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In [34]: import pandas as pd
import numpy as np
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In [35]: data = {'D': {'M': 7, 'N': 21, 'U': 7, 'V': 0},
                 'M': {'D': 52, 'N': 34, 'U': 0, 'V': 7},
                 'N': {'D': 24, 'M': 16, 'U': 7, 'V': 30},
                 'U': {'D': 38, 'M': 0, 'N': 5, 'V': 14},
                 'V': {'D': 45, 'M': 27, 'N': 3, 'U': 52,}}
```

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In [36]: for key1 in data.keys():
          for key2, value in data[key1].items():
              print(f"{key1}\t{key2}\t{value}")
```

```
D      M      7
D      N     21
D      U      7
D      V      0
M      D     52
M      N     34
M      U      0
M      V      7
N      D     24
N      M     16
N      U      7
N      V     30
U      D     38
U      M      0
U      N      5
U      V     14
V      D     45
V      M     27
V      N      3
V      U     52
```

```
In [37]: diseases = ['D', 'M', 'N', 'U', 'V']
```

```
In [38]: point_diff = pd.DataFrame(index=diseases, columns=diseases)
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```
In [39]: for d1 in diseases:
          for d2 in diseases:
              if d1 == d2:
                  point_diff.loc[d1, d2] = 0
              elif d1 in data and d2 in data[d1] and d2 in data and d1 in data[d2]:
                  diff = data[d1][d2] - data[d2][d1]
                  point_diff.loc[d1, d2] = diff
                  point_diff.loc[d2, d1] = -diff
                  point_diff.replace(0, np.nan, inplace=True)
```

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In [40]: point_diff_list = point_diff.to_numpy().tolist()
print(point_diff)
```

	D	M	N	U	V
D	NaN	-45.0	-3.0	-31.0	-45.0
M	45.0	NaN	18.0	NaN	-20.0
N	3.0	-18.0	NaN	2.0	27.0
U	31.0	NaN	-2.0	NaN	-38.0
V	45.0	20.0	-27.0	38.0	0.0

```
In [41]: avg_diff = point_diff.mean(axis=1)
for disease in diseases:
    print(f"AVG OF POINT differentials FOR {disease}: {avg_diff[disease]}")
```

```
AVG OF POINT differentials FOR D: -31.0
AVG OF POINT differentials FOR M: 14.333333333333334
AVG OF POINT differentials FOR N: 3.5
AVG OF POINT differentials FOR U: -3.0
AVG OF POINT differentials FOR V: 15.2
```

```
In [42]: avg_diff = point_diff.mean(axis=1)

ranked_diff = avg_diff.sort_values().reset_index()
ranked_diff.columns = ['Disease', 'Avg. Point Differential']
ranked_diff.index = np.arange(1, len(ranked_diff) + 1)

print(ranked_diff)
```

	Disease	Avg. Point Differential
1	D	-31.000000
2	U	-3.000000
3	N	3.500000
4	M	14.333333
5	V	15.200000

```
In [ ]:
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