

# Content

1. *Preference and Personal Info Attributes in CHC*
2. 2 Methods to solve CHC: **Group and Rank List**
3. **Inputs: 10, 20, 30 TCNs**
4. **Outputs: 10, 20, 30 TCNs**
5. Questions

## Attributes and The Values they can take

In CHC, there are **17** attributes which are needed to be defined by TCNs. These attributes are divided into 2 groups: **Personal** info and **Preference** info. Each Preference has an importance degree which is defined by Praksis. Importance degrees range between 1 and 10 where 1 means the least important while 10 means the most important preference.

**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
7. **Language** – full or shortened name of a language

**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

**Singleton:** 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.

\* **HIGHER** value means a better match between TCNs. E.g. 4.5 is a better match than 2.3.

## Input #1 – 10 TCNs

### 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	eth2	don't mind	mixed	don't mind	mixed	don't mind	same	L1/L2/L3	don't mind	1/5/2021-1/5/2022	don't mind
3	34	male	single_parent_father	nat2	rel1	eth3	26-33/34-43	don't mind	single_parent_mother/single_parent_father/nuclear	don't mind	same	don't mind	L3/L4/L5	yes	1/1/2021-1/7/2022	2-4
4	19	other	extended	nat1	rel3	eth2	18-25	don't mind	don't mind	don't mind	same	mixed	don't mind	don't mind	don't mind	don't mind
5	67	female	single_parent_mother	nat1	rel1	eth1	don't mind	female	single_woman/single_parent_mother/nuclear	same	same	don't mind	don't mind	yes	don't mind	1-2
6	43	male	single_man	nat4	rel4	eth4	34-43/44-50	don't mind	don't 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	don't mind
8	27	female	nuclear	nat3	rel2	eth2	don't mind	don't mind	single_woman/single_parent_mother/nuclear	mixed	mixed	same	L3/L6/L9	yes	don't mind	1-4
9	55	male	nuclear	nat1	rel4	eth3	51-65/65-120	male	don't mind	same	same	same	L4	yes	1/5/2021-1/12/2021	1-2
10	23	other	single_woman	nat2	rel5	eth4	don't mind	female	single_woman/single_parent_mother	don't mind	don't mind	don't mind	don't mind	no	1/1/2021-1/12/2021	don't mind

**Config:** *matchScore* = 1 → Similarity value increases by *matchScore* for each attribute match

### Groups of TCNs Solution:

**Singleton:** [tcn5, tcn8, tcn9, ] --> 3

**Group1:** [tcn2, tcn3, tcn4, tcn6, ] --> 4

**Group2:** [tcn1, tcn7, tcn10, ] --> 3

### Rank List of TCNs Solution:

**TCN1:** [tcn10: 4,94, tcn4: 4,845, tcn5: 4,77, tcn7: 4,629, tcn8: 4,595, tcn3: 4,059, tcn6: 3,95, tcn2: 3,87, tcn9: 3,159, ]

**TCN2:** [tcn6: 4,931, tcn4: 4,867, tcn3: 4,569, tcn8: 4,505, tcn5: 4,343, tcn7: 4,304, tcn10: 4,239, tcn1: 3,87, tcn9: 3,199, ]

**TCN3:** [tcn4: 4,849, tcn8: 4,773, tcn6: 4,723, tcn2: 4,569, tcn5: 4,318, tcn1: 4,059, tcn9: 3,826, tcn7: 3,776, tcn10: 3,561, ]

**TCN4:** [tcn6: 5,138, tcn2: 4,867, tcn3: 4,849, tcn7: 4,849, tcn10: 4,845, tcn1: 4,845, tcn8: 4,691, tcn9: 4,58, tcn5: 4,523, ]

**TCN5:** [tcn1: 4,77, tcn9: 4,591, tcn8: 4,541, tcn4: 4,523, tcn2: 4,343, tcn3: 4,318, tcn6: 4,289, tcn10: 4,14, tcn7: 4,09, ]

**TCN6:** [tcn4: 5,138, tcn2: 4,931, tcn7: 4,74, tcn8: 4,733, tcn3: 4,723, tcn10: 4,349, tcn5: 4,289, tcn9: 4,227, tcn1: 3,95, ]

**TCN7:** [tcn10: 5,01, tcn4: 4,849, tcn6: 4,74, tcn1: 4,629, tcn2: 4,304, tcn5: 4,09, tcn8: 4,035, tcn3: 3,776, tcn9: 2,719, ]

**TCN8:** [tcn3: 4,773, tcn6: 4,733, tcn4: 4,691, tcn1: 4,595, tcn5: 4,541, tcn2: 4,505, tcn10: 4,198, tcn7: 4,035, tcn9: 3,208, ]

**TCN9:** [tcn5: 4,591, tcn4: 4,58, tcn6: 4,227, tcn3: 3,826, tcn8: 3,208, tcn2: 3,199, tcn1: 3,159, tcn10: 3,152, tcn7: 2,719, ]

**TCN10:** [tcn7: 5,01, tcn1: 4,94, tcn4: 4,845, tcn6: 4,349, tcn2: 4,239, tcn8: 4,198, tcn5: 4,14, tcn3: 3,561, tcn9: 3,152, ]

