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Attributes and Possible Values they can take

In CHC, there are **16** attributes which are needed to be defined by TCNs. These attributes are divided into 2 groups: **Personal** info and **Preference** info

Personal Attributes and the **values** they can take:
1. **Age** – a number between 18 and 120
2. **Gender** – "male", "female" or "other"
3. **Family** – "single man", "single woman", "nuclear", "single parent mother", "single parent father" or "extended"
4. **Nationality** – full (e.g. "Arabic") or shortened (e.g. "ARA") name of a nationality
5. **Religion** – full or shortened name of a religion
6. **Ethnicity** – full or shortened name of a ethnicity

Preference Attributes, their **importance degrees** and the **values** they can take :
1. **Age Preference – Importance:** 1
   Values - either "Don't mind" or one or multiple of these age groups: 18-25, 26-33, 34-43, 44-50, 51-65, 66-120
2. **Gender Preference – Importance**: 2
   Values: "Don't mind", "male", "female" or "other"
3. **Family Preference – Importance**: 6
   Values: either "Don't mind" or one or multiple of the family types specified in the Personal Attributes.
4. **Nationality Preference – Importance**: 3
   Values: "Don't mind", "mixed" or "same"
5. **Religion Preference – Importance**: 5
   Values: "Don't mind", "mixed" or "same"
6. **Ethnicity Preference – Importance**: 4
   Values: "Don't mind", "mixed" or "same"
7. **Location Preference – Importance**: 9
   Values: either "Don't mind" or one or multiple of these predefined locations: "Ampelokipoi", "Menemeni", "Kalamaria", "Eleftherio-Kordelio", "Evosmos", "Agios Pavlos", "Neapoli", "Pefka", "Sykies", "Nea Efkarpia", "Polichni", "Stavroupoli", "Pylaia", "Thessaloniki", "Triandria"
8. **Accessibility Preference – Importance**: 8
   Values: - "Don't mind", "yes" or "no"
9. **Rent Period Preference – Importance**: 10
   Values: - "Don't mind" or a date range (e.g. 1/1/2021-15/6/2021)
10. **Share With Preference – Importance**: 7
    Values: "Don't mind" or a range (e.g. 2-4)

CHC Solutions: Group of TCNs and Rank list of TCNs

Groups of TCNs:

1. TCNs will be divided into groups
2. It is not guaranteed that all TCNs will be in a group. Some TCNs could end up being in **no group** because their preferences and personal info wouldn't match with others.
3. TCNs will receive the list of TCNs who are in the same group with them. For example, if TCN1, TCN2, TCN3, TCN4 are in the same group, each of these TCNs will receive the contact info of others in the group.

For example: 10 TCNs could be divided into 2 groups described below.

Group1: TCN1, TCN2, TCN3, TCN4
Group2: TCN7, TCN10
No group found: TCN5, TCN6, TCN8, TCN9

Rank List of TCNs

1. TCNs will NOT be divided into groups.
2. Agent of a TCN will find the rank list of TCNs who are the most similar to its TCN in terms of Personal and Preference info
3. Each TCN will receive a rank list of TCNs. Rank list doesn't mean the suggested TCN can make the best group. For example, TCN1 could like TCN2 very much w.r.t preferences but TCN2 could not feel the same way because of his/her individual preferences.

* Lower value means a better match between TCNs. E.g. 0 means perfect match. 1.5 is a better match than 2.3.

For example, 5 TCNs could be receiving following results.
TCN1: [TCN4: 0.5, TCN5: 1.2, TCN3: 2.5, TCN2: 3.1]
TCN2: [TCN5: 0.4, TCN4: 0.9, TCN3:1.8, TCN1: 3.4]
TCN3: [TCN5: 0.7, TCN1: 1.6, TCN2: 2.0, TCN4: 2.5]
TCN4: [TCN1: 0, TCN2: 1.8, TCN3: 2.4, TCN5:2.7]
TCN5: [TCN3: 1.3, TCN2: 2.2, TCN1: 3.0, TCN4: 3.4]

