**LAB EXERCISE – 5**

**Statistical Tests Using SCIPY**

**Aim of the Experiment**

To write python program for finding Chi-square test and t-tests using SciPy module

**Reference to Textbook and Explanation**

Chapter 2 and Appendix 2 for details about Chi-square and t-tests.

The command,

x=chi\_2(table) helps to find Chi-square test between the observed and expected values. Refer to the Problem 3.11 of chapter 3, its table is reproduced here for reference.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Registered** | **Not Registered** | **Total** |
| **Boys** | 35 | 15 | 50 |
| **Girls** | 25 | 25 | 50 |
| **Total** | 60 | 40 | 100 |

**Expectations Table**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Registered** | **Not Registered** | **Total** |
| **Boys** |  |  | 50 |
| **Girls** |  |  | 50 |
| **Total** | 60 | 40 | 100 |

**Program Listing**

from scipy.stats import chi2\_contingency

from scipy.stats import chi2

from scipy.stats import ttest\_ind

# Perform Chisquare Test

# Compute the Observed value

table = [ [35,15],

[25,25]

]

print('\n Obervartion Table')

# Print the observed value

print(table)

#Perform the Chi square test

stat,p,dof,expected = chi2\_contingency(table)

# Compute the expected value

print('\n')

print('\n Expectation Table')

print(expected)

# Set the parameters

prob = 0.90

# Find the critical value

critical = chi2.ppf(prob,dof)

# Print the critical value

print('\n')

print('The critical Value')

print(critical)

print('statistical value')

print(stat)

if abs(stat) >= critical:

print('Stat value greater or equal to critical:Reject Null Hypotheis')

else:

print('Stat value is less than critical: Accept Alt Hypothesis')

# Perform t-Tests

x = ([6,3,4,5,5,9,7,8])

y = ([4,4,1,3,5,6,2,7])

print('\n')

print('t-Test completed\n\n')

stat,p= ttest\_ind(x,y,equal\_var=True)

print('\n')

print('Statistical value')

print(stat)

print('p value')

print(p)

**Output**

**Chi Square Test**

**Text

Description automatically generated**

**t-test**

**Text

Description automatically generated**