## Input #1 – 10 TCNs

### 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	eth2	don't mind	mixed	don't mind	mixed	don't mind	same	L1/L2/L3	don't mind	1/5/2021-1/5/2022	don't mind
3	34	male	single_parent_father	nat2	rel1	eth3	26-33/34-43	don't mind	single_parent_mother/single_parent_father/nuclear	don't mind	same	don't mind	L3/L4/L5	yes	1/1/2021-1/7/2022	2-4
4	19	other	extended	nat1	rel3	eth2	18-25	don't mind	don't mind	don't mind	same	mixed	don't mind	don't mind	don't mind	don't mind
5	67	female	single_parent_mother	nat1	rel1	eth1	don't mind	female	single_woman/single_parent_mother/nuclear	same	same	don't mind	don't mind	yes	don't mind	1-2
6	43	male	single_man	nat4	rel4	eth4	34-43/44-50	don't mind	don't 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	don't mind
8	27	female	nuclear	nat3	rel2	eth2	don't mind	don't mind	single_woman/single_parent_mother/nuclear	mixed	mixed	same	L3/L6/L9	yes	don't mind	1-4
9	55	male	nuclear	nat1	rel4	eth3	51-65/65-120	male	don't mind	same	same	same	L4	yes	1/5/2021-1/12/2021	1-2
10	23	other	single_woman	nat2	rel5	eth4	don't mind	female	single_woman/single_parent_mother	don't mind	don't mind	don't mind	don't mind	no	1/1/2021-1/12/2021	don't mind

**Config:** *matchScore* = 0,5 → Similarity value increases by *matchScore* for each attribute match

### Groups of TCNs Solution:

**Singleton:** [tcn4, ] --> 1

**Group1:** [tcn1, tcn2, tcn3, tcn6, tcn7, tcn8, tcn10, ] --> 7

**Group2:** [tcn5, tcn9, ] --> 2

### Rank List of TCNs Solution:

**TCN1:** [tcn10: 2,741, tcn5: 2,502, tcn7: 2,48, tcn8: 2,473, tcn3: 2,432, tcn4: 2,423, tcn6: 2,323, tcn2: 1,998, tcn9: 1,788, ]

**TCN2:** [tcn6: 2,842, tcn3: 2,619, tcn7: 2,487, tcn4: 2,434, tcn10: 2,34, tcn8: 2,253, tcn5: 2,172, tcn1: 1,998, tcn9: 1,895, ]

**TCN3:** [tcn6: 2,984, tcn8: 2,652, tcn2: 2,619, tcn1: 2,432, tcn4: 2,425, tcn7: 2,391, tcn5: 2,248, tcn9: 2,199, tcn10: 2,086, ]

**TCN4:** [tcn6: 2,569, tcn2: 2,434, tcn3: 2,425, tcn7: 2,424, tcn10: 2,423, tcn1: 2,423, tcn8: 2,346, tcn9: 2,29, tcn5: 2,262, ]

**TCN5:** [tcn9: 2,646, tcn1: 2,502, tcn8: 2,446, tcn6: 2,384, tcn4: 2,262, tcn3: 2,248, tcn2: 2,172, tcn10: 2,07, tcn7: 2,045, ]

**TCN6:** [tcn3: 2,984, tcn2: 2,842, tcn7: 2,82, tcn8: 2,631, tcn9: 2,569, tcn4: 2,569, tcn10: 2,426, tcn5: 2,384, tcn1: 2,323, ]

**TCN7:** [tcn6: 2,82, tcn10: 2,811, tcn2: 2,487, tcn1: 2,48, tcn4: 2,424, tcn3: 2,391, tcn5: 2,045, tcn8: 2,017, tcn9: 1,557, ]

**TCN8:** [tcn3: 2,652, tcn6: 2,631, tcn1: 2,473, tcn5: 2,446, tcn4: 2,346, tcn2: 2,253, tcn10: 2,099, tcn7: 2,017, tcn9: 1,784, ]

**TCN9:** [tcn5: 2,646, tcn6: 2,569, tcn4: 2,29, tcn3: 2,199, tcn10: 1,9, tcn2: 1,895, tcn1: 1,788, tcn8: 1,784, tcn7: 1,557, ]

**TCN10:** [tcn7: 2,811, tcn1: 2,741, tcn6: 2,426, tcn4: 2,423, tcn2: 2,34, tcn8: 2,099, tcn3: 2,086, tcn5: 2,07, tcn9: 1,9, ]

## 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	eth2	don't mind	mixed	don't mind	mixed	don't mind	same	L1/L2/L3	don't mind	1/5/2021-1/5/2022	don't mind
3	34	male	single_parent_father	nat2	rel1	eth3	26-33/34-43	don't mind	single_parent_mother/single_parent_father/nuclear	don't mind	don't mind	don't mind	L3/L4/L5	yes	1/1/2021-1/7/2022	2-4
4	19	other	extended	nat1	rel3	eth2	18-25	don't mind	don't mind	don't mind	same	mixed	don't mind	don't mind	don't mind	don't mind
5	67	female	single_parent_mother	nat1	rel1	eth1	don't mind	female	single_woman/single_parent_mother/nuclear	same	same	don't mind	don't mind	yes	don't mind	1-2
6	43	male	single_man	nat4	rel4	eth4	34-43/44-50	don't mind	don't 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	don't mind
8	27	female	nuclear	nat3	rel2	eth2	don't mind	don't mind	single_woman/single_parent_mother/nuclear	mixed	mixed	same	L3/L6/L9	yes	don't mind	1-4
9	55	male	nuclear	nat1	rel4	eth3	51-65/65-120	male	don't mind	same	same	same	L4	yes	1/5/2021-1/12/2021	1-2
10	23	other	single_woman	nat2	rel5	eth4	don't mind	female	single_woman/single_parent_mother	don't mind	don't mind	don't mind	don't mind	no	1/1/2021-1/12/2021	don't mind
11	18	female	single_woman	nat2	rel5	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	don't mind	don't mind	single_woman/single_parent_mother/nuclear	same	same	same	L3/L6/L7/L9	don't mind	don't mind	don't mind
13	29	male	extended	nat5	rel3	eth2	26-33/34-43	don't mind	extended	don't mind	same	don't mind	L1/L2/L3/L4	yes	1/9/2021-1/2/2022	don't mind
14	37	male	single_man	nat1	rel4	eth3	don't mind	don't mind	single_man/single_parent_father	mixed	don't mind	don't mind	don't mind	don't mind	don't mind	1-3
15	21	male	nuclear	nat4	rel1	eth6	18-25	mixed	don't 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	don't mind	same	same	same	don't mind	yes	1/7/2021-1/12/2021	don't mind
17	31	female	extended	nat2	rel5	eth1	18-25/26-33/34-43	female	single_woman/single_parent_mother/extended	don't mind	don't mind	don't mind	L4/L7/L12/L14	don't mind	1/1/2021-1/7/2022	1-2
18	26	other	single_woman	nat5	rel3	eth5	18-25/26-33	other	don't mind	same	don't mind	mixed	don't mind	don't mind	don't mind	don't mind
19	37	male	nuclear	nat1	rel7	eth2	26-33/34-43	don't mind	nuclear	same	mixed	same	L2/L3/L4	yes	15/3/2022-15/10/2022	don't 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