Personal and Preference information of 10 TCNs

```
//example 1
// id| age| gender|        family| nation| relig| ethni|      age_pref| gender_pref|                              family_pref| nation_pref| relig_pref| ethni_pref|   locat_pref| acces_pref|        rentper_pref| shrwth_pref
   1|  20| female| single_parent_mother| nat1| rel1| eth1|         18-25|      female|           single_woman, single_parent_mother|  don't mind| don't mind|      mixed|  don't mind| don't mind| 1/1/2021, 1/7/2021| 2, 3
   2|  40|   male|        single_man| nat3| rel2| eth4|     don't mind|       mixed|                                 don't mind|       mixed| don't mind|       same|  L1, L2, L3| don't mind| 1/5/2021, 1/5/2022| dont mind
   3|  34|   male| single_parent_father| nat2| rel1| eth3|   26-33, 34-43|   dont mind| single_parent_mother, single_parent_father, nuclear| don't mind|       same|  dont mind|   L3, L4, L5|        yes| 1/1/2021, 1/7/2022| 2, 4
   4|  19|  other|        extended| nat1| rel3| eth2|         18-25|   dont mind|                                  dont mind|  don't mind|       same|      mixed|  don't mind| don't mind|         dont mind| dont mind
   5|  67| female| single_parent_mother| nat1| rel1| eth1|     dont mind|      female|   single_woman, single_parent_mother, nuclear|       same|       same|  dont mind|  don't mind|        yes|         dont mind| 1, 2
   6|  43|   male|        single_man| nat4| rel4| eth4|   34-43, 44-50|   dont mind|                                  dont mind|  don't mind| don't mind|      mixed|  don't mind| don't mind| 1/3/2021, 1/7/2022| 1, 3
   7|  33| female|        single_woman| nat2| rel3| eth3| 18-25, 26-33, 34-43|  female|           single_woman, single_parent_mother|       same| don't mind|      mixed| L1, L2, L3, L4|         no| 1/1/2021, 1/7/2022| dont mind
   8|  27| female|         nuclear| nat3| rel2| eth2|     dont mind|   dont mind|   single_woman, single_parent_mother, nuclear|       mixed|      mixed|       same|   L3, L6, L9|        yes|         dont mind| 1,  4
   9|  55|   male|         nuclear| nat1| rel4| eth3|   51-65, 65-120|        male|                                  dont mind|       same|       same|       same|          L4|        yes| 1/5/2021, 1/12/2021| 1,2
  10|  23|  other|        single_woman| nat2| rel5| eth4|     dont mind|      female|           single_woman, single_parent_mother|  don't mind| don't mind|  dont mind|  don't mind|         no| 1/1/2021, 1/12/2021| dont mind
```

Groups of TCNs Solution:
No Group Found: tcn1, tcn2, tcn3, tcn4, tcn5, tcn6, tcn7, tcn8, tcn9, tcn10 - 10

Rank List of TCNs Solution:
TCN1: [**tcn10**: 0,054, **tcn4**: 0,062, **tcn5**: 0,063, tcn7: 0,086, **tcn8**: 0,088, **tcn3**: 0,129, **tcn6**: 0,14, **tcn2**: 0,161, **tcn9**: 0,232]
TCN2: [**tcn6**: 0,053, **tcn4**: 0,06, **tcn5**: 0,087, **tcn10**: 0,097, **tcn3**: 0,113, **tcn7**: 0,113, **tcn8**: 0,12, **tcn1**: 0,161, **tcn9**: 0,221]
TCN3: [**tcn6**: 0,071, **tcn4**: 0,08, **tcn8**: 0,086, **tcn5**: 0,09, **tcn2**: 0,113, **tcn1**: 0,129, **tcn9**: 0,187, **tcn7**: 0,195, **tcn10**: 0,217]
TCN4: [**tcn6**: 0,017, **tcn7**: 0,018, **tcn2**: 0,06, **tcn1**: 0,062, **tcn10**: 0,062, **tcn8**: 0,075, **tcn3**: 0,08, **tcn9**: 0,08, **tcn5**: 0,082]
TCN5: [**tcn6**: 0,056, **tcn1**: 0,063, **tcn4**: 0,082, **tcn9**: 0,086, **tcn2**: 0,087, **tcn3**: 0,09, **tcn8**: 0,091, **tcn10**: 0,111, **tcn7**: 0,137]
TCN6: [**tcn4**: 0,017, **tcn7**: 0,035, **tcn8**: 0,045, **tcn2**: 0,053, **tcn5**: 0,056, **tcn3**: 0,071, **tcn10**: 0,113, **tcn9**: 0,115, **tcn1**: 0,14]
TCN7: [**tcn4**: 0,018, **tcn6**: 0,035, **tcn10**: 0,047, **tcn1**: 0,086, **tcn2**: 0,113, **tcn5**: 0,137, **tcn8**: 0,141, **tcn3**: 0,195, **tcn9**: 0,274,]
TCN8: [**tcn6**: 0,045, **tcn4**: 0,075, **tcn3**: 0,086, **tcn1**: 0,088, **tcn5**: 0,091, **tcn2**: 0,12, **tcn10**: 0,129, **tcn7**: 0,141, **tcn9**: 0,206]
TCN9: [**tcn4**: 0,08, **tcn5**: 0,086, **tcn6**: 0,115, **tcn3**: 0,187, **tcn8**: 0,206, **tcn2**: 0,221, **tcn10**: 0,226, **tcn1**: 0,232, **tcn7**: 0,274]
TCN10: [**tcn7**: 0,047, **tcn1**: 0,054, **tcn4**: 0,062, **tcn2**: 0,097, **tcn5**: 0,111, **tcn6**: 0,113, **tcn8**: 0,129, **tcn3**: 0,217, **tcn9**: 0,226]

