

```
In [ ]: import pandas as pd
import numpy as np
```

Importing data

```
In [ ]: df = pd.read_excel("survey.xlsx")
df.head();
```

```
In [ ]: relevant_questions = pd.read_excel("relevant_questions.xlsx")
```

Renaming columns

```
In [ ]: relevant_questions = relevant_questions.rename(columns = {"I think that this system
relevant_questions = relevant_questions.rename(columns = {"I think that this system
relevant_questions.columns;
```

```
In [ ]: relevant_questions
```

	RTEX 1.0 or a similar system would be useful in my clinical setting	The adoption of RTEX 1.0 is likely to happen in my work setting	The adoption of RTEX 1.0 is likely in another clinical setting	I think that RTEX 1.0 system is useful	RTEX 2.0 or a similar system would be useful in my clinical setting	The adoption of RTEX 2.0 is likely to happen in my work setting	The adoption of RTEX 2.0 is likely in another clinical setting	I think that RTEX 2.0 system is useful
0	Agree	Slightly disagree	Slightly agree	Agree	Agree	Slightly agree	Agree	Agree
1	Slightly agree	Slightly agree	Slightly agree	Agree	Slightly agree	Slightly disagree	Slightly agree	Agree
2	Slightly agree	Disagree	Slightly agree	Agree	Slightly disagree	Disagree	Disagree	Slightly agree
3	Slightly agree	Disagree	Slightly disagree	Agree	Agree	Disagree	Slightly disagree	Agree
4	Slightly disagree	Disagree	Slightly agree	Slightly agree	Disagree	Disagree	Disagree	Slightly disagree
5	Agree	Slightly agree	Slightly agree	Agree	Agree	Slightly agree	Slightly agree	Agree
6	Slightly agree	Disagree	Disagree	Agree	Slightly disagree	Disagree	Disagree	Slightly agree
7	Slightly agree	Disagree	Slightly agree	Slightly agree	Slightly agree	Disagree	Slightly agree	Agree
8	Slightly agree	Disagree	Slightly agree	Agree	Agree	Slightly disagree	Slightly agree	Agree
9	Slightly agree	Slightly disagree	Slightly disagree	Slightly agree	Slightly agree	Slightly agree	Slightly disagree	Slightly agree
10	Agree	Agree	Agree	Agree	Agree	Disagree	Agree	Slightly agree

	RTEX 1.0 or a similar system would be useful in my clinical setting	The adoption of RTEX 1.0 is likely to happen in my work setting	The adoption of RTEX 1.0 is likely in another clinical setting	I think that RTEX 1.0 system is useful	RTEX 2.0 or a similar system would be useful in my clinical setting	The adoption of RTEX 2.0 is likely to happen in my work setting	The adoption of RTEX 2.0 is likely in another clinical setting	I think that RTEX 2.0 system is useful
11	Agree	Agree	Slightly agree	Agree	Agree	Slightly agree	Slightly agree	Agree
12	Agree	Slightly disagree	Slightly disagree	Agree	Agree	Agree	Agree	Agree
13	Slightly disagree	Disagree	Slightly agree	Slightly disagree	Slightly agree	Disagree	Agree	Agree
14	Disagree	Disagree	Agree	Slightly agree	Disagree	Disagree	Agree	Agree
15	Slightly agree	Slightly disagree	Slightly agree	Slightly agree	Slightly agree	Slightly disagree	Slightly disagree	Slightly agree
16	Slightly agree	Slightly agree	Slightly agree	Slightly agree	Slightly agree	Slightly agree	Slightly agree	Slightly agree
17	Slightly agree	Disagree	Slightly agree	Slightly agree	Slightly agree	Slightly disagree	Slightly agree	Slightly disagree
18	Slightly agree	Slightly agree	Slightly agree	Agree	Agree	Slightly agree	Slightly agree	Agree
19	Slightly agree	Slightly disagree	Slightly agree	Agree	Slightly disagree	Slightly disagree	Slightly disagree	Slightly agree
20	Agree	Slightly agree	Slightly agree	Agree	Slightly agree	Slightly agree	Slightly agree	Slightly agree
21	Disagree	Disagree	Disagree	Agree	Disagree	Disagree	Disagree	Slightly agree