**Config:** *matchScore* = 1,0 → Similarity value increases by *matchScore* for each attribute match

#### Groups of TCNs Solution:

**Singleton:** [tcn3, tcn5, tcn9, tcn13, tcn15, tcn16, ] --> 6

**Group1:** [tcn8, tcn19, ] --> 2

**Group2:** [tcn1, tcn20, ] --> 2

**Group3:** [tcn2, tcn6, tcn14, ] --> 3

**Group4:** [tcn7, tcn17, ] --> 2

**Group5:** [tcn10, tcn11, tcn12, ] --> 3

**Group6:** [tcn4, tcn18, ] --> 2

**Config:** *matchScore* = 0,5 → Similarity value increases by *matchScore* for each attribute match

#### Groups of TCNs Solution:

**Singleton:** [tcn5, tcn9, tcn13, tcn16, ] --> 4

**Group1:** [tcn4, tcn18, ] --> 2

**Group2:** [tcn8, tcn19, ] --> 2

**Group3:** [tcn1, tcn20, ] --> 2

**Group4:** [tcn2, tcn3, tcn6, tcn7, tcn10, tcn11, tcn12, tcn14, tcn15, tcn17, ] --> 10

## Input #2 – 20 TCNs

**Config:** *matchScore* = 1,0 → Similarity value increases by *matchScore* for each attribute match

### Rank List of TCNs Solution:

**TCN1:** [tcn20: 5,139, tcn18: 5,098, tcn10: 4,94, tcn4: 4,845, tcn12: 4,827, tcn5: 4,77, tcn7: 4,629, tcn8: 4,595, tcn14: 4,367, ]

**TCN2:** [tcn14: 5,183, tcn6: 4,931, tcn18: 4,9, tcn4: 4,867, tcn15: 4,748, tcn3: 4,569, tcn8: 4,505, tcn5: 4,343, tcn7: 4,304, ]

**TCN3:** [tcn18: 4,9, tcn4: 4,849, tcn14: 4,831, tcn8: 4,773, tcn6: 4,723, tcn12: 4,596, tcn2: 4,569, tcn5: 4,318, tcn15: 4,278, ]

**TCN4:** [tcn18: 5,298, tcn13: 5,192, tcn6: 5,138, tcn17: 5,092, tcn15: 5, tcn2: 4,867, tcn3: 4,849, tcn7: 4,849, tcn10: 4,845, ]

**TCN5:** [tcn1: 4,77, tcn16: 4,7, tcn18: 4,691, tcn17: 4,661, tcn19: 4,591, tcn9: 4,591, tcn8: 4,541, tcn4: 4,523, tcn12: 4,491, ]

**TCN6:** [tcn14: 5,5, tcn18: 5,138, tcn4: 5,138, tcn2: 4,931, tcn15: 4,814, tcn7: 4,74, tcn8: 4,733, tcn3: 4,723, tcn17: 4,683, ]

**TCN7:** [tcn17: 5,183, tcn12: 5,01, tcn10: 5,01, tcn18: 5, tcn4: 4,849, tcn6: 4,74, tcn1: 4,629, tcn14: 4,404, tcn15: 4,304, ]

**TCN8:** [tcn19: 5,346, tcn18: 5,05, tcn3: 4,773, tcn6: 4,733, tcn4: 4,691, tcn12: 4,666, tcn16: 4,649, tcn15: 4,648, tcn13: 4,637, ]

**TCN9:** [tcn14: 4,733, tcn5: 4,591, tcn4: 4,58, tcn18: 4,404, tcn6: 4,227, tcn3: 3,826, tcn16: 3,815, tcn19: 3,733, tcn17: 3,668, ]

**TCN10:** [tcn12: 5,5, tcn18: 5,25, tcn7: 5,01, tcn1: 4,94, tcn4: 4,845, tcn14: 4,798, tcn17: 4,703, tcn11: 4,667, tcn15: 4,381, ]

**TCN11:** [tcn12: 5,5, tcn10: 4,667, tcn18: 4,444, tcn4: 4,118, tcn1: 3,958, tcn14: 3,531, tcn17: 3,326, tcn7: 3,188, tcn5: 2,929, ]

**TCN12:** [tcn11: 5,5, tcn10: 5,5, tcn7: 5,01, tcn17: 4,95, tcn1: 4,827, tcn8: 4,666, tcn18: 4,624, tcn15: 4,624, tcn3: 4,596, ]

**TCN13:** [tcn4: 5,192, tcn18: 5,092, tcn14: 4,637, tcn8: 4,637, tcn17: 4,425, tcn2: 4,222, tcn6: 4,155, tcn5: 4,09, tcn15: 3,997, ]