Input #2 – 20 TCNs

Personal and Preference information of 20 TCNs

```
//example 1
```

// id	age	gender	family	nation	relig	ethni	age_pref	gender_pref	family_pref	nation_pref	relig_pref	ethni_pref	locat_pref	acces_pref	rentper_pref	shrwth_pref
1	20	female	single_parent_mother	nat1	rel1	eth1	18-25	female	single_woman, single_parent_mother	don't mind	don't mind	mixed	don't mind	don't mind	1/1/2021, 1/7/2021	2, 3
2	40	male	single_man	nat3	rel2	eth4	don't mind	mixed	don't mind	mixed	don't mind	same	L1, L2, L3	don't mind	1/5/2021, 1/5/2022	dont mind
3	34	male	single_parent_father	nat2	rel1	eth3	26-33, 34-43	dont mind	single_parent_mother, single_parent_father, nuclear	don't mind	same	dont mind	L3, L4, L5	yes	1/1/2021, 1/7/2022	2, 4
4	19	other	extended	nat1	rel3	eth2	18-25	dont mind	dont mind	don't mind	same	mixed	don't mind	don't mind	dont mind	dont mind
5	67	female	single_parent_mother	nat1	rel1	eth1	dont mind	female	single_woman, single_parent_mother, nuclear	same	same	dont mind	don't mind	yes	dont mind	1, 2
6	43	male	single_man	nat4	rel14	eth4	34-43, 44-50	dont mind	dont mind	don't mind	don't mind	mixed	don't mind	don't mind	1/3/2021, 1/7/2022	1, 3
7	33	female	single_woman	nat2	rel3	eth3	18-25, 26-33, 34-43	female	single_woman, single_parent_mother	same	don't mind	mixed	L1, L2, L3, L4	no	1/1/2021, 1/7/2022	dont mind
8	27	female	nuclear	nat3	rel2	eth2	dont mind	dont mind	single_woman, single_parent_mother, nuclear	mixed	mixed	same	L3, L6, L9	yes	dont mind	1, 4
9	55	male	nuclear	nat1	rel14	eth3	51-65, 65-120	male	dont mind	same	same	same	L4	yes	1/5/2021, 1/12/2021	1,2
10	23	other	single_woman	nat2	rel15	eth4	dont mind	female	single_woman, single_parent_mother	don't mind	don't mind	dont mind	don't mind	no	1/1/2021, 1/12/2021	dont mind
11	18	female	single_woman	nat2	rel15	eth4	18-25	female	single_woman, single_parent_mother	same	same	same	L7, L8	no	1/1/2021, 1/4/2021	3
12	24	female	single_parent_mother	nat2	rel5	eth4	dont mind	dont mind	single_woman, single_parent_mother, nuclear	same	same	same	L3, L6, L7, L9	dont mind	dont mind	dont mind
13	29	male	extended	nat5	rel3	eth2	26-33, 34-43	dont mind	extended	dont mind	same	dont mind	L1, L2, L3, L4	yes	1/9/2021, 1/2/2022	dont mind
14	37	male	single_man	nat1	rel4	eth3	dont mind	dont mind	single_man, single_parent_father	mixed	don't mind	dont mind	don't mind	dont mind	dont mind	1, 3
15	21	male	nuclear	nat4	rel1	eth6	18-25	mixed	dont mind	same	mixed	mixed	L3, L12	don't mind	1/4/2021, 1/4/2022	2, 3
16	69	female	single_woman	nat7	rel2	eth1	51-65, 65-120	female	dont mind	same	same	same	dont mind	yes	1/7/2021, 1/12/2021	dont mind
17	31	female	extended	nat2	rel5	eth1	18-25, 26-33, 34-43	female	single_woman, single_parent_mother, extended	dont mind	don't mind	don't mind	L4, L7, L12, L14	dont mind	1/1/2021, 1/7/2022	1, 2
18	26	other	single_woman	nat5	rel3	eth5	18-25, 26-33	other	dont mind	same	dont mind	mixed	don't mind	dont mind	dont mind	dont mind
19	37	male	nuclear	nat1	rel7	eth2	26-33, 34-43	dont mind	nuclear	same	mixed	same	L2, L3, L4	yes	15/3/2022, 15/10/2022	dont mind
20	20	other	single_woman	nat3	rel12	eth1	18-25	female	single_parent_mother	mixed	mixed	same	L1, L11	yes	5/1/2021, 5/7/2021	2, 3

