, 5, 8], [3, 6, 7], [9, 10]] -> -8.03
21. [[1, 2, 4, 7], [3, 6], [5, 8], [9, 10]] -> -8.047
22. [[3, 4, 6, 7], [1, 5], [2, 8], [9, 10]] -> -8.105
23. [[3, 9, 10], [4, 6, 7], [1, 2], [5, 8]] -> -8.124
24. [[1, 2, 4, 6, 7], [3, 9, 10], [5, 8]] -> -8.148
25. [[1, 4, 5, 7], [2, 8], [3, 6], [9, 10]] -> -8.203
26. [[1, 6, 7], [2, 5, 8], [3, 4], [9, 10]] -> -8.223
27. [[1, 4, 5, 6, 7], [3, 9, 10], [2, 8]] -> -8.269
28. [[1, 2, 4, 5, 8], [3, 9, 10], [6, 7]] -> -8.301
29. [[1, 2, 7], [3, 9, 10], [4, 6], [5, 8]] -> -8.308
30. [[3, 9, 10], [4, 6, 7], [1, 5], [2, 8]] -> -8.374

→ **Result computed with Configuration 1 with the following modifications:**
   → **CPL vs Satisfaction weights: 0,1 vs 0,9**

Total Runtime: 131 seconds

Solution:

1. [[1, 4, 6, 7], [2, 8], [3, 5], [9, 10]]->5,797
2. [[4, 6, 9, 10], [1, 7], [2, 8], [3, 5]]->5,442
3. [[1, 6, 9, 10], [2, 8], [3, 5], [4, 7]]->5,245
4. [[1, 4, 9, 10], [2, 8], [3, 5], [6, 7]]->5,119
5. [[1, 4, 7, 10], [2, 8], [3, 5], [6, 9]]->4,934
6. [[1, 4, 7, 9], [2, 8], [3, 5], [6, 10]]->4,917
7. [[1, 6, 7, 10], [2, 8], [3, 5], [4, 9]]->4,837
8. [[1, 4, 6, 9], [2, 8], [3, 5], [7, 10]]->4,702
9. [[4, 6, 7, 10], [1, 9], [2, 8], [3, 5]]->4,654
10. [[4, 8, 9, 10], [1, 7], [2, 6], [3, 5]]->4,508
11. [[1, 4, 5, 7], [2, 8], [3, 9], [6, 10]]->4,506
12. [[1, 4, 5, 10], [2, 8], [3, 9], [6, 7]]->4,336
13. [[1, 4, 9, 10], [2, 6], [3, 5], [7, 8]]->4,319
14. [[1, 2, 6, 8], [3, 5], [4, 7], [9, 10]]->4,266
15. [[1, 6, 7, 10], [2, 8], [3, 9], [4, 5]]->4,187
16. [[1, 4, 5, 6], [2, 8], [3, 9], [7, 10]]->4,152
17. [[1, 4, 5, 7], [2, 8], [3, 6], [9, 10]]->4,106
18. [[4, 6, 8, 9], [1, 7], [2, 10], [3, 5]]->4,099
19. [[1, 4, 7, 10], [2, 8], [3, 9], [5, 6]]->4,084
20. [[1, 4, 7, 10], [2, 8], [3, 6], [5, 9]]->4,034
21. [[1, 6, 7, 8], [2, 10], [3, 5], [4, 9]]->3,993
22. [[1, 4, 6, 7], [2, 8], [3, 9], [5, 10]]->3,947
23. [[1, 4, 6, 9], [2, 10], [3, 5], [7, 8]]->3,902
24. [[1, 7, 9, 10], [2, 8], [3, 5], [4, 6]]->3,866
25. [[1, 4, 7, 10], [2, 6], [3, 9], [5, 8]]->3,734
26. [[1, 3, 6, 10], [2, 8], [4, 7], [5, 9]]->3,721
27. [[1, 2, 4, 7], [3, 5], [6, 8], [9, 10]]->3,694
28. [[3, 4, 6], [9, 10], [1, 5, 7], [2, 8]]->3,681
29. [[4, 6, 7, 8], [1, 9], [2, 10], [3, 5]]->3,638
30. [[1, 4, 7, 10], [2, 6], [3, 5], [8, 9]]->3,634

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Agent ID	1	3	4	6	7		2	5	8		9	10	
Gender	Male	Female	Male	Male	Female		Male	Female	Male		Female	Male	
Nationality	C	D	A	D	E		E	B	B		A	C	
Course Progress Level	72	85	78	80	75		67	66	57		90	92	
Attendance	Yes	Yes	Yes	Yes	Yes		Yes	Yes	No		Yes	Yes	
Gender Preference	Mixed	Same	Mixed	Don't mind	Mixed		Same	Same	Don't mind		Don't mind	Don't mind	
Nationality Preference	Same	Same	Same	Don't mind	Don't mind		Mixed	Mixed	Don't mind		Mixed	Don't mind	

Evaluation on a likert scale:

Number of discrepancies on:
- Gender preference: 3
- Nationality preference: 3

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

Agent ID	2	5	8		3	4	6		1	7		9	10
Gender	Male	Female	Male		Female	Male	Male		Male	Female		Female	Male
Nationality	E	B	B		D	A	D		C	E		A	C
Course Progress Level	67	66	57		85	78	80		72	75		90	92
Attendance	Yes	Yes	No		Yes	Yes	Yes		Yes	Yes		Yes	Yes
Gender Preference	Same	Same	Don't mind		Same	Mixed	Don't mind		Mixed	Mixed		Don't mind	Don't mind
Nationality Preference	Mixed	Mixed	Don't mind		Same	Same	Don't mind		Same	Don't mind		Mixed	Don't mind

Evaluation on a likert scale:

Number of discrepancies on:
- Gender preference: 3
- Nationality preference: 3

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

LCC Example_3
Dataset

→ 10 TCNs
→ 5 Male and 5 Females
→ 3 different types of nationalities
→ CPL ranges between [46,83]
→ 3 TCNs missed previous lesson
→ 6 TCNs want Same gender groups
→ 2 TCNs want Mixed gender groups
→ 3 TCNs want Same nationality groups
→ 3 TCNs want Mixed nationality groups

LCC Example_3 → 10 Agents
Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10
Gender	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Nationality	C	B	C	A	C	B	B	A	A	C
Course Progress Level	51	83	45	74	53	73	63	70	57	81
Attendance	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Gender Preference	Same	Same	Same	Don't mind	Same	Same	Same	Mixed	Mixed	Don't mind
Nationality Preference	Mixed	Mixed	Mixed	Same	Don't mind	Don't mind	Don't mind	Same	Same	Don't mind

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LCC Example_3→ 10 Agents

Results

→ **Result computed with Configuration 1**

Total Runtime: 135 seconds

Solution:

1. [[1, 3, 5], [4, 6, 8], [2, 10], [7, 9]] -> -6.074
2. [[1, 3, 5], [7, 8, 9], [2, 10], [4, 6]] -> -6.534
3. [[4, 6, 8], [5, 7, 9], [1, 3], [2, 10]] -> -6.607
4. [[2, 10], [4, 6], [5, 9], [7, 8], [1, 3]] -> -6.75
5. [[4, 6, 7, 8], [1, 3], [2, 10], [5, 9]] -> -7.351
6. [[2, 4, 6, 8, 10], [1, 3, 5], [7, 9]] -> -7.766
7. [[1, 3, 5], [2, 4, 10], [6, 8], [7, 9]] -> -8.068
8. [[1, 5], [2, 10], [3, 9], [4, 6], [7, 8]] -> -8.125
9. [[2, 4, 6, 8, 10], [5, 7, 9], [1, 3]] -> -8.299
10. [[1, 3, 5], [2, 8, 10], [4, 6], [7, 9]] -> -8.336
11. [[2, 4, 10], [5, 7, 9], [1, 3], [6, 8]] -> -8.601
12. [[4, 6, 7, 8], [1, 5], [2, 10], [3, 9]] -> -8.726
13. [[1, 3, 5, 7], [2, 10], [4, 6], [8, 9]] -> -8.861
14. [[1, 3, 5], [2, 6, 10], [4, 8], [7, 9]] -> -8.915
15. [[2, 4, 6, 10], [1, 3, 5], [7, 8, 9]] -> -9.026
16. [[2, 4, 6, 8, 10], [3, 7, 9], [1, 5]] -> -9.204
17. [[2, 4, 6, 10], [1, 3], [5, 9], [7, 8]] -> -9.242
18. [[3, 5, 9], [4, 6, 8], [1, 7], [2, 10]] -> -9.266
19. [[1, 3], [2, 10], [4, 7], [5, 9], [6, 8]] -> -9.375
20. [[2, 4, 10], [6, 7, 8], [1, 3], [5, 9]] -> -9.411
21. [[2, 6, 10], [5, 7, 9], [1, 3], [4, 8]] -> -9.448
22. [[1, 3], [2, 10], [4, 8], [5, 9], [6, 7]] -> -9.5
23. [[2, 4, 6, 8, 10], [1, 3, 7], [5, 9]] -> -9.829
24. [[4, 7, 8, 9], [1, 3, 5], [2, 6, 10]] -> -9.929
25. [[2, 4, 6, 10], [5, 7, 8, 9], [1, 3]] -> -9.93
26. [[1, 3], [2, 10], [4, 6], [5, 7], [8, 9]] -> -10.25
27. [[2, 4, 6, 10], [3, 7, 8, 9], [1, 5]] -> -10.374
28. [[2, 4, 6, 10], [1, 5], [3, 9], [7, 8]] -> -10.617
29. [[1, 5], [2, 10], [3, 9], [4, 7], [6, 8]] -> -10.75
30. [[1, 3, 5], [2, 4, 8], [6, 10], [7, 9]] -> -10.752