**TCN14:** [tcn6: 5,5, tcn2: 5,183, tcn18: 4,9, tcn3: 4,831, tcn10: 4,798, tcn4: 4,745, tcn9: 4,733, tcn15: 4,667, tcn13: 4,637, ]

**TCN15:** [tcn4: 5, tcn18: 4,949, tcn6: 4,814, tcn2: 4,748, tcn14: 4,667, tcn8: 4,648, tcn12: 4,624, tcn10: 4,381, tcn7: 4,304, ]

**TCN16:** [tcn5: 4,7, tcn8: 4,649, tcn18: 4,404, tcn14: 4,404, tcn4: 4,404, tcn12: 4,249, tcn17: 4,243, tcn2: 4,11, tcn6: 3,892, ]

**TCN17:** [tcn7: 5,183, tcn18: 5,146, tcn4: 5,092, tcn12: 4,95, tcn10: 4,703, tcn6: 4,683, tcn5: 4,661, tcn14: 4,564, tcn13: 4,425, ]

**TCN18:** [tcn4: 5,298, tcn10: 5,25, tcn17: 5,146, tcn6: 5,138, tcn1: 5,098, tcn13: 5,092, tcn8: 5,05, tcn7: 5, tcn15: 4,949, ]

**TCN19:** [tcn8: 5,346, tcn4: 4,645, tcn5: 4,591, tcn14: 4,549, tcn18: 4,523, tcn12: 4,198, tcn2: 4,008, tcn6: 3,927, tcn3: 3,91, ]

**TCN20:** [tcn1: 5,139, tcn18: 4,647, tcn4: 4,624, tcn5: 4,438, tcn14: 4,288, tcn12: 3,758, tcn6: 3,704, tcn16: 3,587, tcn10: 3,471, ]

## Input #2 – 20 TCNs

**Config:** *matchScore* = 0,5 → Similarity value increases by *matchScore* for each attribute match

### Rank List of TCNs Solution:

**TCN1:** [tcn20: 3,4, tcn10: 2,741, tcn18: 2,549, tcn5: 2,502, tcn7: 2,48, tcn8: 2,473, tcn3: 2,432, tcn4: 2,423, tcn14: 2,417, ]  
**TCN2:** [tcn6: 2,842, tcn15: 2,798, tcn3: 2,619, tcn14: 2,591, tcn7: 2,487, tcn18: 2,45, tcn4: 2,434, tcn10: 2,34, tcn13: 2,323, ]  
**TCN3:** [tcn6: 2,984, tcn17: 2,724, tcn15: 2,712, tcn8: 2,652, tcn2: 2,619, tcn14: 2,591, tcn18: 2,45, tcn1: 2,432, tcn4: 2,425, ]  
**TCN4:** [tcn18: 2,649, tcn13: 2,596, tcn6: 2,569, tcn17: 2,546, tcn15: 2,5, tcn2: 2,434, tcn3: 2,425, tcn7: 2,424, tcn10: 2,423, ]  
**TCN5:** [tcn17: 2,686, tcn9: 2,646, tcn1: 2,502, tcn8: 2,446, tcn6: 2,384, tcn16: 2,35, tcn18: 2,346, tcn20: 2,337, tcn14: 2,312, ]  
**TCN6:** [tcn14: 3,1, tcn17: 3,024, tcn15: 3,015, tcn3: 2,984, tcn2: 2,842, tcn7: 2,82, tcn8: 2,631, tcn9: 2,569, tcn18: 2,569, ]  
**TCN7:** [tcn17: 3,093, tcn6: 2,82, tcn10: 2,811, tcn12: 2,505, tcn18: 2,5, tcn15: 2,487, tcn2: 2,487, tcn1: 2,48, tcn4: 2,424, ]  
**TCN8:** [tcn19: 2,673, tcn3: 2,652, tcn6: 2,631, tcn18: 2,525, tcn14: 2,521, tcn15: 2,499, tcn1: 2,473, tcn5: 2,446, tcn4: 2,346, ]  
**TCN9:** [tcn5: 2,646, tcn14: 2,601, tcn6: 2,569, tcn17: 2,383, tcn4: 2,29, tcn16: 2,265, tcn18: 2,202, tcn3: 2,199, tcn13: 1,954, ]  
**TCN10:** [tcn7: 2,811, tcn12: 2,75, tcn1: 2,741, tcn17: 2,658, tcn18: 2,625, tcn11: 2,468, tcn15: 2,459, tcn6: 2,426, tcn4: 2,423, ]  
**TCN11:** [tcn12: 2,75, tcn10: 2,468, tcn1: 2,41, tcn18: 2,222, tcn4: 2,059, tcn14: 1,887, tcn17: 1,748, tcn7: 1,678, tcn6: 1,585, ]  
**TCN12:** [tcn11: 2,75, tcn10: 2,75, tcn7: 2,505, tcn17: 2,475, tcn1: 2,413, tcn8: 2,333, tcn18: 2,312, tcn15: 2,312, tcn3: 2,298, ]  
**TCN13:** [tcn4: 2,596, tcn18: 2,546, tcn17: 2,353, tcn2: 2,323, tcn14: 2,318, tcn8: 2,318, tcn6: 2,237, tcn15: 2,209, tcn3: 2,098, ]  
**TCN14:** [tcn6: 3,1, tcn9: 2,601, tcn3: 2,591, tcn2: 2,591, tcn15: 2,567, tcn8: 2,521, tcn17: 2,516, tcn18: 2,45, tcn1: 2,417, ]  
**TCN15:** [tcn6: 3,015, tcn2: 2,798, tcn3: 2,712, tcn14: 2,567, tcn4: 2,5, tcn8: 2,499, tcn7: 2,487, tcn18: 2,475, tcn10: 2,459, ]  
**TCN16:** [tcn5: 2,35, tcn8: 2,325, tcn9: 2,265, tcn2: 2,265, tcn17: 2,263, tcn18: 2,202, tcn14: 2,202, tcn4: 2,202, tcn12: 2,125, ]  
**TCN17:** [tcn7: 3,093, tcn6: 3,024, tcn3: 2,724, tcn5: 2,686, tcn10: 2,658, tcn18: 2,573, tcn4: 2,546, tcn14: 2,516, tcn12: 2,475, ]  
**TCN18:** [tcn4: 2,649, tcn10: 2,625, tcn17: 2,573, tcn6: 2,569, tcn1: 2,549, tcn13: 2,546, tcn8: 2,525, tcn7: 2,5, tcn15: 2,475, ]  
**TCN19:** [tcn8: 2,673, tcn4: 2,323, tcn5: 2,296, tcn14: 2,275, tcn18: 2,262, tcn12: 2,099, tcn6: 2,057, tcn2: 2,048, tcn3: 2,04, ]  
**TCN20:** [tcn1: 3,4, tcn14: 2,379, tcn5: 2,337, tcn18: 2,323, tcn4: 2,312, tcn6: 2,209, tcn10: 2,011, tcn15: 1,92, tcn12: 1,879, ]