Groups of TCNs Solution:
Group1: tcn1, tcn7, tcn11, tcn12, tcn17, tcn20
Group2: tcn2, tcn6, tcn14
Group3: tcn4, tcn13, tcn18
Group4: tcn8, tcn19
No Group Found: tcn3, tcn5, tcn9, tcn15, tcn16 - 5

Rank List of TCNs Solution:
TCN1: [**tcn12**: 0, **tcn20**: 0,008, **tcn18**: 0,038, **tcn10**: 0,054, **tcn4**: 0,062, **tcn5**: 0,063, **tcn7**: 0,086, **tcn8**: 0,088, **tcn14**: 0,113,]
TCN2: [**tcn14**: 0, **tcn12**: 0,035, **tcn6**: 0,053, **tcn4**: 0,06, **tcn18**: 0,06, **tcn15**: 0,075, **tcn5**: 0,087, **tcn10**: 0,097, **tcn3**: 0,113,]
TCN3: [**tcn14**: 0,056, **tcn6**: 0,071, **tcn18**: 0,078, **tcn4**: 0,08, **tcn12**: 0,086, **tcn8**: 0,086, **tcn5**: 0,09, **tcn15**: 0,095, **tcn2**: 0,113,]
TCN4: [**tcn18**: 0,015, **tcn13**: 0,017, **tcn6**: 0,017, **tcn7**: 0,018, **tcn17**: 0,03, **tcn15**: 0,05, **tcn2**: 0,06, **tcn1**: 0,062, **tcn10**: 0,062,]
TCN5: [**tcn17**: 0,019, **tcn6**: 0,056, **tcn1**: 0,063, **tcn18**: 0,075, **tcn16**: 0,08, **tcn20**: 0,082, **tcn4**: 0,082, **tcn9**: 0,086, tcn19: 0,086,]
TCN6: [**tcn14**: 0, **tcn4**: 0,017, **tcn18**: 0,017, **tcn7**: 0,035, **tcn8**: 0,045, **tcn2**: 0,053, **tcn5**: 0,056, **tcn17**: 0,064, **tcn15**: 0,067,]
TCN7: [**tcn17**: 0, **tcn12**: 0, **tcn4**: 0,018, **tcn6**: 0,035, **tcn10**: 0,047, **tcn18**: 0,05, **tcn1**: 0,086, **tcn14**: 0,086, **tcn2**: 0,113,]
TCN8: [**tcn19**: 0, **tcn18**: 0,044, **tcn6**: 0,045, **tcn12**: 0,06, **tcn4**: 0,075, **tcn13**: 0,078, **tcn15**: 0,084, **tcn16**: 0,085, **tcn3**: 0,086,]
TCN9: [**tcn14**: 0,052, **tcn4**: 0,08, **tcn5**: 0,086, **tcn18**: 0,086, **tcn6**: 0,115, **tcn16**: 0,168, **tcn19**: 0,171, **tcn17**: 0,176, **tcn3**: 0,187,]
TCN10: [**tcn12**: 0, **tcn18**: 0,024, **tcn7**: 0,047, **tcn1**: 0,054, **tcn4**: 0,062, **tcn14**: 0,069, **tcn17**: 0,074, **tcn11**: 0,082, **tcn2**: 0,097,]
TCN11: [**tcn12**: 0, **tcn18**: 0,075, **tcn4**: 0,08, **tcn10**: 0,082, **tcn1**: 0,121, **tcn14**: 0,151, **tcn17**: 0,194, **tcn7**: 0,212, **tcn6**: 0,237,]
TCN12: [**tcn10**: 0, **tcn11**: 0, **tcn7**: 0, **tcn17**: 0, **tcn1**: 0, **tcn2**: 0,035, **tcn8**: 0,06, **tcn15**: 0,071, **tcn18**: 0,071,]
TCN13: [**tcn4**: 0,017, **tcn18**: 0,03, **tcn8**: 0,078, **tcn14**: 0,078, **tcn17**: 0,105, **tcn6**: 0,109, **tcn5**: 0,137, **tcn2**: 0,139, **tcn15**: 0,142,]
TCN14: [**tcn6**: 0, **tcn2**: 0, **tcn9**: 0,052, **tcn3**: 0,056, **tcn18**: 0,06, **tcn10**: 0,069, **tcn4**: 0,072, **tcn13**: 0,078, **tcn15**: 0,083,]
TCN15: [**tcn4**: 0,05, **tcn18**: 0,055, **tcn6**: 0,067, **tcn12**: 0,071, **tcn2**: 0,075, **tcn14**: 0,083, **tcn8**: 0,084, **tcn3**: 0,095, **tcn10**: 0,109,]
TCN16: [**tcn5**: 0,08, **tcn8**: 0,085, **tcn4**: 0,086, **tcn14**: 0,086, **tcn18**: 0,086, **tcn17**: 0,109, **tcn6**: 0,116, **tcn12**: 0,125, **tcn2**: 0,135,]
TCN17: [**tcn7**: 0, **tcn12**: 0, **tcn5**: 0,019, **tcn18**: 0,029, **tcn4**: 0,03, **tcn6**: 0,064, **tcn10**: 0,074, **tcn14**: 0,092, **tcn13**: 0,105,]
TCN18: [**tcn4**: 0,015, **tcn6**: 0,017, **tcn10**: 0,024, **tcn17**: 0,029, **tcn13**: 0,03, **tcn1**: 0,038, **tcn8**: 0,044, **tcn20**: 0,049, **tcn7**: 0,05,]
TCN19: [**tcn8**: 0, **tcn18**: 0,082, **tcn4**: 0,082, **tcn5**: 0,086, **tcn14**: 0,095, **tcn6**: 0,118, **tcn12**: 0,129, **tcn3**: 0,164, **tcn15**: 0,166,]
TCN20: [**tcn1**: 0,008, **tcn18**: 0,049, **tcn4**: 0,071, **tcn5**: 0,082, **tcn14**: 0,108, **tcn6**: 0,149, **tcn12**: 0,161, **tcn10**: 0,183, **tcn16**: 0,184,]