→ **Result computed with Configuration 1 with the following modifications:**
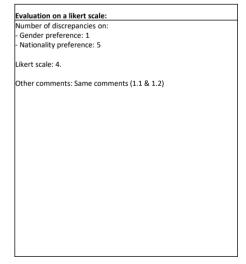 → **CPL vs Satisfaction weights: 0,1 vs 0,9**

Total Runtime: 127 seconds

Solution:

1. [[1, 3, 5, 7], [2, 6, 10], [4, 8, 9]]->7,194
2. [[1, 3, 5, 7], [2, 10], [4, 6], [8, 9]]->7,102
3. [[1, 3, 5, 7], [2, 4, 6, 10], [8, 9]]->6,82
4. [[2, 6, 10], [4, 8, 9], [1, 5], [3, 7]]->6,392
5. [[2, 6, 10], [4, 8, 9], [1, 3], [5, 7]]->6,142
6. [[1, 3, 5, 7], [2, 4, 6], [8, 9, 10]]->5,571
7. [[1, 3, 5, 7], [2, 10], [4, 9], [6, 8]]->5,452
8. [[1, 3, 5, 7], [4, 8, 9, 10], [2, 6]]->5,179
9. [[1, 3, 5, 7], [2, 6, 8, 10], [4, 9]]->5,162
10. [[1, 3, 5, 7], [2, 8, 9, 10], [4, 6]]->4,567
11. [[1, 3, 7], [2, 6, 10], [4, 5], [8, 9]]->4,32
12. [[1, 3, 5, 7], [2, 4, 8, 9], [6, 10]]->4,317
13. [[1, 3, 7], [2, 6, 10], [4, 8], [5, 9]]->4,27
14. [[1, 3, 5, 7], [2, 8, 9], [4, 6, 10]]->4,235
15. [[2, 6, 10], [3, 5, 7], [1, 4], [8, 9]]->4,232
16. [[1, 5, 7], [2, 6, 10], [3, 4], [8, 9]]->4,143
17. [[1, 5, 7], [2, 6, 10], [3, 9], [4, 8]]->4,093
18. [[1, 3, 5, 7], [2, 6, 8], [4, 9, 10]]->4,088
19. [[1, 3, 5, 7], [2, 4, 6, 8], [9, 10]]->3,967
20. [[1, 5, 7], [4, 8, 9], [2, 10], [3, 6]]->3,549
21. [[1, 5, 7], [4, 8, 9], [2, 6], [3, 10]]->3,199
22. [[1, 3, 5, 7], [2, 4, 9, 10], [6, 8]]->3,129
23. [[2, 4, 6, 10], [3, 7, 8, 9], [1, 5]]->3,05
24. [[2, 4, 6, 10], [3, 5, 8, 9], [1, 7]]->3,014
25. [[1, 3, 5, 7], [2, 9, 10], [4, 6, 8]]->2,951
26. [[2, 4, 6, 10], [3, 5, 7, 9], [1, 8]]->2,914
27. [[1, 3, 5, 7], [2, 4, 9], [6, 8, 10]]->2,76
28. [[1, 5, 7], [4, 8, 9], [2, 3], [6, 10]]->2,749
29. [[2, 4, 6, 10], [5, 7, 8, 9], [1, 3]]->2,676
30. [[1, 3, 5, 7], [4, 6, 8, 10], [2, 9]]->2,599

Agent ID	1	3	5		4	6	8		2	10		7	9
Gender	Female	Female	Female		Male	Male	Male		Male	Male		Female	Female
Nationality	C	C	C		A	B	A		B	C		B	A
Course Progress Level	51	45	53		74	73	70		83	81		63	57
Attendance	No	Yes	Yes		Yes	No	Yes		Yes	Yes		Yes	No
Gender Preference	Same	Same	Same		Don't mind	Same	Mixed		Same	Don't mind		Same	Mixed
Nationality Preference	Mixed	Mixed	Don't mind		Same	Don't mind	Same		Mixed	Don't mind		Don't mind	Same

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 2
- Nationality preference: 5

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

Agent ID	1	3	5		8	7	9		2	10		4	6
Gender	Female	Female	Female		Male	Female	Female		Male	Male		Male	Male
Nationality	C	C	C		A	B	A		B	C		A	B
Course Progress Level	51	45	53		70	63	57		83	81		74	73
Attendance	No	Yes	Yes		Yes	Yes	No		Yes	Yes		Yes	No
Gender Preference	Same	Same	Same		Mixed	Same	Mixed		Same	Don't mind		Don't mind	Same
Nationality Preference	Mixed	Mixed	Don't mind		Same	Don't mind	Same		Mixed	Don't mind		Same	Don't mind

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 1
- Nationality preference: 5

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

LCC Example_4

Dataset

→ 10 TCNs
→ 5 Male and 5 Females
→ 4 different types of nationalities
→ CPL ranges between [55, 93]
→ 3 TCN missed previous lesson
→ 3 TCNs want Same gender groups
→ 3 TCNs want Mixed gender groups
→ 3 TCNs want Same nationality groups
→ 3 TCNs want Mixed nationality groups

LCC Example_4 → 10 Agents
Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10
Gender	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Nationality	A	C	A	B	C	A	A	C	D	B
Course Progress Level	74	84	55	93	62	58	92	80	70	66
Attendance	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Gender Preference	Mixed	Same	Same	Mixed	Same	Don't mind	Mixed	Don't mind	Don't mind	Don't mind
Nationality Preference	Same	Mixed	Same	Same	Mixed	Don't mind	Don't mind	Don't mind	Mixed	Don't mind

LCC Example_4 → 10 Agents

Results

→ **Results computed with Configuration 1**

Total Runtime: 137 seconds

Solution:
1. [[1, 8, 9], [2, 4, 7], [3, 6], [5, 10]] -> -7.603
2. [[2, 4, 7], [5, 9, 10], [1, 8], [3, 6]] -> -7.72
3. [[1, 8], [9, 10], [2, 4, 7], [3, 5, 6]] -> -7.921
4. [[1, 8, 9, 10], [2, 4, 7], [3, 5, 6]] -> -8.05
5. [[3, 5, 6, 10], [1, 8, 9], [2, 4, 7]] -> -8.212
6. [[3, 5, 6, 9, 10], [2, 4, 7], [1, 8]] -> -8.307
7. [[2, 9], [4, 7], [3, 6], [5, 10], [1, 8]] -> -9.375
8. [[1, 6, 8, 9, 10], [2, 4, 7], [3, 5]] -> -9.46
9. [[3, 5, 6], [8, 9, 10], [1, 2], [4, 7]] -> -9.691
10. [[1, 3, 8, 9, 10], [2, 4, 7], [5, 6]] -> -9.814
11. [[2, 4, 7], [6, 9, 10], [1, 8], [3, 5]] -> -9.887
12. [[1, 8, 10], [2, 4, 7], [3, 6], [5, 9]] -> -9.947
13. [[1, 8, 9], [2, 4, 7], [3, 5], [6, 10]] -> -9.978
14. [[3, 5, 6, 10], [1, 2], [4, 7], [8, 9]] -> -9.984
15. [[2, 4, 7], [3, 6, 10], [1, 8], [5, 9]] -> -10.378
16. [[1, 5, 10], [2, 4, 7], [3, 6], [8, 9]] -> -10.512
17. [[2, 4, 7], [3, 9, 10], [1, 8], [5, 6]] -> -10.527
18. [[3, 5, 6, 9], [1, 8, 10], [2, 4, 7]] -> -10.544
19. [[1, 2, 9, 10], [3, 5, 6], [4, 7, 8]] -> -10.598
20. [[4, 7, 8], [5, 9, 10], [1, 2], [3, 6]] -> -10.63
21. [[2, 4, 7], [3, 6, 9], [1, 8], [5, 10]] -> -10.631
22. [[1, 3, 6, 8, 9], [2, 4, 7], [5, 10]] -> -10.645
23. [[1, 8, 9], [2, 4, 7], [3, 10], [5, 6]] -> -10.728
24. [[1, 3, 5, 6, 10], [2, 4, 7], [8, 9]] -> -10.746
25. [[3, 5, 6], [4, 7, 8], [1, 2], [9, 10]] -> -10.831
26. [[2, 4, 7], [3, 5, 6], [1, 10], [8, 9]] -> -10.921
27. [[3, 5, 6, 10], [1, 2, 9], [4, 7, 8]] -> -10.955
28. [[1, 2, 4, 7], [3, 6], [5, 10], [8, 9]] -> -10.971
29. [[1, 8, 9], [3, 5, 6], [2, 10], [4, 7]] -> -10.983
30. [[2, 4, 7], [3, 5, 9], [1, 8], [6, 10]] -> -11.117