## Input #3 – 30 TCNs

### 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	eth2	don't mind	mixed	don't mind	mixed	don't mind	same	L1/L2/L3	don't mind	1/5/2021-1/5/2022	don't mind	
3	34	male	single_parent_father	nat2	rel1	eth3	26-33/34-43	don't mind	single_parent_mother/single_parent_father/nuclear	don't mind	don't mind	don't mind	L3/L4/L5	yes	1/1/2021-1/7/2022	2-4	
4	19	other	extended	nat1	rel3	eth2	18-25	don't mind	don't mind	don't mind	same	mixed	don't mind	don't mind	don't mind	don't mind	
5	67	female	single_parent_mother	nat1	rel1	eth1	don't mind	female	single_woman/single_parent_mother/nuclear	same	same	don't mind	don't mind	yes	don't mind	1-2	
6	43	male	single_man	nat4	rel4	eth4	34-43/44-50	don't mind	don't 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	don't mind	
8	27	female	nuclear	nat3	rel2	eth2	don't mind	don't mind	single_woman/single_parent_mother/nuclear	mixed	mixed	same	L3/L6/L9	yes	don't mind	1-4	
9	55	male	nuclear	nat1	rel4	eth3	51-65/65-120	male	don't mind	same	same	same	L4	yes	1/5/2021-1/12/2021	1-2	
10	23	other	single_woman	nat2	rel5	eth4	don't mind	female	single_woman/single_parent_mother	don't mind	don't mind	don't mind	don't mind	no	1/1/2021-1/12/2021	don't mind	
11	18	female	single_woman	nat2	rel5	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	don't mind	don't mind	single_woman/single_parent_mother/nuclear	same	same	same	L3/L6/L7/L9	don't mind	don't mind	don't mind	
13	29	male	extended	nat5	rel3	eth2	26-33/34-43	don't mind	extended	don't mind	same	don't mind	L1/L2/L3/L4	yes	1/9/2021-1/2/2022	don't mind	
14	37	male	single_man	nat1	rel4	eth3	don't mind	don't mind	single_man/single_parent_father	mixed	don't mind	don't mind	don't mind	don't mind	don't mind	1-3	
15	21	male	nuclear	nat4	rel1	eth6	18-25	mixed	don't 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	don't mind	same	same	same	don't mind	yes	1/7/2021-1/12/2021	don't mind	
17	31	female	extended	nat2	rel5	eth1	18-25/26-33/34-43	female	single_woman/single_parent_mother/extended	don't mind	don't mind	don't mind	L4/L7/L12/L14	don't mind	1/1/2021-1/7/2022	1-2	
18	26	other	single_woman	nat5	rel3	eth5	18-25/26-33	other	don't mind	same	don't mind	mixed	don't mind	don't mind	don't mind	don't mind	
19	37	male	nuclear	nat1	rel7	eth2	26-33/34-43	don't mind	nuclear	same	mixed	same	L2/L3/L4	yes	15/3/2022-15/10/2022	don't 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	don't mind	single_woman	same	don't mind	mixed	don't 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	don't mind	mixed	L2	no	3/7/2021-12/2/2022	3-4	
23	44	male	nuclear	nat5	rel4	eth4	26-33	other	nuclear	don't mind	mixed	mixed	L5	don't mind	don't mind	2	
24	55	male	extended	nat1	rel1	eth5	don't mind	don't mind	don't mind	don't 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	don't mind	1/1/2021-1/4/2021	1-3	
26	77	female	single_parent_mother	nat4	rel7	eth3	don't mind	female	single_parent_mother/extended/nuclear	don't mind	don't mind	same	L4/L6/L8	yes	1/5/2021-1/12/2021	3-4	
27	50	male	nuclear	nat5	rel6	eth7	44-50/51-65	other	single_parent_father	same	mixed	mixed	L1/L2/L3	don't mind	1/1/2021-1/7/2022	1-5	
28	36	female	extended	nat7	rel4	eth2	18-25/26-33/34-43	male	don't mind	don't mind	mixed	don't mind	L3/L5	don't mind	1/1/2021-1/7/2022	2-4	
29	41	male	nuclear	nat1	rel4	eth3	26-33/51-65/65-120	don't mind	don't 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	don't mind	mixed	mixed	mixed	don't mind	don't mind	13/12/2021-1/5/2022	1-4	