Personal and Preference information of 30 TCNs

```
//example 1
```

// id	age	gender	family	nation	relig	ethni	age_pref	gender_pref	family_pref	nation_pref	relig_pref	ethni_pref	locat_pref	acces_pref	rentper_pref	shrwth_pref
1	20	female	single_parent_mother	nat1	rel1	eth1	18-25	female	single_woman, single_parent_mother	don't mind	don't mind	mixed	don't mind	don't mind	1/1/2021, 1/7/2021	2, 3
2	40	male	single_man	nat3	rel2	eth4	don't mind	mixed	don't mind	mixed	don't mind	same	L1, L2, L3	don't mind	1/5/2021, 1/5/2022	dont mind
3	34	male	single_parent_father	nat2	rel1	eth3	26-33, 34-43	dont mind	single_parent_mother, single_parent_father, nuclear	don't mind	same	dont mind	L3, L4, L5	yes	1/1/2022, 1/7/2022	2, 4
4	19	other	extended	nat1	rel3	eth2	18-25	dont mind	dont mind	don't mind	same	mixed	don't mind	don't mind	dont mind	dont mind
5	67	female	single_parent_mother	nat1	rel1	eth1	dont mind	female	single_woman, single_parent_mother, nuclear	same	same	dont mind	don't mind	yes	dont mind	1, 2
6	43	male	single_man	nat4	rel4	eth4	34-43, 44-50	dont mind	dont mind	don't mind	don't mind	mixed	don't mind	don't mind	1/3/2021, 1/7/2022	1, 3
7	33	female	single_woman	nat2	rel3	eth3	18-25, 26-33, 34-43	female	single_woman, single_parent_mother	same	don't mind	mixed	L1, L2, L3, L4	no	1/1/2021, 1/7/2022	dont mind
8	27	female	nuclear	nat3	rel2	eth2	dont mind	dont mind	single_woman, single_parent_mother, nuclear	mixed	mixed	same	L3, L6, L9	yes	dont mind	1, 4
9	55	male	nuclear	nat1	rel4	eth3	51-65, 65-120	male	dont mind	same	same	same	L4	yes	1/5/2021, 1/12/2021	1,2
10	23	other	single_woman	nat2	rel5	eth4	dont mind	female	single_woman, single_parent_mother	don't mind	don't mind	dont mind	don't mind	no	1/1/2021, 1/12/2021	dont mind
11	18	female	single_woman	nat2	rel5	3	18-25	female	single_woman, single_parent_mother	same	same	same	L7, L8	no	1/1/2021, 1/4/2021	3
12	24	female	single_parent_mother	nat2	rel5	eth4	dont mind	dont mind	single_woman, single_parent_mother, nuclear	same	same	same	L3, L6, L7, L9	dont mind	dont mind	dont mind
13	29	male	extended	nat5	rel3	eth2	26-33, 34-43	dont mind	extended	dont mind	same	dont mind	L1, L2, L3, L4	yes	1/9/2021, 1/2/2022	dont mind
14	37	male	single_man	nat1	rel4	eth3	dont mind	dont mind	single_man, single_parent_father	mixed	don't mind	dont mind	don't mind	dont mind	dont mind	1, 3
15	21	male	nuclear	nat4	rel1	eth6	18-25	mixed	dont mind	same	mixed	mixed	L3, L12	don't mind	1/4/2021, 1/4/2022	2, 3
16	69	female	single_woman	nat7	rel2	eth1	51-65, 65-120	female	dont mind	same	same	same	dont mind	yes	1/7/2021, 1/12/2021	dont mind
17	31	female	extended	nat2	rel5	eth1	18-25, 26-33, 34-43	female	single_woman, single_parent_mother, extended	dont mind	don't mind	don't mind	L4, L7, L12, L14	dont mind	1/1/2021, 1/7/2022	1, 2
18	26	other	single_woman	nat5	rel3	eth5	18-25, 26-33	other	dont mind	same	dont mind	mixed	don't mind	dont mind	dont mind	dont mind
19	37	male	nuclear	nat1	rel7	eth2	26-33, 34-43	dont mind	nuclear	same	mixed	same	L2, L3, L4	yes	15/3/2022, 15/10/2022	dont mind
20	20	other	single_woman	nat3	rel2	eth1	18-25	female	single_parent_mother	mixed	mixed	same	L1, L11	yes	5/1/2021, 5/7/2021	2, 3
21	22	other	single_parent_mother	nat7	rel5	eth3	44-50	dont mind	single_woman	same	dont mind	mixed	dont mind	no	1/5/2021, 1/5/2022	2
22	33	male	nuclear	nat4	rel4	eth3	26-33, 51-65, 65-120	male	single_parent_mother	mixed	dont mind	mixed	L2	no	3/7/2021, 12/2/2022	3,4
23	44	male	nuclear	nat5	rel4	eth4	26-33	other	nuclear	dont mind	mixed	mixed	L5	dont mind	dont mind	2
24	55	male	extended	nat1	rel1	eth5	dont mind	dont mind	dont mind	dont mind	same	same	L6	yes	1/1/2021, 1/7/2022	1,4
25	66	female	single_woman	nat3	rel5	eth3	44-50, 51-65	female	nuclear	same	mixed	mixed	L2, L3	dont mind	1/1/2021, 1/4/2021	1,3
26	77	female	single_parent_mother	nat4	rel17	eth3	dont mind	other	nuclear	dont mind	same	same	L6	no	1/9/2021, 1/12/2021	3,4
27	50	male	nuclear	nat5	rel16	eth7	44-50, 51-65	other	single_parent_father	same	mixed	mixed	L1, L2, L3	dont mind	1/1/2021, 1/7/2022	1,5
28	36	female	extended	nat7	rel4	eth2	18-25, 26-33,34-43	male	dont mind	dont mind	mixed	dont mind	L3, L5	dont mind	1/1/2021, 1/7/2022	2,4
29	41	male	nuclear	nat1	rel4	eth3	51-65, 65-120	dont mind	dont mind	don't mind	don't mind	don't mind	don't mind	don't mind	1/3/2021, 1/10/2021	2
30	25	male	single_man	nat3	rel2	eth1	18-25, 26-33, 34-43	mixed	dont mind	mixed	mixed	mixed	don't mind	dont mind	13/12/2021, 1/5/2022	1, 4