Agent ID	1	8	9		2	4	7		3	6		5	10
Gender	Female	Male	Female		Male	Male	Female		Female	Male		Female	Male
Nationality	A	C	D		C	B	A		A	A		C	B
Course Progress Level	74	80	70		84	93	92		55	58		62	66
Attendance	Yes	No	Yes		No	Yes	Yes		Yes	Yes		No	Yes
Gender Preference	Mixed	Don't mind	Don't mind		Same	Mixed	Mixed		Same	Don't mind		Same	Don't mind
Nationality Preference	Same	Don't mind	Mixed		Mixed	Same	Don't mind		Same	Don't mind		Mixed	Don't mind

Agent ID	2	4	7		5	9	10		1	8		3	6
Gender	Male	Male	Female		Female	Female	Male		Female	Male		Female	Male
Nationality	C	B	A		C	D	B		A	C		A	A
Course Progress Level	84	93	92		62	70	66		74	80		55	58
Attendance	No	Yes	Yes		No	Yes	Yes		Yes	No		Yes	Yes
Gender Preference	Same	Mixed	Mixed		Same	Don't mind	Don't mind		Mixed	Don't mind		Same	Don't mind
Nationality Preference	Mixed	Same	Don't mind		Mixed	Mixed	Don't mind		Same	Don't mind		Same	Don't mind

LCC Example_5
Dataset

→ 10 TCNs
→ 3 Male and 7 Females
→ 4 different types of nationalities
→ CPL ranges between [51, 95]
→ 3 TCNs missed previous lesson
→ 4 TCNs want Same gender groups
→ 2 TCNs want Mixed gender groups
→ 3 TCNs want Same nationality groups
→ 0 TCNs want Mixed nationality groups

LCC Example_5 → 10 Agents
Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10
Gender	Male	Female	Female	Male	Female	Female	Female	Male	Female	Female
Nationality	B	D	A	C	B	A	C	C	A	B
Course Progress Level	88	66	55	77	51	95	80	57	90	68
Attendance	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes
Gender Preference	Don't mind	Same	Mixed	Don't mind	Same	Mixed	Same	Don't mind	Don't mind	Same
Nationality Preference	Same	Same	Don't mind	Don't mind	Same	Don't mind	Don't mind	Don't mind	Don't mind	Don't mind

Results

→ **Results computed with** **Configuration 1**

Total Runtime: 140 seconds

Solution:
1. [[1, 6, 9], [3, 4, 7], [2, 8], [5, 10]] -> -18.817
2. [[1, 6, 9], [4, 7, 8], [2, 3], [5, 10]] -> -18.865
3. [[1, 6, 9], [3, 4, 7], [2, 5], [8, 10]] -> -18.942
4. [[1, 6, 9], [4, 7, 8], [2, 5], [3, 10]] -> -18.99
5. [[1, 6, 9], [4, 5, 7], [2, 3], [8, 10]] -> -19.599
6. [[1, 3, 4, 7], [2, 8], [5, 10], [6, 9]] -> -19.67
7. [[3, 4, 6, 7], [1, 9], [2, 8], [5, 10]] -> -19.717
8. [[1, 3, 4, 7], [2, 5], [6, 9], [8, 10]] -> -19.795
9. [[3, 4, 6, 7], [1, 9], [2, 5], [8, 10]] -> -19.842
10. [[4, 6, 7, 8], [1, 9], [2, 3], [5, 10]] -> -19.901
11. [[1, 4, 7, 8], [2, 5], [3, 10], [6, 9]] -> -19.935
12. [[4, 6, 7, 8], [1, 9], [2, 5], [3, 10]] -> -20.026
13. [[4, 5, 6, 7], [1, 9], [2, 3], [8, 10]] -> -20.25
14. [[1, 4, 5, 7], [2, 8], [3, 10], [6, 9]] -> -20.281
15. [[1, 6, 7, 9], [2, 3], [4, 8], [5, 10]] -> -20.552
16. [[1, 6, 7, 9], [2, 5], [3, 4], [8, 10]] -> -20.677
17. [[1, 3, 6, 7, 9], [4, 8, 10], [2, 5]] -> -20.997
18. [[1, 6, 9], [5, 7, 10], [2, 3], [4, 8]] -> -21.006
19. [[1, 6, 7, 8, 9], [3, 4, 10], [2, 5]] -> -21.074
20. [[1, 3, 6, 9], [2, 8], [4, 7], [5, 10]] -> -21.222
21. [[1, 6, 9], [3, 7, 10], [2, 5], [4, 8]] -> -21.24
22. [[1, 3, 4, 6, 9], [5, 7, 10], [2, 8]] -> -21.25
23. [[1, 5, 6, 7, 9], [3, 4, 10], [2, 8]] -> -21.271
24. [[1, 3, 6, 9], [2, 5], [4, 7], [8, 10]] -> -21.347
25. [[1, 5, 6, 7, 9], [4, 8, 10], [2, 3]] -> -21.382
26. [[1, 6, 7, 9], [2, 3], [4, 5], [8, 10]] -> -21.427
27. [[1, 3, 6, 7, 9], [4, 5, 10], [2, 8]] -> -21.448
28. [[1, 6, 8, 9], [3, 10], [4, 7], [2, 5]] -> -21.456
29. [[1, 3, 6, 7, 9], [2, 4, 8], [5, 10]] -> -21.622
30. [[1, 6, 7, 8, 9], [4, 5, 10], [2, 3]] -> -21.637

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Agent ID	1	6	9		3	4	7		2	8		5	10
Gender	Male	Female	Female		Female	Male	Female		Female	Male		Female	Female
Nationality	B	A	A		A	C	C		D	C		B	B
Course Progress Level	88	95	90		55	77	80		66	57		51	68
Attendance	Yes	Yes	Yes		No	Yes	Yes		Yes	No		No	Yes
Gender Preference	Don't mind	Mixed	Don't mind		Mixed	Don't mind	Same		Same	Don't mind		Same	Same
Nationality Preference	Same	Don't mind	Don't mind		Don't mind	Don't mind	Don't mind		Same	Don't mind		Same	Don't mind

Evaluation on a likert scale:

Number of discrepancies on:
- Gender preference: 2
- Nationality preference: 2

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

Agent ID	1	6	9		4	7	8		2	3		5	10
Gender	Male	Female	Female		Male	Female	Male		Female	Female		Female	Female
Nationality	B	A	A		C	C	C		D	A		B	B
Course Progress Level	88	95	90		77	80	57		66	55		51	68
Attendance	Yes	Yes	Yes		Yes	Yes	No		Yes	No		No	Yes
Gender Preference	Don't mind	Mixed	Don't mind		Don't mind	Same	Don't mind		Same	Mixed		Same	Same
Nationality Preference	Same	Don't mind	Don't mind		Don't mind	Don't mind	Don't mind		Same	Don't mind		Same	Don't mind

Evaluation on a likert scale:

Number of discrepancies on:
- Gender preference: 2
- Nationality preference: 2

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

LCC Example_6

Dataset

→ 15 TCNs
→ 6 Male and 9 Females
→ 4 different types of nationalities
→ CPL ranges between [25, 95]
→ 4 TCNs missed previous lesson
→ 6 TCNs want Same gender groups
→ 7 TCNs want Mixed gender groups
→ 6 TCNs want Same nationality groups
→ 8 TCNs want Mixed nationality groups

LCC Example_6 → 15 Agents
Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gender	Male	Male	Female	Male	Female	Female	Female	Female	Female	Male	Female	Male	Female	Male	Female
Nationality	A	A	B	C	D	B	C	C	D	C	A	C	A	B	C
Course Progress Level	72	84	73	53	25	44	89	57	95	60	74	84	55	93	62
Attendance	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No
Gender Preference	Don't mind	Mixed	Same	Mixed	Don't mind	Same	Mixed	Mixed	Same	Mixed	Mixed	Same	Same	Mixed	Same
Nationality Preference	Same	Same	Mixed	Mixed	Mixed	Mixed	Don't mind	Mixed	Mixed	Same	Same	Mixed	Same	Same	Mixed

Results

→ Results computed with Configuration 1

Total Runtime: 209 seconds

Solution:

1. [[4, 5, 6, 13, 15], [1, 3, 11], [7, 9, 14], [2, 12], [8, 10]] -> -12.307
2. [[1, 3, 11], [4, 13, 15], [7, 9, 14], [2, 12], [5, 6], [8, 10]] -> -12.377
3. [[1, 3, 11], [4, 8, 10], [7, 9, 14], [2, 12], [5, 6], [13, 15]] -> -12.509
4. [[1, 3, 11], [4, 10, 13], [7, 9, 14], [2, 12], [5, 6], [8, 15]] -> -12.691
5. [[4, 5, 6, 13, 15], [1, 3, 11], [2, 7, 12], [8, 10], [9, 14]] -> -12.954
6. [[1, 3, 11], [2, 7, 12], [4, 8, 10], [5, 6], [9, 14], [13, 15]] -> -13.156
7. [[4, 5, 6, 8, 15], [1, 3, 11], [7, 9, 14], [2, 12], [10, 13]] -> -13.244
8. [[4, 5, 6, 10], [1, 3, 11], [7, 9, 14], [8, 13, 15], [2, 12]] -> -13.284
9. [[1, 3, 11], [2, 7, 12], [4, 10, 13], [5, 6], [8, 15], [9, 14]] -> -13.338
10. [[1, 3, 11], [4, 5, 6], [7, 9, 14], [2, 12], [8, 10], [13, 15]] -> -13.362
11. [[1, 3, 11], [4, 8, 15], [7, 9, 14], [2, 12], [5, 6], [10, 13]] -> -13.37
12. [[4, 5, 6, 15], [1, 3, 11], [7, 9, 14], [8, 10, 13], [2, 12]] -> -13.419
13. [[1, 3, 11], [7, 9, 14], [8, 10, 13], [2, 12], [4, 15], [5, 6]] -> -13.524
14. [[1, 3, 11], [7, 9, 14], [8, 13, 15], [2, 12], [4, 10], [5, 6]] -> -13.566
15. [[5, 6, 13, 15], [1, 3, 11], [2, 7, 12], [4, 8, 10], [9, 14]] -> -13.886
16. [[4, 5, 6, 8, 15], [1, 3, 11], [2, 7, 12], [9, 14], [10, 13]] -> -13.891
17. [[4, 5, 6, 10], [1, 3, 11], [2, 7, 12], [8, 13, 15], [9, 14]] -> -13.931
18. [[4, 5, 6, 15], [1, 3, 11], [2, 7, 12], [8, 10, 13], [9, 14]] -> -14.066
19. [[1, 3, 11], [4, 5, 6], [7, 9, 14], [2, 12], [8, 15], [10, 13]] -> -14.362
20. [[7, 9, 14], [1, 3], [2, 12], [4, 13], [5, 6], [8, 10], [11, 15]] -> -14.496
21. [[7, 9, 14], [1, 11], [3, 5, 6, 13, 15], [4, 8, 10], [2, 12]] -> -14.562
22. [[1, 3, 11], [5, 6, 13], [7, 9, 14], [2, 12], [4, 15], [8, 10]] -> -14.902
23. [[2, 7, 12], [1, 3], [4, 13], [5, 6], [8, 10], [9, 14], [11, 15]] -> -15.143
24. [[4, 5, 6, 10], [7, 9, 14], [1, 11], [2, 12], [3, 15], [8, 13]] -> -15.464
25. [[4, 8, 13, 15], [1, 3, 11], [2, 7, 12], [5, 6, 10], [9, 14]] -> -15.493
26. [[4, 8, 13, 15], [7, 9, 14], [1, 11], [2, 12], [3, 10], [5, 6]] -> -15.629
27. [[1, 3, 11], [5, 6, 13], [7, 9, 14], [2, 12], [4, 10], [8, 15]] -> -15.652
28. [[7, 9, 14], [1, 11], [2, 12], [3, 15], [4, 10], [5, 6], [8, 13]] -> -15.746
29. [[4, 8, 13, 15], [7, 9, 14], [1, 3], [2, 12], [5, 6], [10, 11]] -> -15.879
30. [[1, 3, 11], [2, 9, 14], [4, 8, 10], [5, 6], [7, 12], [13, 15]] -> -16.226

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Agent ID	4	5	6	13	15		1	3	11		7	9	14		2	12		8	10
Gender	Male	Female	Female	Female	Female		Male	Female	Female		Female	Female	Male		Male	Male		Female	Male
Nationality	C	D	B	A	C		A	B	A		C	D	B		A	C		C	C
Course Progress Level	53	25	44	55	62		72	73	74		89	95	93		84	84		57	60
Attendance	Yes	Yes	Yes	Yes	No		No	Yes	Yes		Yes	Yes	Yes		Yes	No		Yes	No
Gender Preference	Mixed	Don't mind	Same	Same	Same		Don't mind	Same	Mixed		Mixed	Same	Mixed		Mixed	Same		Mixed	Mixed
Nationality Preference	Mixed	Mixed	Mixed	Same	Mixed		Same	Mixed	Same		Don't mind	Mixed	Same		Same	Mixed		Mixed	Same

Agent ID	1	3	11		4	13	15		7	9	14		2	12		5	6		8	10
Gender	Male	Female	Female		Male	Female	Female		Female	Female	Male		Male	Male		Female	Female		Female	Male
Nationality	A	B	A		C	A	C		C	D	B		A	C		D	B		C	C
Course Progress Level	72	73	74		53	55	62		89	95	93		84	84		25	44		57	60
Attendance	No	Yes	Yes		Yes	Yes	No		Yes	Yes	Yes		Yes	No		Yes	Yes		Yes	No
Gender Preference	Don't mind	Same	Mixed		Mixed	Same	Same		Mixed	Same	Mixed		Mixed	Same		Don't mind	Same		Mixed	Mixed
Nationality Preference	Same	Mixed	Same		Mixed	Same	Mixed		Don't mind	Mixed	Same		Same	Mixed		Mixed	Mixed		Mixed	Same

LCC Example_7
Dataset

→ 15 TCNs
→ 8 Male and 7 Females
→ 5 different types of nationalities
→ CPL ranges between [45, 92]
→ 2 TCNs missed previous lesson
→ 7 TCNs want Same gender groups
→ 3 TCNs want Mixed gender groups
→ 4 TCNs want Same nationality groups
→ 5 TCNs want Mixed nationality groups

LCC Example_7 → 15 Agents

Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gender	Male	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Nationality	C	E	D	A	B	D	E	B	A	C	C	B	C	A	C
Course Progress Level	72	67	85	78	66	80	75	57	90	92	51	83	45	74	53
Attendance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Gender Preference	Mixed	Same	Same	Mixed	Same	Don't mind	Mixed	Don't mind	Don't mind	Don't mind	Same	Same	Same	Don't mind	Same
Nationality Preference	Same	Mixed	Same	Same	Mixed	Don't mind	Don't mind	Don't mind	Mixed	Don't mind	Mixed	Mixed	Mixed	Same	Don't mind

LCC Example_7 → 15 Agents
Results

→ **Results computed with Configuration 1**

Total Runtime: 250 seconds

Solution:
1. [[1, 7, 14], [4, 6], [2, 5], [3, 12], [8, 15], [9, 10], [11, 13]] -> -5.81
2. [[1, 4, 6, 7, 14], [2, 5], [3, 12], [8, 15], [9, 10], [11, 13]] -> -5.892
3. [[1, 7, 14], [4, 6], [2, 5, 8], [11, 13, 15], [3, 12], [9, 10]] -> -7.233
4. [[1, 2, 5, 7, 14], [3, 12], [4, 6], [8, 15], [9, 10], [11, 13]] -> -7.241
5. [[1, 4, 6, 7, 14], [2, 5], [3, 12], [8, 13], [9, 10], [11, 15]] -> -7.267
6. [[1, 4, 6, 7, 14], [2, 5, 8], [11, 13, 15], [3, 12], [9, 10]] -> -7.315
7. [[1, 7, 14], [3, 9, 10], [4, 6, 12], [2, 5], [8, 15], [11, 13]] -> -7.684
8. [[1, 2, 5, 8, 14], [4, 6, 7], [3, 12], [11, 13, 15], [9, 10]] -> -7.775
9. [[3, 9, 10, 12], [1, 7, 14], [2, 5], [4, 6], [8, 15], [11, 13]] -> -7.79
10. [[1, 4, 6, 7, 14], [3, 9, 10, 12], [2, 5], [8, 15], [11, 13]] -> -7.872
11. [[3, 4, 6, 12], [1, 7, 14], [2, 5, 8], [11, 13, 15], [9, 10]] -> -8.127
12. [[1, 2, 5, 7, 14], [3, 4, 6, 12], [8, 15], [9, 10], [11, 13]] -> -8.136
13. [[1, 4, 7, 14], [2, 5, 8], [3, 6, 12], [11, 13, 15], [9, 10]] -> -8.337
14. [[1, 2, 5, 8], [3, 6, 12], [4, 7, 14], [11, 13, 15], [9, 10]] -> -8.672
15. [[1, 2, 7, 14], [11, 13, 15], [3, 12], [4, 6], [5, 8], [9, 10]] -> -8.736
16. [[1, 2, 5, 8, 14], [3, 4, 6, 7, 12], [11, 13, 15], [9, 10]] -> -8.892
17. [[1, 7, 14], [3, 9, 10], [4, 6, 12], [2, 5], [8, 13], [11, 15]] -> -9.059
18. [[1, 7, 14], [2, 5, 8], [3, 9, 10], [4, 6, 12], [11, 13, 15]] -> -9.107
19. [[3, 9, 10, 12], [1, 7, 14], [2, 5], [4, 6], [8, 13], [11, 15]] -> -9.165
20. [[3, 9, 10, 12], [1, 7, 14], [2, 5, 8], [11, 13, 15], [4, 6]] -> -9.213
21. [[1, 2, 5, 7, 14], [3, 9, 10, 12], [4, 6], [8, 15], [11, 13]] -> -9.221
22. [[1, 2, 5, 8], [3, 9, 10], [4, 6, 12], [11, 13, 15], [7, 14]] -> -9.23
23. [[1, 4, 7, 8, 14], [11, 13, 15], [2, 5], [3, 6, 12], [9, 10]] -> -9.235
24. [[1, 4, 6, 7, 14], [3, 9, 10, 12], [2, 5], [8, 13], [11, 15]] -> -9.247
25. [[1, 4, 6, 7, 14], [3, 9, 10, 12], [2, 5, 8], [11, 13, 15]] -> -9.295
26. [[1, 4, 7, 14], [2, 5, 8], [3, 9, 10], [11, 13, 15], [6, 12]] -> -9.379
27. [[1, 2, 4, 7, 14], [3, 6, 12], [11, 13, 15], [5, 8], [9, 10]] -> -9.582
28. [[1, 2, 5, 8], [3, 9, 10, 12], [4, 6, 7, 14], [11, 13, 15]] -> -9.624
29. [[3, 6, 9, 10, 12], [1, 2, 5, 8], [4, 7, 14], [11, 13, 15]] -> -9.701
30. [[1, 2, 5, 8], [3, 9, 10], [4, 7, 14], [11, 13, 15], [6, 12]] -> -9.713