**Config:** *matchScore* = 1,0 → Similarity value increases by *matchScore* for each attribute match

#### Groups of TCNs Solution:

**Singleton:** [tcn5, tcn9, tcn13, tcn15, tcn16, tcn21, tcn22, tcn23, tcn24, tcn25, tcn26, tcn27, tcn29, ] --> 13

**Group1:** [tcn8, tcn19, ] --> 2

**Group2:** [tcn3, tcn28, ] --> 2

**Group3:** [tcn1, tcn20, ] --> 2

**Group4:** [tcn7, tcn17, ] --> 2

**Group5:** [tcn2, tcn6, tcn14, tcn30, ] --> 4

**Group6:** [tcn10, tcn11, tcn12, ] --> 3

**Group7:** [tcn4, tcn18, ] --> 2

**Config:** *matchScore* = 0,5 → Similarity value increases by *matchScore* for each attribute match

#### Groups of TCNs Solution:

**Singleton:** [tcn5, tcn8, tcn13, tcn16, tcn19, tcn22, tcn25, tcn26, ] --> 8

**Group1:** [tcn4, tcn18, ] --> 2

**Group2:** [tcn9, tcn23, tcn29, ] --> 3

**Group3:** [tcn1, tcn20, ] --> 2

**Group4:** [tcn2, tcn3, tcn6, tcn7, tcn10, tcn11, tcn12, tcn14, tcn15, tcn17, tcn21, tcn24, tcn27, tcn28, tcn30, ] --> 15

## Input #3 – 30 TCNs

**Config:** *matchScore* = 1,0 → Similarity value increases by *matchScore* for each attribute match

### Rank List of TCNs Solution:

**TCN1:** [tcn20: 5,139, tcn18: 5,098, tcn10: 4,94, tcn4: 4,845, tcn12: 4,827, tcn5: 4,77, tcn7: 4,629, tcn8: 4,595, tcn14: 4,367, ]  
**TCN2:** [tcn14: 5,183, tcn28: 5,067, tcn6: 4,931, tcn18: 4,9, tcn4: 4,867, tcn15: 4,748, tcn21: 4,691, tcn3: 4,569, tcn8: 4,505, ]  
**TCN3:** [tcn28: 5,183, tcn18: 4,9, tcn27: 4,857, tcn4: 4,849, tcn14: 4,831, tcn8: 4,773, tcn6: 4,723, tcn12: 4,596, tcn2: 4,569, ]  
**TCN4:** [tcn18: 5,298, tcn13: 5,192, tcn30: 5,146, tcn29: 5,138, tcn6: 5,138, tcn17: 5,092, tcn15: 5, tcn26: 4,9, tcn28: 4,867, ]  
**TCN5:** [tcn29: 4,774, tcn1: 4,77, tcn16: 4,7, tcn18: 4,691, tcn17: 4,661, tcn19: 4,591, tcn9: 4,591, tcn24: 4,541, tcn8: 4,541, ]  
**TCN6:** [tcn14: 5,5, tcn18: 5,138, tcn4: 5,138, tcn2: 4,931, tcn15: 4,814, tcn28: 4,779, tcn7: 4,74, tcn8: 4,733, tcn3: 4,723, ]  
**TCN7:** [tcn17: 5,183, tcn12: 5,01, tcn10: 5,01, tcn18: 5, tcn28: 4,925, tcn4: 4,849, tcn6: 4,74, tcn1: 4,629, tcn14: 4,404, ]  
**TCN8:** [tcn19: 5,346, tcn18: 5,05, tcn28: 4,917, tcn25: 4,907, tcn3: 4,773, tcn29: 4,767, tcn26: 4,75, tcn6: 4,733, tcn4: 4,691, ]  
**TCN9:** [tcn14: 4,733, tcn29: 4,656, tcn5: 4,591, tcn4: 4,58, tcn18: 4,404, tcn6: 4,227, tcn26: 4,162, tcn3: 3,826, tcn16: 3,815, ]  
**TCN10:** [tcn12: 5,5, tcn18: 5,25, tcn7: 5,01, tcn1: 4,94, tcn4: 4,845, tcn14: 4,798, tcn28: 4,703, tcn17: 4,703, tcn11: 4,667, ]  
**TCN11:** [tcn12: 5,5, tcn10: 4,667, tcn18: 4,444, tcn4: 4,118, tcn1: 3,958, tcn14: 3,531, tcn17: 3,326, tcn7: 3,188, tcn21: 