Groups of TCNs Solution:
Group1: tcn1, tcn7, tcn10, tcn11, tcn12, tcn17, tcn20
Group2: tcn2, tcn6, tcn14
Group3: tcn4, tcn13, tcn18
Group4: tcn8, tcn19, tcn25
Group5: tcn3, tcn28
No Group Found: tcn5, tcn9, tcn15, tcn16, tcn21, tcn22, tcn23, tcn24, tcn26, tcn27, tcn29, tcn30 - 12

Rank List of TCNs Solution:
TCN1: [**tcn12**: 0, **tcn20**: 0,008, **tcn18**: 0,038, **tcn10**: 0,054, **tcn4**: 0,062, **tcn5**: 0,063, **tcn7**: 0,086, **tcn8**: 0,088, **tcn25**: 0,113,]
TCN2: [**tcn14**: 0, **tcn12**: 0,035, **tcn28**: 0,049, **tcn6**: 0,053, **tcn4**: 0,06, **tcn18**: 0,06, **tcn21**: 0,075, **tcn15**: 0,075, **tcn5**: 0,087,]
TCN3: [**tcn28**: 0, **tcn14**: 0,056, **tcn6**: 0,071, **tcn18**: 0,078, **tcn4**: 0,08, **tcn12**: 0,086, **tcn8**: 0,086, **tcn27**: 0,088, **tcn5**: 0,09,]
TCN4: [**tcn18**: 0,015, **tcn13**: 0,017, **tcn6**: 0,017, **tcn29**: 0,017, **tcn7**: 0,018, **tcn30**: 0,029, **tcn17**: 0,03, **tcn28**: 0,033, **tcn15**: 0,05,]
TCN5: [**tcn17**: 0,019, **tcn29**: 0,053, **tcn6**: 0,056, **tcn1**: 0,063, **tcn18**: 0,075, **tcn16**: 0,08, **tcn20**: 0,082, **tcn4**: 0,082, **tcn9**: 0,086,]
TCN6: [**tcn14**: 0, **tcn4**: 0,017, **tcn18**: 0,017, **tcn7**: 0,035, **tcn8**: 0,045, **tcn2**: 0,053, **tcn5**: 0,056, **tcn24**: 0,058, **tcn28**: 0,062,]
TCN7: [**tcn17**: 0, **tcn12**: 0, **tcn4**: 0,018, **tcn28**: 0,033, **tcn6**: 0,035, **tcn10**: 0,047, **tcn18**: 0,05, **tcn1**: 0,086, **tcn14**: 0,086,]
TCN8: [**tcn19**: 0, **tcn25**: 0,042, **tcn18**: 0,044, **tcn6**: 0,045, **tcn28**: 0,051, **tcn12**: 0,06, **tcn29**: 0,075, **tcn4**: 0,075, **tcn27**: 0,077,]
TCN9: [**tcn14**: 0,052, **tcn4**: 0,08, **tcn29**: 0,084, **tcn5**: 0,086, **tcn18**: 0,086, **tcn6**: 0,115, **tcn16**: 0,168, **tcn19**: 0,171, **tcn17**: 0,176,]
TCN10: [**tcn12**: 0, **tcn18**: 0,024, **tcn7**: 0,047, **tcn1**: 0,054, **tcn4**: 0,062, **tcn29**: 0,066, **tcn14**: 0,069, **tcn17**: 0,074, **tcn28**: 0,074,]
TCN11: [**tcn12**: 0, **tcn18**: 0,075, **tcn4**: 0,08, **tcn10**: 0,082, **tcn1**: 0,121, **tcn14**: 0,151, **tcn17**: 0,194, **tcn7**: 0,212, **tcn29**: 0,231,]
TCN12: [**tcn10**: 0, **tcn11**: 0, **tcn7**: 0, tcn17: 0, **tcn1**: 0, **tcn29**: 0,018, **tcn2**: 0,035, **tcn28**: 0,036, **tcn30**: 0,036,]
TCN13: [**tcn4**: 0,017, **tcn18**: 0,03, **tcn8**: 0,078, **tcn14**: 0,078, **tcn28**: 0,091, **tcn17**: 0,105, **tcn6**: 0,109, **tcn30**: 0,133, **tcn29**: 0,135,]
TCN14: [**tcn6**: 0, **tcn2**: 0, **tcn30**: 0,024, **tcn9**: 0,052, **tcn3**: 0,056, **tcn18**: 0,06, **tcn10**: 0,069, **tcn4**: 0,072, **tcn13**: 0,078,]