Agent ID	1	7	14		4	6		2	5		3	12		8	15		9	10		11	13
Gender	Male	Female	Male		Male	Male		Male	Female		Female	Male		Male	Female		Female	Male		Female	Female
Nationality	C	E	A		A	D		E	B		D	B		B	C		A	C		C	C
Course Progress Level	72	75	74		78	80		67	66		85	83		57	53		90	92		51	45
Attendance	Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		No	Yes		Yes	Yes		No	Yes
Gender Preference	Mixed	Mixed	Don't mind		Mixed	Don't mind		Same	Same		Same	Same		Don't mind	Same		Don't mind	Don't mind		Same	Same
Nationality Preference	Same	Don't mind	Same		Same	Don't mind		Mixed	Mixed		Same	Mixed		Don't mind	Don't mind		Mixed	Don't mind		Mixed	Mixed

Evaluation on a likert scale:

Number of discrepancies on:
- Gender preference: 6
- Nationality preference: 6

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

Agent ID	1	4	6	7	14		2	5		3	12		8	15		9	10		11	13
Gender	Male	Male	Male	Female	Male		Male	Female		Female	Male		Male	Female		Female	Male		Female	Female
Nationality	C	A	D	E	A		E	B		D	B		B	C		A	C		C	C
Course Progress Level	72	78	80	75	74		67	66		85	83		57	53		90	92		51	45
Attendance	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes		No	Yes		Yes	Yes		No	Yes
Gender Preference	Mixed	Mixed	Don't mind	Mixed	Don't mind		Same	Same		Same	Same		Don't mind	Same		Don't mind	Don't mind		Same	Same
Nationality Preference	Same	Same	Don't mind	Don't mind	Same		Mixed	Mixed		Same	Mixed		Don't mind	Don't mind		Mixed	Don't mind		Mixed	Mixed

Evaluation on a likert scale:

Number of discrepancies on:
- Gender preference: 5
- Nationality preference: 6

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

LCC Example_8
Dataset

→ 15 TCNs
→ 7 Male and 8 Females
→ 4 different types of nationalities
→ CPL ranges between [45, 88]
→ 5 TCNs missed previous lesson
→ 8 TCNs want Same gender groups
→ 3 TCNs want Mixed gender groups
→ 6 TCNs want Same nationality groups
→ 3 TCNs want Mixed nationality groups

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LCC Example_8 → 15 Agents

Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gender	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Male	Female	Female	Male	Female
Nationality	C	B	C	A	C	B	B	A	A	C	B	D	A	C	B
Course Progress Level	51	83	45	74	53	73	63	70	57	81	88	66	55	77	51
Attendance	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No
Gender Preference	Same	Same	Same	Don't mind	Same	Same	Same	Mixed	Mixed	Don't mind	Don't mind	Same	Mixed	Don't mind	Same
Nationality Preference	Mixed	Mixed	Mixed	Same	Don't mind	Don't mind	Don't mind	Same	Same	Don't mind	Same	Same	Don't mind	Don't mind	Same

Results

→ **Results computed with** **Configuration 1**

Total Runtime: 201 seconds

Solution:
1. [[2, 10, 11, 14], [8, 12, 13], [1, 5], [3, 15], [4, 6], [7, 9]] -> -11.602
2. [[2, 10, 11, 14], [8, 9, 12], [1, 5], [3, 15], [4, 6], [7, 13]] -> -11.673
3. [[2, 10, 11, 14], [8, 12, 13], [1, 3], [4, 6], [5, 15], [7, 9]] -> -11.727
4. [[2, 10, 11], [4, 6, 14], [8, 12, 13], [1, 5], [3, 15], [7, 9]] -> -11.739
5. [[2, 10, 11, 14], [8, 9, 12], [1, 3], [4, 6], [5, 15], [7, 13]] -> -11.798
6. [[2, 10, 11], [4, 6, 14], [8, 9, 12], [1, 5], [3, 15], [7, 13]] -> -11.81
7. [[8, 12, 13], [1, 5], [2, 11], [3, 15], [4, 6], [7, 9], [10, 14]] -> -12.007
8. [[8, 9, 12], [1, 5], [2, 11], [3, 15], [4, 6], [7, 13], [10, 14]] -> -12.077
9. [[4, 6, 8, 14], [2, 10, 11], [1, 5], [3, 15], [7, 9], [12, 13]] -> -12.083
10. [[8, 12, 13], [1, 3], [2, 11], [4, 6], [5, 15], [7, 9], [10, 14]] -> -12.132
11. [[8, 9, 12], [1, 3], [2, 11], [4, 6], [5, 15], [7, 13], [10, 14]] -> -12.202
12. [[4, 6, 8, 14], [2, 10, 11], [1, 3], [5, 15], [7, 9], [12, 13]] -> -12.208
13. [[2, 10, 11, 14], [7, 12, 13], [1, 5], [3, 15], [4, 6], [8, 9]] -> -12.328
14. [[2, 10, 11, 14], [7, 12, 13], [1, 3], [4, 6], [5, 15], [8, 9]] -> -12.453
15. [[2, 10, 11], [4, 6, 14], [7, 12, 13], [1, 5], [3, 15], [8, 9]] -> -12.465
16. [[4, 6, 10, 14], [8, 12, 13], [1, 5], [2, 11], [3, 15], [7, 9]] -> -12.466
17. [[2, 10, 11], [6, 14], [4, 8, 12, 13], [1, 5], [3, 15], [7, 9]] -> -12.521
18. [[2, 10, 11, 14], [7, 9, 12], [1, 5], [3, 15], [4, 6], [8, 13]] -> -12.527
19. [[2, 8, 10, 11, 14], [1, 5], [3, 15], [4, 6], [7, 9], [12, 13]] -> -12.535
20. [[4, 6, 10, 14], [8, 9, 12], [1, 5], [2, 11], [3, 15], [7, 13]] -> -12.537
21. [[8, 10, 12, 13, 14], [1, 5], [2, 11], [3, 15], [4, 6], [7, 9]] -> -12.548
22. [[2, 10, 11, 14], [7, 8, 13], [1, 5], [3, 15], [4, 6], [9, 12]] -> -12.567
23. [[4, 8, 12, 13], [2, 10, 11], [1, 3], [5, 15], [6, 14], [7, 9]] -> -12.646
24. [[4, 6, 8], [1, 5], [2, 11], [3, 15], [7, 9], [10, 14], [12, 13]] -> -12.65
25. [[2, 10, 11, 14], [7, 9, 12], [1, 3], [4, 6], [5, 15], [8, 13]] -> -12.652
26. [[2, 8, 10, 11, 14], [1, 3], [4, 6], [5, 15], [7, 9], [12, 13]] -> -12.66
27. [[2, 10, 11], [4, 6, 14], [7, 9, 12], [1, 5], [3, 15], [8, 13]] -> -12.664
28. [[8, 10, 12, 13, 14], [1, 3], [2, 11], [4, 6], [5, 15], [7, 9]] -> -12.673
29. [[4, 8, 9, 12], [2, 10, 11], [1, 5], [3, 15], [6, 14], [7, 13]] -> -12.683
30. [[2, 10, 11, 14], [7, 8, 13], [1, 3], [4, 6], [5, 15], [9, 12]] -> -12.692

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Table 1

Agent ID	2	10	11	14		8	12	13		1	5		3	15		4	6		7	9
Gender	Male	Male	Female	Male		Male	Male	Female		Male	Female		Female	Female		Male	Male		Female	Female
Nationality	E	C	C	A		B	B	C		C	B		D	C		A	D		E	A
Course Progress Level	67	92	51	74		57	83	45		72	66		85	53		78	80		75	90
Attendance	Yes	Yes	No	Yes		No	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Gender Preference	Same	Don't mind	Same	Don't mind		Don't mind	Same	Same		Mixed	Same		Same	Same		Mixed	Don't mind		Mixed	Don't mind
Nationality Preference	Mixed	Don't mind	Mixed	Same		Don't mind	Mixed	Mixed		Same	Mixed		Same	Don't mind		Same	Don't mind		Don't mind	Mixed

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 7
- Nationality preference: 4