3,13, ]  
**TCN12:** [tcn11: 5,5, tcn10: 5,5, tcn7: 5,01, tcn17: 4,95, tcn1: 4,827, tcn29: 4,788, tcn26: 4,666, tcn8: 4,666, tcn21: 4,645, ]  
**TCN13:** [tcn4: 5,192, tcn18: 5,092, tcn14: 4,637, tcn8: 4,637, tcn28: 4,517, tcn17: 4,425, tcn2: 4,222, tcn6: 4,155, tcn5: 4,09, ]  
**TCN14:** [tcn6: 5,5, tcn30: 5,223, tcn2: 5,183, tcn18: 4,9, tcn3: 4,831, tcn10: 4,798, tcn4: 4,745, tcn9: 4,733, tcn15: 4,667, ]  
**TCN15:** [tcn4: 5, tcn18: 4,949, tcn6: 4,814, tcn2: 4,748, tcn14: 4,667, tcn8: 4,648, tcn12: 4,624, tcn28: 4,616, tcn10: 4,381, ]  
**TCN16:** [tcn5: 4,7, tcn8: 4,649, tcn18: 4,404, tcn14: 4,404, tcn4: 4,404, tcn23: 4,279, tcn12: 4,249, tcn17: 4,243, tcn26: 4,113, ]  
**TCN17:** [tcn7: 5,183, tcn18: 5,146, tcn4: 5,092, tcn12: 4,95, tcn10: 4,703, tcn6: 4,683, tcn5: 4,661, tcn14: 4,564, tcn13: 4,425, ]  
**TCN18:** [tcn4: 5,298, tcn10: 5,25, tcn29: 5,183, tcn21: 5,15, tcn30: 5,146, tcn17: 5,146, tcn6: 5,138, tcn1: 5,098, tcn28: 5,092, ]  
**TCN19:** [tcn8: 5,346, tcn4: 4,645, tcn5: 4,591, tcn14: 4,549, tcn18: 4,523, tcn29: 4,245, tcn12: 4,198, tcn28: 4,168, tcn23: 4,035, ]  
**TCN20:** [tcn1: 5,139, tcn18: 4,647, tcn4: 4,624, tcn5: 4,438, tcn14: 4,288, tcn29: 3,826, tcn12: 3,758, tcn6: 3,704, tcn16: 3,587, ]  
**TCN21:** [tcn18: 5,15, tcn4: 4,737, tcn23: 4,698, tcn2: 4,691, tcn12: 4,645, tcn10: 4,639, tcn7: 4,318, tcn28: 4,237, tcn15: 4,233, ]  
**TCN22:** [tcn18: 4,845, tcn4: 4,745, tcn2: 4,463, tcn14: 4,11, tcn10: 4,02, tcn30: 3,886, tcn6: 3,833, tcn12: 3,797, tcn7: 3,554, ]  
**TCN23:** [tcn18: 5,046, tcn29: 5,026, tcn4: 4,849, tcn21: 4,698, tcn10: 4,545, tcn3: 4,498, tcn30: 4,354, tcn16: 4,279, tcn1: 4,25, ]  
**TCN24:** [tcn4: 4,745, tcn18: 4,737, tcn6: 4,683, tcn8: 4,549, tcn5: 4,541, tcn14: 4,425, tcn30: 4,133, tcn12: 4,101, tcn28: 3,884, ]  
**TCN25:** [tcn8: 4,907, tcn18: 4,58, tcn4: 4,58, tcn5: 4,364, tcn12: 4,364, tcn14: 4,343, tcn1: 4,166, tcn6: 3,829, tcn10: 3,735, ]  
**TCN26:** [tcn4: 4,9, tcn8: 4,75, tcn12: 4,666, tcn18: 4,58, tcn14: 4,273, tcn29: 4,254, tcn5: 4,19, tcn3: 4,18, tcn9: 4,162, ]  
**TCN27:** [tcn18: 4,992, tcn3: 4,857, tcn4: 4,691, tcn8: 4,525, tcn28: 4,504, tcn6: 4,432, tcn12: 4,3, tcn7: 4,3, tcn14: 4,299, ]  
**TCN28:** [tcn3: 5,183, tcn18: 5,092, tcn2: 5,067, tcn7: 4,925, tcn8: 4,917, tcn4: 4,867, tcn6: 4,779, tcn10: 4,703, tcn15: 4,616, ]  
**TCN29:** [tcn18: 5,183, tcn4: 5,138, tcn23: 5,026, tcn12: 4,788, tcn5: 4,774, tcn8: 4,767, tcn10: 4,664, tcn9: 4,656, tcn14: 4,498, ]  
**TCN30:** [tcn14: 5,223, tcn18: 5,146, tcn4: 5,146, tcn28: 4,477, tcn6: 4,46, tcn12: 4,358, tcn23: 4,354, tcn24: 4,133, tcn3: 4,114, ]