Preprocess the table to fit a Chi2 test

In [ ]:

```

rtex_1 = relevant_questions.iloc[:, :4]
rtex_2 = relevant_questions.iloc[:, 4 :]

rtex_1["System"] = np.full(len(rtex_1), "RTEX1")
rtex_2["System"] = np.full(len(rtex_1), "RTEX2")

rtex_1 = rtex_1.rename(columns={"RTEX 1.0 or a similar system would be useful in my
                                "The adoption of RTEX 1.0 is likely to happen in my
                                "The adoption of RTEX 1.0 is likely in another clin
                                "I think that RTEX 1.0 system is useful": "Usefulness"
                                })

rtex_2 = rtex_2.rename(columns={"RTEX 2.0 or a similar system would be useful in my
                                "The adoption of RTEX 2.0 is likely to happen in my
                                "The adoption of RTEX 2.0 is likely in another clin
                                "I think that RTEX 2.0 system is useful": "Usefulness"
                                })

rtex_1 = rtex_1[["System", "Usefulness", "Adoption in my clinical setting", "Adoption in my work set"]
rtex_2 = rtex_2[["System", "Usefulness", "Adoption in my clinical setting", "Adoption in my work set"]

```

```
rTEX = pd.concat([rTEX_1, rTEX_2])
```

<ipython-input-6-add06b95e619>:4: SettingWithCopyWarning:  
A value is trying to be set on a copy of a slice from a DataFrame.  
Try using .loc[row\_indexer,col\_indexer] = value instead

See the caveats in the documentation: [https://pandas.pydata.org/pandas-docs/stable/user\\_guide/indexing.html#returning-a-view-versus-a-copy](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

```
rTEX_1["System"] = np.full(len(rTEX_1), "RTEX1")
```

<ipython-input-6-add06b95e619>:5: SettingWithCopyWarning:

A value is trying to be set on a copy of a slice from a DataFrame.

Try using .loc[row\_indexer,col\_indexer] = value instead

See the caveats in the documentation: [https://pandas.pydata.org/pandas-docs/stable/user\\_guide/indexing.html#returning-a-view-versus-a-copy](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

```
rTEX_2["System"] = np.full(len(rTEX_1), "RTEX2")
```

In [ ]:

```
rTEX
```

Out[ ]:

	System	Useful in my clinical setting	Adoption in my work setting	Adoption in other work setting	Usefulness
0	RTEX1	Agree	Slightly disagree	Slightly agree	Agree
1	RTEX1	Slightly agree	Slightly agree	Slightly agree	Agree
2	RTEX1	Slightly agree	Disagree	Slightly agree	Agree
3	RTEX1	Slightly agree	Disagree	Slightly disagree	Agree
4	RTEX1	Slightly disagree	Disagree	Slightly agree	Slightly agree
5	RTEX1	Agree	Slightly agree	Slightly agree	Agree
6	RTEX1	Slightly agree	Disagree	Disagree	Agree
7	RTEX1	Slightly agree	Disagree	Slightly agree	Slightly agree
8	RTEX1	Slightly agree	Disagree	Slightly agree	Agree
9	RTEX1	Slightly agree	Slightly disagree	Slightly disagree	Slightly agree
10	RTEX1	Agree	Agree	Agree	Agree
11	RTEX1	Agree	Agree	Slightly agree	Agree
12	RTEX1	Agree	Slightly disagree	Slightly disagree	Agree
13	RTEX1	Slightly disagree	Disagree	Slightly agree	Slightly disagree
14	RTEX1	Disagree	Disagree	Agree	Slightly agree
15	RTEX1	Slightly agree	Slightly disagree	Slightly agree	Slightly agree
16	RTEX1	Slightly agree	Slightly agree	Slightly agree	Slightly agree
17	RTEX1	Slightly agree	Disagree	Slightly agree	Slightly agree
18	RTEX1	Slightly agree	Slightly agree	Slightly agree	Agree

