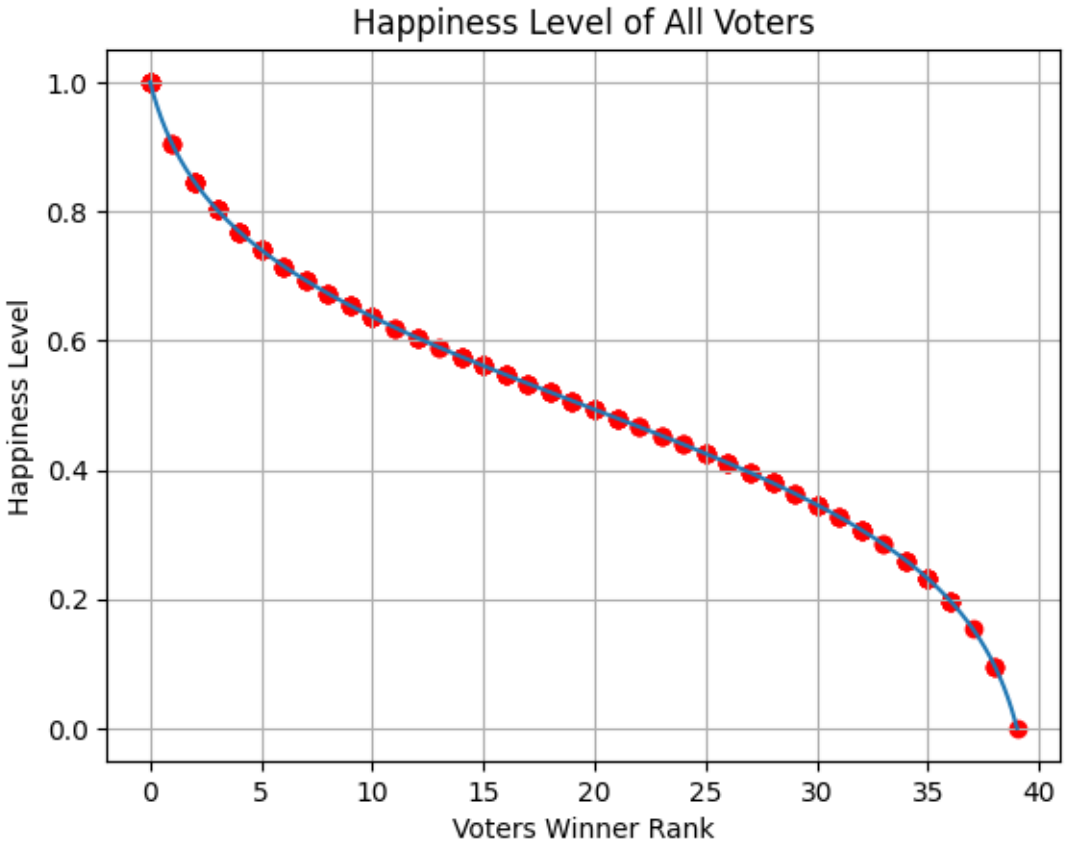
tva

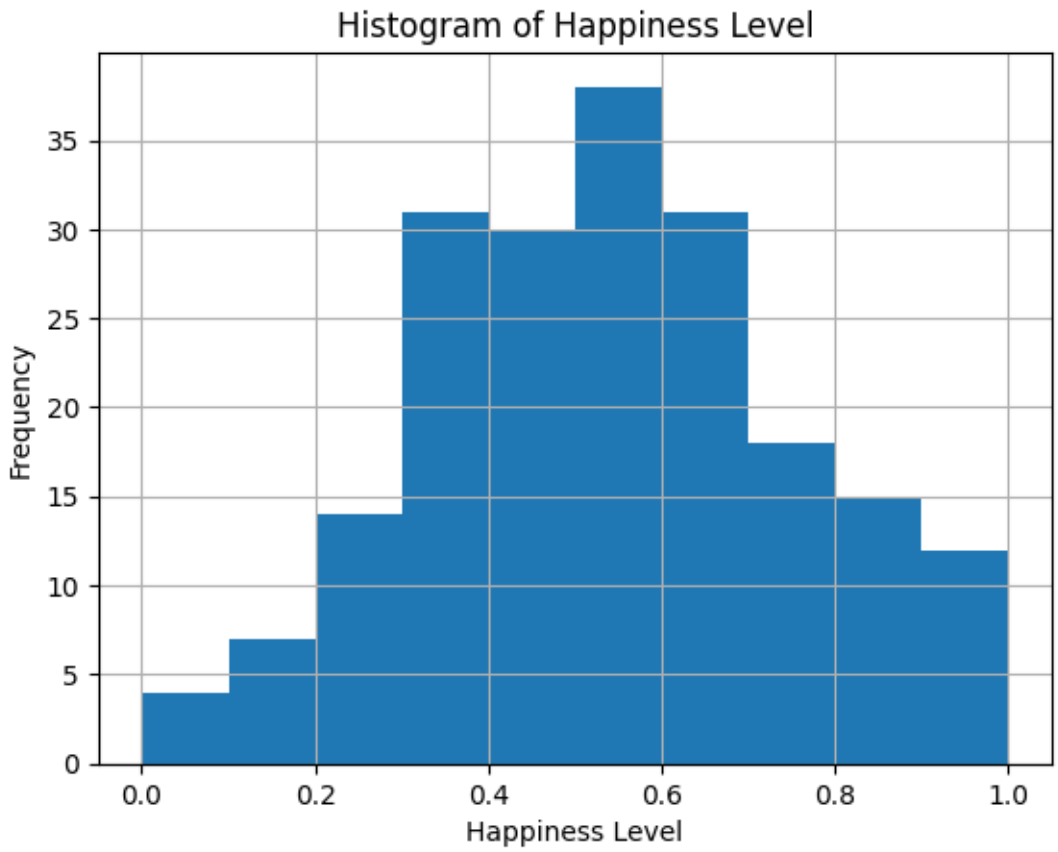
March 12, 2024

1 TVA

This is the voting input

	voter_0	voter_1	voter_2	voter_3	voter_4	voter_5
preference_0	C	B	C	C	B	A
preference_1	A	D	D	D	A	D
preference_2	D	C	A	B	D	B
preference_3	B	A	B	A	C	C





1.1 Strategic Voting

```
             voter_0 voter_1 voter_2 voter_3 voter_4 voter_5
preference_0       C       B       C       C       B       A
preference_1       A       D       D       D       A       D
preference_2       D       C       A       B       D       B
preference_3       B       A       B       A       C       C

Winner: C
{'A': 1, 'B': 2, 'C': 3, 'D': 0}
```

Note that **voter 5** is the only voter that can engage in strategic voting. Voter 5 prefers B over the winner C. Hence, they can increase their Happiness Level by placing B as their first preference, resulting in a tie between C and B in the voting outcome (for plurality, voting for two, Borda). Since ties are resolved in alphabetical order, B wins over C.

The table below displays the two voting strategies available to voter 5.

```
   voter strategic_voting new_result  strategic_H  previous_H  \
0      5     [B, A, D, C]          B     0.410487         0.0
```

```
1      5     [B, D, A, C]          B     0.410487         0.0

   strategic_overall_H  previous_overall_H
0             2.820973            3.410487
1             2.820973            3.410487
```

The table displays the best strategic voting for each voter

```
   voter strategic_voting new_result  strategic_H  previous_H  \
0      5     [B, A, D, C]          B     0.410487         0.0

   strategic_overall_H  previous_overall_H
0             2.820973            3.410487