TCN15: [**tcn4**: 0,05, **tcn18**: 0,055, **tcn6**: 0,067, **tcn12**: 0,071, **tcn2**: 0,075, **tcn28**: 0,076, **tcn14**: 0,083, **tcn8**: 0,084, **tcn3**: 0,095,]
TCN16: [**tcn5**: 0,08, **tcn8**: 0,085, **tcn4**: 0,086, **tcn14**: 0,086, **tcn18**: 0,086, **tcn29**: 0,102, **tcn17**: 0,109, **tcn23**: 0,113, **tcn6**: 0,116,]
TCN17: [**tcn7**: 0, **tcn12**: 0, **tcn5**: 0,019, **tcn18**: 0,029, **tcn4**: 0,03, **tcn6**: 0,064, **tcn10**: 0,074, **tcn14**: 0,092, **tcn13**: 0,105,]
TCN18: [**tcn4**: 0,015, **tcn6**: 0,017, **tcn29**: 0,017, **tcn10**: 0,024, **tcn17**: 0,029, **tcn30**: 0,029, **tcn13**: 0,03, **tcn28**: 0,03, **tcn21**: 0,034,]
TCN19: [**tcn8**: 0, **tcn18**: 0,082, **tcn4**: 0,082, **tcn5**: 0,086, **tcn14**: 0,095, **tcn28**: 0,113, **tcn6**: 0,118, **tcn29**: 0,123, **tcn12**: 0,129,]
TCN20: [**tcn1**: 0,008, **tcn18**: 0,049, **tcn4**: 0,071, **tcn5**: 0,082, **tcn14**: 0,108, **tcn29**: 0,135, **tcn6**: 0,149, **tcn12**: 0,161, **tcn10**: 0,183,]
TCN21: [**tcn18**: 0,034, **tcn4**: 0,067, **tcn2**: 0,075, **tcn23**: 0,079, **tcn12**: 0,082, **tcn10**: 0,085, **tcn29**: 0,109, **tcn6**: 0,111, **tcn17**: 0,116,]
TCN22: [**tcn18**: 0,062, **tcn4**: 0,072, **tcn2**: 0,103, **tcn14**: 0,133, **tcn10**: 0,148, **tcn6**: 0,149, **tcn12**: 0,153, **tcn30**: 0,156, **tcn29**: 0,192,]
TCN23: [**tcn29**: 0,018, **tcn18**: 0,04, **tcn4**: 0,065, **tcn21**: 0,079, **tcn10**: 0,093, **tcn30**: 0,105, **tcn16**: 0,113, **tcn3**: 0,12, **tcn1**: 0,125,]
TCN24: [**tcn6**: 0,058, **tcn18**: 0,067, **tcn4**: 0,072, **tcn5**: 0,091, **tcn8**: 0,095, **tcn14**: 0,108, **tcn12**: 0,12, **tcn30**: 0,128, **tcn29**: 0,146,]
TCN25: [**tcn8**: 0,042, **tcn4**: 0,08, **tcn18**: 0,08, **tcn14**: 0,087, **tcn12**: 0,095, **tcn10**: 0,112, **tcn5**: 0,112, **tcn1**: 0,113, **tcn6**: 0,14,]
TCN26: [**tcn4**: 0,086, **tcn18**: 0,086, **tcn10**: 0,11, **tcn14**: 0,139, **tcn12**: 0,141, **tcn8**: 0,184, **tcn29**: 0,188, **tcn6**: 0,195, **tcn1**: 0,21,]
TCN27: [**tcn18**: 0,042, **tcn28**: 0,06, **tcn6**: 0,062, **tcn4**: 0,075, **tcn8**: 0,077, **tcn3**: 0,088, **tcn14**: 0,11, **tcn2**: 0,116, **tcn12**: 0,12,]
TCN28: [**tcn3**: 0, **tcn18**: 0,03, **tcn7**: 0,033, **tcn4**: 0,033, **tcn12**: 0,036, **tcn2**: 0,049, **tcn8**: 0,051, **tcn27**: 0,06, **tcn6**: 0,062,]
TCN29: [**tcn4**: 0,017, **tcn18**: 0,017, **tcn23**: 0,018, **tcn12**: 0,018, **tcn5**: 0,053, **tcn10**: 0,066, **tcn8**: 0,075, **tcn14**: 0,08, **tcn9**: 0,084,]
TCN30: [**tcn14**: 0,024, **tcn4**: 0,029, **tcn18**: 0,029, **tcn12**: 0,036, **tcn28**: 0,101, **tcn6**: 0,104, **tcn23**: 0,105, **tcn7**: 0,125, **tcn24**: 0,128,]

