In [3]:

```
import pandas as pd
import numpy as np
from scipy import stats
from scipy.stats import norm
from scipy.stats import chi2_contingency
```

Importing dataset

In [2]:

```
customer_data=pd.read_csv("Costomer+OrderForm.csv")
customer_data
```

Out[2]:

	Phillippines	Indonesia	Malta	India
0	Error Free	Error Free	Defective	Error Free
1	Error Free	Error Free	Error Free	Defective
2	Error Free	Defective	Defective	Error Free
3	Error Free	Error Free	Error Free	Error Free
4	Error Free	Error Free	Defective	Error Free
...	...	...	...	...
295	Error Free	Error Free	Error Free	Error Free
296	Error Free	Error Free	Error Free	Error Free
297	Error Free	Error Free	Defective	Error Free
298	Error Free	Error Free	Error Free	Error Free
299	Error Free	Defective	Defective	Error Free

300 rows × 4 columns

Initial Analysis

In [4]:

```
customer_data.shape
```

Out[4]:

```
(300, 4)
```

In [5]:

```
customer_data['Phillippines'].value_counts()
```

Out[5]:

```
Error Free    271
Defective      29
Name: Phillippines, dtype: int64
```

In [6]:

```
customer_data['Indonesia'].value_counts()
```

Out[6]:

```
Error Free    267
Defective      33
Name: Indonesia, dtype: int64
```

In [7]:

```
customer_data['Malta'].value_counts()
```

Out[7]:

```
Error Free    269
Defective      31
Name: Malta, dtype: int64
```

In [8]:

```
customer_data['India'].value_counts()
```

Out[8]:

```
Error Free    280
Defective      20
Name: India, dtype: int64
```

In [9]:

```
# Make a contingency table
tele_data=np.array([[271,267,269,280],[29,33,31,20]])
tele_data
```

Out[9]:

```
array([[271, 267, 269, 280],
       [ 29,  33,  31,  20]])
```

In [11]:

```
# Chi2 contengency independence test
chi2_contingency(tele_data) # o/p is (Chi2 stats value, p_value, df, expected obsvations)
```

Out[11]:

```
(3.858960685820355,
 0.2771020991233135,
 3,
 array([[271.75, 271.75, 271.75, 271.75],
        [ 28.25,  28.25,  28.25,  28.25]]))
```

In [13]:

```
## Comparing p_value with alpha=0.05
```

Inference: p_value(0.2771)>0.05

We Accept the Null Hypothesis. Thus, customer order forms defective % does not varies by centre

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>The End!!<<<<<<<<<<<<<<<<<<<<<<<<