```

Strategic Voting Risk

```
0.13682886358890622
```

1.2 Coalition Voting

```
              voter_0 voter_1 voter_2 voter_3 voter_4
preference_0       A       B       A       A       B
preference_1       B       C       C       C       C
preference_2       C       A       B       B       A
preference_3       D       D       D       D       D

New voting configuration:
[['A' 'D' 'A' 'A' 'C']
 ['B' 'C' 'C' 'C' 'D']
 ['C' 'B' 'B' 'B' 'B']
 ['D' 'A' 'D' 'D' 'A']]
Effective Coalition: [1, 4], Strategic Changes: {1: ('D', 'C', 'B', 'A'), 4:
('C', 'D', 'B', 'A')}, Original Winner: A, New Winner: C
Changes in Happiness Levels for Coalition Members:
Voter 1: Happiness Change = 0.179
Voter 4: Happiness Change = 0.179


New voting configuration:
[['A' 'B' 'A' 'A' 'B']
 ['B' 'D' 'C' 'C' 'D']
 ['C' 'C' 'B' 'B' 'C']
 ['D' 'A' 'D' 'D' 'A']]
Effective Coalition: [1, 4], Strategic Changes: {1: ('B', 'D', 'C', 'A'), 4:
('B', 'D', 'C', 'A')}, Original Winner: A, New Winner: B
Changes in Happiness Levels for Coalition Members:
Voter 1: Happiness Change = 0.590
```

Voter 4: Happiness Change = 0.590

Summary of Successful Coalitions and their Strategic Votes BORDA:

Successful Coalition Members: Voter_1, Voter_4
Strategic Changes (Borda Rankings): Voter_1 changes to D > C > B > A; Voter_4 changes to C > D > B > A
Original Winner: A, New Winner: C
Changes in Happiness Levels for Coalition Members: Voter_1: 0.179; Voter_4: 0.179

Successful Coalition Members: Voter_1, Voter_4
Strategic Changes (Borda Rankings): Voter_1 changes to B > D > C > A; Voter_4 changes to B > D > C > A
Original Winner: A, New Winner: B
Changes in Happiness Levels for Coalition Members: Voter_1: 0.590; Voter_4: 0.590