## Input #3 – 30 TCNs

**Config:** *matchScore* = 0,5 → Similarity value increases by *matchScore* for each attribute match

### Rank List of TCNs Solution:

**TCN1:** [tcn20: 3,4, tcn10: 2,741, tcn25: 2,569, tcn18: 2,549, tcn5: 2,502, tcn7: 2,48, tcn8: 2,473, tcn28: 2,467, tcn3: 2,432, ]  
**TCN2:** [tcn28: 2,868, tcn21: 2,846, tcn6: 2,842, tcn15: 2,798, tcn3: 2,619, tcn14: 2,591, tcn22: 2,539, tcn7: 2,487, tcn27: 2,459, ]  
**TCN3:** [tcn28: 3,443, tcn27: 3,14, tcn6: 2,984, tcn17: 2,724, tcn15: 2,712, tcn24: 2,698, tcn8: 2,652, tcn2: 2,619, tcn14: 2,591, ]  
**TCN4:** [tcn18: 2,649, tcn13: 2,596, tcn30: 2,573, tcn29: 2,569, tcn6: 2,569, tcn17: 2,546, tcn15: 2,5, tcn26: 2,45, tcn28: 2,434, ]  
**TCN5:** [tcn17: 2,686, tcn9: 2,646, tcn29: 2,563, tcn1: 2,502, tcn24: 2,446, tcn8: 2,446, tcn25: 2,416, tcn6: 2,384, tcn16: 2,35, ]  
**TCN6:** [tcn14: 3,1, tcn24: 3,054, tcn17: 3,024, tcn15: 3,015, tcn28: 3,012, tcn3: 2,984, tcn27: 2,881, tcn2: 2,842, tcn7: 2,82, ]  
**TCN7:** [tcn17: 3,093, tcn28: 2,965, tcn6: 2,82, tcn10: 2,811, tcn27: 2,65, tcn12: 2,505, tcn18: 2,5, tcn21: 2,493, tcn15: 2,487, ]  
**TCN8:** [tcn28: 2,721, tcn25: 2,717, tcn19: 2,673, tcn3: 2,652, tcn6: 2,631, tcn24: 2,625, tcn26: 2,55, tcn27: 2,544, tcn18: 2,525, ]  
**TCN9:** [tcn29: 2,781, tcn5: 2,646, tcn14: 2,601, tcn26: 2,585, tcn6: 2,569, tcn17: 2,383, tcn4: 2,29, tcn16: 2,265, tcn18: 2,202, ]  
**TCN10:** [tcn7: 2,811, tcn12: 2,75, tcn1: 2,741, tcn28: 2,658, tcn17: 2,658, tcn29: 2,654, tcn18: 2,625, tcn21: 2,54, tcn11: 2,468, ]  
**TCN11:** [tcn12: 2,75, tcn10: 2,468, tcn1: 2,41, tcn18: 2,222, tcn25: 2,094, tcn4: 2,059, tcn14: 1,887, tcn17: 1,748, tcn7: 1,678, ]  
**TCN12:** [tcn11: 2,75, tcn10: 2,75, tcn7: 2,505, tcn17: 2,475, tcn1: 2,413, tcn29: 2,394, tcn26: 2,333, tcn8: 2,333, tcn21: 2,323, ]  
**TCN13:** [tcn4: 2,596, tcn18: 2,546, tcn28: 2,399, tcn17: 2,353, tcn2: 2,323, tcn14: 2,318, tcn8: 2,318, tcn6: 2,237, tcn15: 2,209, ]  
**TCN14:** [tcn6: 3,1, tcn30: 2,874, tcn9: 2,601, tcn3: 2,591, tcn2: 2,591, tcn15: 2,567, tcn25: 2,525, tcn8: 2,521, tcn17: 2,516, ]  
**TCN15:** [tcn6: 3,015, tcn28: 2,877, tcn2: 2,798, tcn21: 2,717, tcn3: 2,712, tcn14: 2,567, tcn29: 2,531, tcn4: 2,5, tcn8: 2,499, ]  
**TCN16:** [tcn26: 2,414, tcn5: 2,35, tcn8: 2,325, tcn9: 2,265, tcn2: 2,265, tcn17: 2,263, tcn18: 2,202, tcn14: 2,202, tcn4: 2,202, ]  
**TCN17:** [tcn7: 3,093, tcn6: 3,024, tcn3: 2,724, tcn5: 2,686, tcn10: 2,658, tcn21: 2,603, tcn28: 2,574, tcn18: 2,573, tcn4: 2,546, ]  
**TCN18:** [tcn4: 2,649, tcn10: 2,625, tcn29: 2,591, tcn21: 2,575, tcn30: 2,573, tcn17: 2,573, tcn6: 2,569, tcn1: 2,549, tcn28: 2,546, ]  
**TCN19:** [tcn8: 2,673, tcn4: 2,323, tcn5: 2,296, tcn14: 2,275, tcn18: 2,262, tcn28: 2,167, tcn29: 2,122, tcn12: 2,099, tcn6: 2,057, ]  
**TCN20:** [tcn1: 3,4, tcn14: 2,379, tcn5: 2,337, tcn29: 2,33, tcn18: 2,323, tcn4: 2,312, tcn6: 2,209, tcn10: 2,011, tcn27: 1,934, ]  
**TCN21:** [tcn2: 2,846, tcn15: 2,717, tcn23: 2,699, tcn17: 2,603, tcn6: 2,588, tcn18: 2,575, tcn28: 2,571, tcn29: 2,543, tcn10: 2,54, ]  
**TCN22:** [tcn2: 2,539, tcn18: 2,423, tcn4: 2,373, tcn6: 2,238, tcn30: 2,22, tcn10: 2,196, tcn14: 2,143, tcn27: 2,108, tcn13: 2,101, ]  
**TCN23:** [tcn29: 2,864, tcn21: 2,699, tcn18: 2,523, tcn4: 2,425, tcn3: 2,367, tcn1: 2,3, tcn5: 2,275, tcn10: 2,273, tcn30: 2,265, ]  
**TCN24:** [tcn6: 3,054, tcn28: 2,71, tcn3: 2,698, tcn8: 2,625, tcn30: 2,546, tcn27: 2,509, tcn17: 2,491, tcn14: 2,475, tcn5: 2,446, ]  
**TCN25:** [tcn8: 2,717, tcn1: 2,569, tcn14: 2,525, tcn5: 2,416, tcn6: 2,299, tcn18: 2,29, tcn4: 2,29, tcn12: 2,182, tcn11: 2,094, ]  
**TCN26:** [tcn9: 2,585, tcn8: 2,55, tcn3: 2,522, tcn4: 2,45, tcn16: 2,414, tcn29: 2,405, tcn12: 2,333, tcn18: 2,29, tcn24: 2,265, ]  
**TCN27:** [tcn3: 3,14, tcn28: 2,97, tcn6: 2,881, tcn7: 2,65, tcn8: 2,544, tcn24: 2,509, tcn18: 2,496, tcn2: 2,459, tcn10: 2,411, ]  
**TCN28:** [tcn3: 3,443, tcn6: 3,012, tcn27: 2,97, tcn7: 2,965, tcn15: 2,877, tcn2: 2,868, tcn8: 2,721, tcn24: 2,71, tcn10: 2,658, ]  
**TCN29:** [tcn23: 2,864, tcn9: 2,781, tcn10: 2,654, tcn18: 2,591, tcn4: 2,569, tcn5: 2,563, tcn6: 2,547, tcn21: 2,543, tcn15: 2,531, ]  
**TCN30:** [tcn14: 2,874, tcn6: 2,635, tcn28: 2,629, tcn18: 2,573, tcn4: 2,573, tcn24: 2,546, tcn3: 2,448, tcn8: 2,383, tcn15: 2,348, ]

## Questions