	System	Useful in my clinical setting	Adoption in my work setting	Adoption in other work setting	Usefulness
19	RTEX1	Slightly agree	Slightly disagree	Slightly agree	Agree
20	RTEX1	Agree	Slightly agree	Slightly agree	Agree
21	RTEX1	Disagree	Disagree	Disagree	Agree
0	RTEX2	Agree	Slightly agree	Agree	Agree
1	RTEX2	Slightly agree	Slightly disagree	Slightly agree	Agree
2	RTEX2	Slightly disagree	Disagree	Disagree	Slightly agree
3	RTEX2	Agree	Disagree	Slightly disagree	Agree
4	RTEX2	Disagree	Disagree	Disagree	Slightly disagree
5	RTEX2	Agree	Slightly agree	Slightly agree	Agree
6	RTEX2	Slightly disagree	Disagree	Disagree	Slightly agree
7	RTEX2	Slightly agree	Disagree	Slightly agree	Agree
8	RTEX2	Agree	Slightly disagree	Slightly agree	Agree
9	RTEX2	Slightly agree	Slightly agree	Slightly disagree	Slightly agree
10	RTEX2	Agree	Disagree	Agree	Slightly agree
11	RTEX2	Agree	Slightly agree	Slightly agree	Agree
12	RTEX2	Agree	Agree	Agree	Agree
13	RTEX2	Slightly agree	Disagree	Agree	Agree
14	RTEX2	Disagree	Disagree	Agree	Agree
15	RTEX2	Slightly agree	Slightly disagree	Slightly disagree	Slightly agree
16	RTEX2	Slightly agree	Slightly agree	Slightly agree	Slightly agree
17	RTEX2	Slightly agree	Slightly disagree	Slightly agree	Slightly disagree
18	RTEX2	Agree	Slightly agree	Slightly agree	Agree
19	RTEX2	Slightly disagree	Slightly disagree	Slightly disagree	Slightly agree
20	RTEX2	Slightly agree	Slightly agree	Slightly agree	Slightly agree
21	RTEX2	Disagree	Disagree	Disagree	Slightly agree

In [ ]:

```
print(rtex.columns)

chi2_result = {"Chi2": [], "P-value": []}
```

Index(['System', 'Useful in my clinical setting',

```
'Adoption in my work setting', 'Adoption in other work setting',
'Usefulness'],
dtype='object')
```

Chi2 test 4\*4 categorical variable

In [ ]:

```
from scipy.stats import chi2_contingency

# chi2 usefulness
system_useful_contingency = pd.crosstab(rtex["System"], rtex["Useful in my clinical setting"])
chi2, pval, dof, expected = chi2_contingency(system_useful_contingency)
print("P-value and correlation for association between system and usefulness in clinical setting: " + str(pval))
chi2_result["Chi2"].append(chi2)
chi2_result["P-value"].append(pval)

# chi2 adoption in my work setting
system_adoption_contingency = pd.crosstab(rtex["System"], rtex["Adoption in my work setting"])
chi2, pval, dof, expected = chi2_contingency(system_adoption_contingency)
print("P-value for association between system and adoption in my clinical setting: " + str(pval))
chi2_result["Chi2"].append(chi2)
chi2_result["P-value"].append(pval)

# chi2 usefulness
system_adoption_another_contingency = pd.crosstab(rtex["System"], rtex["Adoption in other work settings"])
chi2, pval, dof, expected = chi2_contingency(system_adoption_another_contingency)
print("P-value for association between system and adoption in other work settings: " + str(pval))
chi2_result["Chi2"].append(chi2)
chi2_result["P-value"].append(pval)

# chi2 usefulness
system_overall_useful_contingency = pd.crosstab(rtex["System"], rtex["Usefulness"])
chi2, pval, dof, expected = chi2_contingency(system_overall_useful_contingency)
print("P-value for association between system and overall usefulness " + str(pval))
chi2_result["Chi2"].append(chi2)
chi2_result["P-value"].append(pval)

chi2_result = pd.DataFrame(chi2_result).transpose()
chi2_result = chi2_result.set_axis(['Useful in my clinical setting',
                                    'Adoption in my work setting', 'Adoption in other work setting',
                                    'General usefulness'], axis=1, inplace=False)
```