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

Table 2

Agent ID	2	10	11	**14**		8	9	12		1	5		3	15		4	6		7	13
Gender	Male	Male	Female	Male		Male	Female	Male		Male	Female		Female	Female		Male	Male		Female	Female
Nationality	E	C	C	A		B	A	B		C	B		D	C		A	D		E	C
Course Progress Level	67	92	51	74		57	90	83		72	66		85	53		78	80		75	45
Attendance	Yes	Yes	No	Yes		No	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Gender Preference	Same	Don't mind	Same	Don't mind		Don't mind	Don't mind	Same		Mixed	Same		Same	Same		Mixed	Don't mind		Mixed	Same
Nationality Preference	Mixed	Don't mind	Mixed	Same		Don't mind	Mixed	Mixed		Same	Mixed		Same	Don't mind		Same	Don't mind		Don't mind	Mixed

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 6
- Nationality preference: 4

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

LCC Example_9
Dataset

→ 20 TCNs

→ 9 Male and 11 Females

→ 4 different types of nationalities

→ CPL ranges between [25, 95]

→ 5 TCNs missed previous lesson

→ 6 TCNs want Same gender groups

→ 8 TCNs want Mixed gender groups

→ 6 TCNs want Same nationality groups

→ 9 TCNs want Mixed nationality groups

LCC Example_9 → 20 Agents

Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Gender	Male	Male	Female	Male	Female	Female	Female	Female	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Nationality	A	A	B	C	D	B	C	C	D	C	A	C	A	B	C	A	A	C	D	B
Course Progress Level	72	84	73	53	25	44	89	57	95	60	74	84	55	93	62	58	92	80	70	66
Attendance	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Gender Preference	Don't mind	Mixed	Same	Mixed	Don't mind	Same	Mixed	Mixed	Same	Mixed	Mixed	Same	Same	Mixed	Same	Don't mind	Mixed	Don't mind	Don't mind	Don't mind
Nationality Preference	Same	Same	Mixed	Mixed	Mixed	Mixed	Don't mind	Mixed	Mixed	Same	Same	Mixed	Same	Same	Mixed	Don't mind	Don't mind	Don't mind	Mixed	Don't mind

Results

→ **Results computed with Configuration 1**

Total Runtime: 577 seconds

Solution:
1. [[7, 9, 14, 17], [3, 11, 18], [8, 10, 16], [1, 19], [2, 12], [4, 13], [5, 6], [15, 20]] -> -12.503
2. [[7, 9, 14, 17], [1, 3, 19], [8, 10, 16], [2, 12], [4, 13], [5, 6], [11, 18], [15, 20]] -> -12.62
3. [[7, 9, 14, 17], [3, 11, 18], [4, 8, 13], [1, 19], [2, 12], [5, 6], [10, 16], [15, 20]] -> -13.167
4. [[1, 3, 11, 19], [8, 10, 16], [9, 14, 17], [2, 12], [4, 13], [5, 6], [7, 18], [15, 20]] -> -13.23
5. [[7, 9, 14, 17], [3, 11, 18], [4, 10, 13], [1, 19], [2, 12], [5, 6], [8, 16], [15, 20]] -> -13.4
6. [[7, 9, 14, 17], [3, 11, 18], [4, 13, 16], [1, 19], [2, 12], [5, 6], [8, 10], [15, 20]] -> -13.483
7. [[1, 3, 11, 19], [7, 17, 18], [8, 10, 16], [2, 12], [4, 13], [5, 6], [9, 14], [15, 20]] -> -13.494
8. [[3, 11, 18], [8, 10, 16], [1, 19], [2, 12], [4, 13], [5, 6], [7, 9], [14, 17], [15, 20]] -> -13.504
9. [[7, 9, 14, 17, 18], [1, 3, 11, 19], [4, 8, 13], [2, 12], [5, 6], [10, 16], [15, 20]] -> -13.536
10. [[1, 3, 19], [8, 10, 16], [2, 12], [4, 13], [5, 6], [7, 9], [11, 18], [14, 17], [15, 20]] -> -13.621
11. [[1, 3, 11, 19], [8, 10, 16], [9, 14, 17], [2, 18], [4, 13], [5, 6], [7, 12], [15, 20]] -> -13.73
12. [[7, 9, 14, 17], [1, 3], [2, 12], [4, 13], [5, 6], [8, 10], [11, 18], [15, 16], [19, 20]] -> -13.749
13. [[7, 9, 14, 17], [1, 3, 11], [8, 10, 16], [2, 12], [4, 13], [5, 6], [15, 20], [18, 19]] -> -13.797
14. [[7, 9, 14, 17, 18], [1, 3, 11, 19], [4, 13, 16], [2, 12], [5, 6], [8, 10], [15, 20]] -> -13.852
15. [[8, 10, 16], [15, 19, 20], [1, 3], [2, 12], [4, 13], [5, 6], [7, 9], [11, 18], [14, 17]] -> -14.01
16. [[7, 9, 14, 17, 18], [8, 10, 16], [1, 3], [2, 12], [4, 13], [5, 6], [11, 19], [15, 20]] -> -14.012
17. [[1, 3, 11], [19, 20], [7, 9, 14, 17, 18], [2, 12], [4, 13], [5, 6], [8, 10], [15, 16]] -> -14.064
18. [[1, 3, 11, 19, 20], [7, 9, 14, 17, 18], [2, 12], [4, 13], [5, 6], [8, 10], [15, 16]] -> -14.073
19. [[7, 9, 14, 17], [3, 11, 18], [4, 8, 10], [1, 19], [2, 12], [5, 6], [13, 16], [15, 20]] -> -14.093
20. [[4, 8, 10, 16], [7, 9, 14, 17], [1, 3], [2, 12], [5, 6], [11, 18], [13, 15], [19, 20]] -> -14.161
21. [[4, 8, 13, 15, 16], [7, 9, 14, 17], [3, 11, 18], [1, 19], [2, 12], [5, 6], [10, 20]] -> -14.217
22. [[7, 9, 14, 17], [3, 11, 18], [4, 8, 16], [1, 19], [2, 12], [5, 6], [10, 13], [15, 20]] -> -14.312
23. [[4, 8, 13, 15, 16], [7, 9, 14, 17], [1, 3, 19], [2, 12], [5, 6], [10, 20], [11, 18]] -> -14.334
24. [[1, 3, 11], [4, 8, 13], [9, 14, 17], [15, 19, 20], [2, 12], [5, 6], [7, 18], [10, 16]] -> -14.347
25. [[4, 5, 6, 10, 16], [7, 9, 14, 17], [3, 11, 18], [1, 19], [2, 12], [8, 13], [15, 20]] -> -14.387
26. [[7, 9, 14, 17, 18], [1, 3, 11, 19], [4, 8, 10], [2, 12], [5, 6], [13, 16], [15, 20]] -> -14.461
27. [[8, 10, 16], [15, 19, 20], [1, 11], [2, 12], [3, 18], [4, 13], [5, 6], [7, 9], [14, 17]] -> -14.51
28. [[4, 8, 15, 16, 20], [7, 9, 14, 17], [3, 11, 18], [1, 19], [2, 12], [5, 6], [10, 13]] -> -14.526
29. [[1, 3, 11], [4, 8, 13], [7, 17, 18], [15, 19, 20], [2, 12], [5, 6], [9, 14], [10, 16]] -> -14.611
30. [[4, 8, 15, 16, 20], [7, 9, 14, 17], [1, 3, 19], [2, 12], [5, 6], [10, 13], [11, 18]] -> -14.643

Table 1

Agent ID	7	9	14	17		3	11	18		8	10	16		1	19		2	12		4	13		5	6		15	20
Gender	Female	Female	Male	Female		Female	Female	Male		Female	Male	Male		Male	Female		Male	Male		Male	Female		Female	Female		Female	Male
Nationality	C	D	B	A		B	A	C		C	C	A		A	D		A	C		C	A		D	B		C	B
Course Progress Level	89	95	93	92		73	74	80		57	60	58		72	70		84	84		53	55		25	44		62	66
Attendance	Yes	Yes	Yes	Yes		Yes	Yes	No		Yes	No	Yes		No	Yes		Yes	No		Yes	Yes		Yes	Yes		No	Yes
Gender Preference	Mixed	Same	Mixed	Mixed		Same	Mixed	Don't mind		Mixed	Mixed	Don't mind		Don't mind	Don't mind		Mixed	Same		Mixed	Same		Don't mind	Same		Same	Don't mind
Nationality Preference	Don't mind	Mixed	Same	Don't mind		Mixed	Same	Don't mind		Mixed	Same	Don't mind		Same	Mixed		Same	Mixed		Mixed	Same		Mixed	Mixed		Mixed	Don't mind

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 5
- Nationality preference: 6

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

Table 2

Agent ID	7	9	14	17		1	3	19		8	10	16		2	12		4	13		5	6		11	18		15	20
Gender	Female	Female	Male	Female		Male	Female	Female		Female	Male	Male		Male	Male		Male	Female		Female	Female		Female	Male		Female	Male
Nationality	C	D	B	A		A	B	D		C	C	A		A	C		C	A		D	B		A	C		C	B
Course Progress Level	89	95	93	92		72	73	70		57	60	58		84	84		53	55		25	44		74	80		62	66
Attendance	Yes	Yes	Yes	Yes		No	Yes	Yes		Yes	No	Yes		Yes	No		Yes	Yes		Yes	No		Yes	No		No	Yes
Gender Preference	Mixed	Same	Mixed	Mixed		Don't mind	Same	Don't mind		Mixed	Mixed	Don't mind		Mixed	Same		Mixed	Same		Don't mind	Same		Mixed	Don't mind		Same	Don't mind
Nationality Preference	Don't mind	Mixed	Same	Don't mind		Same	Mixed	Mixed		Mixed	Same	Don't mind		Same	Mixed		Mixed	Same		Mixed	Mixed		Same	Don't mind		Mixed	Don't mind