Input #4 & 5 – 50 & 100 TCNs

Personal and Preference info for 50 TCNs are generated RANDOMLY

Groups of TCNs Solution:
Group1 has 2 TCNs
Group2 has 4 TCNs
Group3 has 9 TCNs
Group4 has 2 TCNs
Group5 has 4 TCNs
Group6 has 2 TCNs
No Group Found for 26 TCNs

Personal and Preference info for 100 TCNs are generated RANDOMLY

Groups of TCNs Solution:
Group1 has 6 TCNs
Group2 has 5 TCNs
Group3 has 2 TCNs
Group4 has 2 TCNs
Group5 has 2 TCNs
Group6 has 2 TCNs
Group7 has 2 TCNs
Group8 has 2 TCNs
Group9 has 2 TCNs
Group10 has 2 TCNs
Group11 has 2 TCNs
Group12 has 2 TCNs
No Group Found for 69 TCNs

Personal and Preference info for 250 TCNs are generated RANDOMLY

Groups of TCNs Solution:
Group1 has 2 TCNs
Group2 has 2 TCNs
Group3 has 2 TCNs
Group4 has 2 TCNs
Group5 has 2 TCNs
Group6 has 2 TCNs
Group7 has 2 TCNs
Group8 has 2 TCNs
Group9 has 2 TCNs
Group10 has 2 TCNs
Group11 has 2 TCNs
Group12 has 2 TCNs
Group13 has 2 TCNs
Group14 has 3 TCNs
Group15 has 3 TCNs
Group16 has 3 TCNs
Group17 has 3 TCNs
Group18 has 3 TCNs
Group19 has 3 TCNs
Group20 has 3 TCNs
Group21 has 3 TCNs
Group22 has 3 TCNs
Group23 has 4 TCNs
Group24 has 4 TCNs

Groups of TCNs Solution:
Group25 has 4 TCNs
Group26 has 4 TCNs
Group27 has 6 TCNs
Group28 has 6 TCNs
Group29 has 6 TCNs
Group30 has 7 TCNs
Group31 has 5 TCNs
Group32 has 5 TCNs
Group33 has 9 TCNs
No Group Found for 137 TCNs

Personal and Preference info for 500 TCNs are generated RANDOMLY

Personal and Preference info for 1000 TCNs are generated RANDOMLY

176 of 500 TCNs are divided into **57** groups.
NO group found for **324** TCNs.

350 of 1000 TCNs are divided into **64** groups.
NO group found for **650** TCNs.

Conclusion: on average, NO group is found for more than half of randomly generated TCN profiles.

Questions