P-value and correlation for association between system and usefulness in clinical setting: 0.6855713690176422  
 P-value for association between system and adoption in my clinical setting: 0.8686556923198563  
 P-value for association between system and adoption in other work settings: 0.3086184997564474  
 P-value for association between system and overall usefulness 0.6239614654122148

In [ ]:

```
chi2_result.transpose().to_excel("chi2_result.xlsx")
```

Inspecting the contingency tables for each variable

In [ ]:

```
system_useful_contingency
```

Out[ ]: Useful in my clinical setting Agree Disagree Slightly agree Slightly disagree

System					
RTEX1	6	2	12	2	

**Useful in my clinical setting Agree Disagree Slightly agree Slightly disagree**

**System**

System	8	3	8	3
RTEX2	8	3	8	3

In [ ]: system\_adoption\_contingency

Out[ ]: **Adoption in my work setting Agree Disagree Slightly agree Slightly disagree**

**System**

System	2	10	5	5
RTEX1	2	10	5	5
RTEX2	1	9	7	5

In [ ]: system\_adoption\_another\_contingency

Out[ ]: **Adoption in other work setting Agree Disagree Slightly agree Slightly disagree**

**System**

System	2	2	15	3
RTEX1	2	2	15	3
RTEX2	5	4	9	4

In [ ]: system\_overall\_useful\_contingency

Out[ ]: **Usefulness Agree Slightly agree Slightly disagree**

**System**

System	14	7	1
RTEX1	14	7	1
RTEX2	11	9	2

Chi2 test 2\*2 categorical variable

In [ ]:

```
# table transformation
rtex_compact = rtex.copy()

rtex_compact = rtex_compact.replace({"Slightly agree": "Agree",
                                      "Slightly disagree": "Disagree"})
rtex_compact
```

	System	Useful in my clinical setting	Adoption in my work setting	Adoption in other work setting	Usefulness
0	RTEX1	Agree	Disagree	Agree	Agree
1	RTEX1	Agree	Agree	Agree	Agree
2	RTEX1	Agree	Disagree	Agree	Agree
3	RTEX1	Agree	Disagree	Disagree	Agree
4	RTEX1	Disagree	Disagree	Agree	Agree
5	RTEX1	Agree	Agree	Agree	Agree

System	Useful in my clinical setting	Adoption in my work setting	Adoption in other work setting	Usefulness
6 RTEX1	Agree	Disagree	Disagree	Agree
7 RTEX1	Agree	Disagree	Agree	Agree
8 RTEX1	Agree	Disagree	Agree	Agree
9 RTEX1	Agree	Disagree	Disagree	Agree
10 RTEX1	Agree	Agree	Agree	Agree
11 RTEX1	Agree	Agree	Agree	Agree
12 RTEX1	Agree	Disagree	Disagree	Agree
13 RTEX1	Disagree	Disagree	Agree	Disagree
14 RTEX1	Disagree	Disagree	Agree	Agree
15 RTEX1	Agree	Disagree	Agree	Agree
16 RTEX1	Agree	Agree	Agree	Agree
17 RTEX1	Agree	Disagree	Agree	Agree
18 RTEX1	Agree	Agree	Agree	Agree
19 RTEX1	Agree	Disagree	Agree	Agree
20 RTEX1	Agree	Agree	Agree	Agree
21 RTEX1	Disagree	Disagree	Disagree	Agree
0 RTEX2	Agree	Agree	Agree	Agree
1 RTEX2	Agree	Disagree	Agree	Agree
2 RTEX2	Disagree	Disagree	Disagree	Agree
3 RTEX2	Agree	Disagree	Disagree	Agree
4 RTEX2	Disagree	Disagree	Disagree	Disagree
5 RTEX2	Agree	Agree	Agree	Agree
6 RTEX2	Disagree	Disagree	Disagree	Agree
7 RTEX2	Agree	Disagree	Agree	Agree
8 RTEX2	Agree	Disagree	Agree	Agree
9 RTEX2	Agree	Agree	Disagree	Agree
10 RTEX2	Agree	Disagree	Agree	Agree
11 RTEX2	Agree	Agree	Agree	Agree
12 RTEX2	Agree	Agree	Agree	Agree
13 RTEX2	Agree	Disagree	Agree	Agree
14 RTEX2	Disagree	Disagree	Agree	Agree
15 RTEX2	Agree	Disagree	Disagree	Agree
16 RTEX2	Agree	Agree	Agree	Agree
17 RTEX2	Agree	Disagree	Agree	Disagree
18 RTEX2	Agree	Agree	Agree	Agree