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 5
- Nationality preference: 6

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

LCC Example_10

Dataset

→ 20 TCNs
→ 11 Male and 9 Females
→ 5 different types of nationalities
→ CPL ranges between [45, 92]
→ 4 TCNs missed previous lesson
→ 9 TCNs want Same gender groups
→ 5 TCNs want Mixed gender groups
→ 6 TCNs want Same nationality groups
→ 6 TCNs want Mixed nationality groups

LCC Example_10 → 20 Agents
Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Gender	Male	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Nationality	C	E	D	A	B	D	E	B	A	C	C	B	C	A	C	B	B	A	A	C
Course Progress Level	72	67	85	78	66	80	75	57	90	92	51	83	45	74	53	73	63	70	57	81
Attendance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Gender Preference	Mixed	Same	Same	Mixed	Same	Don't mind	Mixed	Don't mind	Don't mind	Don't mind	Same	Same	Same	Don't mind	Same	Same	Same	Mixed	Mixed	Don't mind
Nationality Preference	Same	Mixed	Same	Same	Mixed	Don't mind	Don't mind	Don't mind	Mixed	Don't mind	Mixed	Mixed	Mixed	Same	Don't mind	Don't mind	Don't mind	Same	Same	Don't mind

LCC Example_10 → 20 Agents

Results

→ **Results computed with** **Configuration 1**

Total Runtime: 636 seconds

Solution:
1. [[1, 7, 14, 16, 18], [4, 6, 20], [2, 5], [3, 12], [8, 15], [9, 10], [11, 13], [17, 19]] -> -8.351
2. [[1, 4, 7, 18], [2, 5], [3, 12], [6, 20], [8, 15], [9, 10], [11, 13], [14, 16], [17, 19]] -> -8.398
3. [[1, 2, 5, 18], [3, 12], [4, 7], [6, 20], [8, 15], [9, 10], [11, 13], [14, 16], [17, 19]] -> -8.664
4. [[1, 4, 7, 14], [2, 5], [3, 12], [6, 20], [8, 15], [9, 10], [11, 13], [16, 18], [17, 19]] -> -8.874
5. [[1, 16], [2, 5], [3, 12], [4, 7], [6, 20], [8, 15], [9, 10], [11, 13], [14, 18], [17, 19]] -> -9.25
6. [[1, 4, 7, 16], [2, 5], [3, 12], [6, 20], [8, 15], [9, 10], [11, 13], [14, 18], [17, 19]] -> -9.468
7. [[2, 5, 17, 19], [1, 16], [3, 12], [4, 7], [6, 20], [8, 15], [9, 10], [11, 13], [14, 18]] -> -9.548
8. [[1, 7, 14, 16, 18], [4, 6, 20], [2, 5], [3, 12], [8, 13], [9, 10], [11, 15], [17, 19]] -> -9.726
9. [[1, 4, 7, 18], [2, 5], [3, 12], [6, 20], [8, 17], [9, 10], [11, 15], [13, 19], [14, 16]] -> -9.773
10. [[1, 7, 14, 16, 18], [3, 4, 6], [2, 5], [8, 15], [9, 10], [11, 13], [12, 20], [17, 19]] -> -9.998
11. [[1, 4, 7, 14], [2, 5], [3, 12], [6, 20], [8, 17], [9, 10], [11, 15], [13, 19], [16, 18]] -> -10.249
12. [[1, 16], [2, 5], [3, 12], [4, 7], [6, 20], [8, 17], [9, 10], [11, 15], [13, 19], [14, 18]] -> -10.625
13. [[1, 4, 7, 14, 16], [11, 13, 15], [2, 5], [3, 12], [6, 20], [8, 17], [9, 10], [18, 19]] -> -10.719
14. [[1, 4, 7, 16], [2, 5], [3, 12], [6, 20], [8, 17], [9, 10], [11, 15], [13, 19], [14, 18]] -> -10.843
15. [[1, 7, 16, 18], [2, 5], [3, 12], [4, 6], [8, 15], [9, 10], [11, 13], [14, 20], [17, 19]] -> -10.852
16. [[1, 7, 14, 18], [2, 5], [3, 12], [4, 6], [8, 15], [9, 10], [11, 13], [16, 20], [17, 19]] -> -10.94
17. [[1, 4, 7, 14, 16], [2, 5, 17], [3, 12], [6, 20], [8, 15], [9, 10], [11, 13], [18, 19]] -> -10.944
18. [[1, 4, 7], [11, 13, 15], [2, 5], [3, 12], [6, 20], [8, 17], [9, 10], [14, 16], [18, 19]] -> -11.012
19. [[1, 4, 7, 14, 16], [2, 5, 8], [3, 12], [6, 20], [9, 10], [11, 13], [15, 19], [17, 18]] -> -11.042
20. [[1, 4, 7], [2, 5, 17], [3, 12], [6, 20], [8, 15], [9, 10], [11, 13], [14, 16], [18, 19]] -> -11.237
21. [[1, 2, 5, 18], [3, 12], [4, 6], [7, 14], [8, 15], [9, 10], [11, 13], [16, 20], [17, 19]] -> -11.289
22. [[1, 2, 5, 19], [3, 12], [4, 7], [6, 20], [8, 15], [9, 10], [11, 13], [14, 16], [17, 18]] -> -11.306
23. [[1, 7, 14, 16, 18], [3, 4, 6], [2, 5], [8, 17], [9, 10], [11, 15], [12, 20], [13, 19]] -> -11.373
24. [[1, 14, 16], [2, 8, 17], [3, 12, 20], [4, 6, 7], [5, 18, 19], [11, 13, 15], [9, 10]] -> -12.087
25. [[1, 16], [2, 5], [3, 12], [4, 6], [7, 14], [8, 15], [9, 10], [11, 13], [17, 19], [18, 20]] -> -12.125
26. [[1, 16, 18], [2, 5, 8], [3, 9, 10], [4, 7, 14], [6, 12, 20], [11, 13, 15], [17, 19]] -> -12.151
27. [[2, 8, 18], [3, 9, 10], [4, 7, 14], [5, 17, 19], [6, 12, 20], [11, 13, 15], [1, 16]] -> -12.192
28. [[1, 7, 14, 16], [2, 5], [3, 12], [4, 6], [8, 15], [9, 10], [11, 13], [17, 19], [18, 20]] -> -12.214
29. [[1, 7, 16, 18], [2, 5], [3, 12], [4, 6], [8, 17], [9, 10], [11, 15], [13, 19], [14, 20]] -> -12.227
30. [[4, 6, 7, 12, 20], [1, 14, 16], [2, 8, 18], [3, 9, 10], [5, 17, 19], [11, 13, 15]] -> -12.265

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Table 1

Agent ID	1	7	14	16	18		4	6	20		2	5		3	12		8	15		9	10		11	13		17	19
Gender	Male	Female	Male	Male	Male		Male	Male	Male		Male	Female		Female	Male		Male	Female		Female	Male		Female	Female		Female	Female
Nationality	C	E	A	B	A		A	D	C		E	B		D	B		B	C		A	C		C	C		B	A
Course Progress Level	72	75	74	73	70		78	80	81		67	66		85	83		57	53		90	92		51	45		63	57
Attendance	Yes	Yes	Yes	No	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes		No	Yes		Yes	Yes		No	Yes		Yes	No
Gender Preference	Mixed	Mixed	Don't mind	Same	Mixed		Mixed	Don't mind	Don't mind		Same	Same		Same	Same		Don't mind	Same		Don't mind	Don't mind		Same	Same		Same	Mixed
Nationality Preference	Same	Don't mind	Same	Don't mind	Same		Same	Don't mind	Don't mind		Mixed	Mixed		Same	Mixed		Don't mind	Don't mind		Mixed	Don't mind		Mixed	Mixed		Don't mind	Same

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 8
- Nationality preference: 8

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

Table 2

Agent ID	1	4	7	18		2	5		3	12		6	20		8	15		9	10		11	13		14	16		17	19
Gender	Male	Male	Female	Male		Male	Female		Female	Male		Male	Male		Male	Female		Female	Male		Female	Female		Male	Male		Female	Female
Nationality	C	A	E	A		E	B		D	B		D	C		B	C		A	C		C	C		A	B		B	A
Course Progress Level	72	78	75	70		67	66		85	83		80	81		57	53		90	92		51	45		74	73		63	57
Attendance	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		No	Yes		Yes	Yes		No	Yes		Yes	No		Yes	No
Gender Preference	Mixed	Mixed	Mixed	Mixed		Same	Same		Same	Same		Don't mind	Don't mind		Don't mind	Same		Don't mind	Don't mind		Same	Same		Don't mind	Same		Same	Mixed
Nationality Preference	Same	Same	Don't mind	Same		Mixed	Mixed		Same	Mixed		Don't mind	Don't mind		Don't mind	Don't mind		Mixed	Don't mind		Mixed	Mixed		Same	Don't mind		Don't mind	Same