System	Useful in my clinical setting	Adoption in my work setting	Adoption in other work setting	Usefulness
19 RTEX2	Disagree	Disagree	Disagree	Agree
20 RTEX2	Agree	Agree	Agree	Agree
21 RTEX2	Disagree	Disagree	Disagree	Agree

In [ ]:

```
# chi2 usefulness
system_useful_contingency = pd.crosstab(rtex_compact["System"], rtex_compact["Useful"])
chi2, pval, dof, expected = chi2_contingency(system_useful_contingency)
print("P-value for association between system and usefulness in clinical setting: " + str(pval))

# chi2 adoption in my work setting
system_adoption_contingency = pd.crosstab(rtex_compact["System"], rtex_compact["Adopt"])
chi2, pval, dof, expected = chi2_contingency(system_adoption_contingency)
print("P-value for association between system and adoption in my clinical setting: " + str(pval))

# chi2 usefulness
system_adoption_another_contingency = pd.crosstab(rtex_compact["System"], rtex_compact["Adopt"])
chi2, pval, dof, expected = chi2_contingency(system_adoption_another_contingency)
print("P-value for association between system and adoption in other work settings: " + str(pval))

# chi2 usefulness
system_overall_useful_contingency = pd.crosstab(rtex_compact["System"], rtex_compact["Useful"])
chi2, pval, dof, expected = chi2_contingency(system_overall_useful_contingency)
print("P-value for association between system and overall usefulness " + str(pval))
```

P-value for association between system and usefulness in clinical setting: 0.719042  
7226249021  
P-value for association between system and adoption in my clinical setting: 1.0  
P-value for association between system and adoption in other work settings: 0.508707  
6194607042  
P-value for association between system and overall usefulness 1.0

Creating a summary table comparing RTEX1 and RTEX2

In [ ]:

```
combined_df_rtex1 = {"System": "RTEX1", "Agree": 0, "Slightly agree": 0, "Slightly disagree": 0, "Disagree": 0}
combined_df_rtex2 = {"System": "RTEX2", "Agree": 0, "Slightly agree": 0, "Slightly disagree": 0, "Disagree": 0}
counter = 0

for col in relevant_questions:
    for row in relevant_questions[col]:
        if counter <= 3:
            if row == "Slightly agree":
                combined_df_rtex1["Slightly agree"] += 1
            elif row == "Agree":
                combined_df_rtex1["Agree"] += 1
            elif row == "Slightly disagree":
                combined_df_rtex1["Slightly disagree"] += 1
            elif row == "Disagree":
                combined_df_rtex1["Disagree"] += 1
        else:
            if row == "Slightly agree":
                combined_df_rtex2["Slightly agree"] += 1
            elif row == "Agree":
                combined_df_rtex2["Agree"] += 1
            elif row == "Slightly disagree":
                combined_df_rtex2["Slightly disagree"] += 1
            elif row == "Disagree":
                combined_df_rtex2["Disagree"] += 1
        counter += 1
```

```
counter += 1
```

In [ ]:

```
combined_df = pd.DataFrame(columns=["System", "Agree", "Slightly agree", "Slightly disagree", "Disagree"])

combined_df = combined_df.append(combined_df_rtex1, ignore_index=True)
combined_df = combined_df.append(combined_df_rtex2, ignore_index=True)
combined_df
```

Out[ ]:

	System	Agree	Slightly agree	Slightly disagree	Disagree
0	RTEX1	24	39	11	14
1	RTEX2	25	33	14	16