Evaluation on a likert scale:
Number of discrepancies on:
- Gender preference: 6
- Nationality preference: 8

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

LCC Example_11

Dataset

→ 20 TCNs
→ 8 Male and 12 Females
→ 4 different types of nationalities
→ CPL ranges between [45, 95]
→ 6 TCNs missed previous lesson
→ 10 TCNs want Same gender groups
→ 4 TCNs want Mixed gender groups
→ 6 TCNs want Same nationality groups
→ 3 TCNs want Mixed nationality groups

LCC Example_11 → 20 Agents

Dataset

Agent ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Gender	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Male	Female	Female	Male	Female	Female	Female	Male	Female	Female
Nationality	C	B	C	A	C	B	B	A	A	C	B	D	A	C	B	A	C	C	A	B
Course Progress Level	51	83	45	74	53	73	63	70	57	81	88	66	55	77	51	95	80	57	90	68
Attendance	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes
Gender Preference	Same	Same	Same	Don't mind	Same	Same	Same	Mixed	Mixed	Don't mind	Don't mind	Same	Mixed	Don't mind	Same	Mixed	Same	Don't mind	Don't mind	Same
Nationality Preference	Mixed	Mixed	Mixed	Same	Don't mind	Don't mind	Don't mind	Same	Same	Don't mind	Same	Same	Don't mind	Don't mind	Same	Don't mind	Don't mind	Don't mind	Don't mind	Don't mind

→ **Results computed with Configuration 1**

Total Runtime: 756 seconds

Solution:
1. [[2, 10, 14, 17], [8, 13, 20], [11, 16, 19], [1, 5], [3, 15], [4, 6], [7, 9], [12, 18]] -> -15.569
2. [[2, 10, 14, 17], [8, 9, 20], [11, 16, 19], [1, 5], [3, 15], [4, 6], [7, 13], [12, 18]] -> -15.618
3. [[2, 10, 14, 17], [8, 13, 20], [11, 16, 19], [1, 3], [4, 6], [5, 15], [7, 9], [12, 18]] -> -15.694
4. [[2, 10, 14, 17], [8, 9, 20], [11, 16, 19], [1, 3], [4, 6], [5, 15], [7, 13], [12, 18]] -> -15.743
5. [[11, 16, 19], [2, 10], [8, 13, 20], [14, 17], [1, 5], [3, 15], [4, 6], [7, 9], [12, 18]] -> -15.82
6. [[2, 10, 14, 17], [11, 16, 19], [12, 13, 20], [1, 3], [4, 6], [5, 15], [7, 18], [8, 9]] -> -15.868
7. [[8, 9, 20], [11, 16, 19], [1, 5], [2, 10], [3, 15], [4, 6], [7, 13], [12, 18], [14, 17]] -> -15.87
8. [[2, 10, 14, 17], [9, 12, 20], [11, 16, 19], [1, 5], [3, 15], [4, 6], [7, 18], [8, 13]] -> -15.92
9. [[8, 13, 20], [11, 16, 19], [1, 3], [2, 10], [4, 6], [5, 15], [7, 18], [9, 12], [14, 17]] -> -15.945
10. [[8, 9, 20], [11, 16, 19], [1, 3], [2, 10], [4, 6], [5, 15], [7, 13], [12, 18], [14, 17]] -> -15.995
11. [[8, 10, 13, 14, 20], [11, 16, 19], [1, 5], [2, 17], [3, 15], [4, 6], [7, 9], [12, 18]] -> -16.031
12. [[2, 10, 14, 17], [9, 12, 20], [11, 16, 19], [1, 3], [4, 6], [5, 15], [7, 18], [8, 13]] -> -16.045
13. [[2, 10, 14, 17], [8, 12, 13], [11, 16, 19], [1, 5], [3, 15], [4, 6], [7, 9], [18, 20]] -> -16.088
14. [[11, 16, 19], [12, 13, 20], [1, 3], [2, 10], [4, 6], [5, 15], [7, 18], [8, 9], [14, 17]] -> -16.12
15. [[8, 10, 13, 14, 20], [11, 16, 19], [1, 3], [2, 17], [4, 6], [5, 15], [7, 9], [12, 18]] -> -16.156
16. [[2, 10, 14, 17], [8, 9, 12], [11, 16, 19], [1, 5], [3, 15], [4, 6], [7, 13], [18, 20]] -> -16.159
17. [[2, 10, 14, 17], [11, 16, 19], [12, 18, 20], [1, 5], [3, 15], [4, 6], [7, 13], [8, 9]] -> -16.17
18. [[9, 12, 20], [11, 16, 19], [1, 5], [2, 10], [3, 15], [4, 6], [7, 18], [8, 13], [14, 17]] -> -16.171
19. [[2, 10, 14, 17], [8, 12, 13], [11, 16, 19], [1, 3], [4, 6], [5, 15], [7, 9], [18, 20]] -> -16.213
20. [[2, 11, 16, 19], [4, 6, 14], [8, 13, 20], [1, 5], [3, 15], [7, 9], [10, 17], [12, 18]] -> -16.238
21. [[8, 9, 10, 14, 20], [11, 16, 19], [1, 5], [2, 17], [3, 15], [4, 6], [7, 13], [12, 18]] -> -16.279
22. [[2, 10, 14, 17], [8, 9, 12], [11, 16, 19], [1, 3], [4, 6], [5, 15], [7, 13], [18, 20]] -> -16.284
23. [[2, 11, 16, 19], [4, 6, 14], [8, 9, 20], [1, 5], [3, 15], [7, 13], [10, 17], [12, 18]] -> -16.287
24. [[2, 10, 14, 17], [11, 16, 19], [12, 18, 20], [1, 3], [4, 6], [5, 15], [7, 13], [8, 9]] -> -16.295
25. [[9, 12, 20], [11, 16, 19], [1, 3], [2, 10], [4, 6], [5, 15], [7, 18], [8, 13], [14, 17]] -> -16.296
26. [[2, 11, 16, 19], [8, 13, 14, 20], [1, 5], [3, 15], [4, 6], [7, 9], [10, 17], [12, 18]] -> -16.316
27. [[8, 12, 13], [11, 16, 19], [1, 5], [2, 10], [3, 15], [4, 6], [7, 9], [14, 17], [18, 20]] -> -16.34
28. [[2, 10, 14, 17], [11, 16, 19], [12, 13, 20], [1, 5], [3, 15], [4, 6], [7, 9], [8, 18]] -> -16.368
29. [[8, 9, 10, 14, 20], [11, 16, 19], [1, 3], [2, 17], [4, 6], [5, 15], [7, 13], [12, 18]] -> -16.404
30. [[8, 9, 12], [11, 16, 19], [1, 5], [2, 10], [3, 15], [4, 6], [7, 13], [14, 17], [18, 20]] -> -16.41

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Table 1

Agent ID	2	10	14	17	8	13	20	11	16	19	1	5	3	15	4	6	7	9	12	18
Gender	Male	Male	Male	Female	Male	Female	Female	Male	Female	Female	Female	Female	Female	Female	Male	Male	Female	Female	Female	Male
Nationality	B	C	C	C	A	A	B	B	A	A	C	C	C	B	A	B	B	A	D	C
Course Progress Level	83	81	77	80	70	55	68	88	95	90	51	53	45	51	74	73	63	57	66	57
Attendance	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	No	Yes	No
Gender Preference	Same	Don't mind	Don't mind	Same	Mixed	Mixed	Same	Don't mind	Mixed	Don't mind	Same	Same	Same	Same	Don't mind	Same	Same	Mixed	Same	Don't mind
Nationality Preference	Mixed	Don't mind	Don't mind	Don't mind	Same	Don't mind	Don't mind	Same	Don't mind	Don't mind	Mixed	Don't mind	Mixed	Same	Same	Don't mind	Don't mind	Same	Same	Don't mind

Evaluation on a likert scale:

Number of discrepancies on:
- Gender preference: 5
- Nationality preference: 7

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)

Table 2

Agent ID	2	10	14	17	8	9	20	11	16	19	1	5	3	15	4	6	7	13	12	18
Gender	Male	Male	Male	Female	Male	Female	Female	Male	Female	Female	Female	Female	Female	Female	Male	Male	Female	Female	Female	Male
Nationality	B	C	C	C	A	A	B	B	A	A	C	C	C	B	A	B	B	A	D	C
Course Progress Level	83	81	77	80	70	57	68	88	95	90	51	53	45	51	74	73	63	55	66	57
Attendance	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	No	Yes	No
Gender Preference	Same	Don't mind	Don't mind	Same	Mixed	Mixed	Same	Don't mind	Mixed	Don't mind	Same	Same	Same	Same	Don't mind	Same	Same	Mixed	Same	Don't mind
Nationality Preference	Mixed	Don't mind	Don't mind	Don't mind	Same	Same	Don't mind	Same	Don't mind	Don't mind	Mixed	Don't mind	Mixed	Same	Same	Don't mind	Don't mind	Don't mind	Same	Don't mind

Evaluation on a likert scale:

Number of discrepancies on:
- Gender preference: 5
- Nationality preference: 7

Likert scale: 4.

Other comments: Same comments (1.1 & 1.2)