:NON_PARAMETRIC STATISTICAL TESTS:

1) Wilcoxon Sign Test:

a) Comparison between Job Level and Distance From Home :

- H0 : There is no significant importance of allocation of Job Level based on distance from home.
- H1 : There is significant importance of allocation of Job Level based on distance from home.
- stats, p = wilcoxon(dataset.JobLevel,dataset.DistanceFromHome)
- print(stats,p) --------> 413895.0 0.0
- As p=0.0, hence we accept H0.

b) Comparison between Job Level and Years at Company :

- H0 : There is no significant importance of allocation of Job Level based on experience in company.
- H1 : There is significant importance of allocation of Job Level based on experience in company.
- stats, p = wilcoxon(dataset.JobLevel,dataset.YearsAtCompany)
- print(stats,p)---------> 520414.5 0.0
- As p=0.0, hence we accept H0.

c) Comparison between Job Level and Years since last promotion :

- H0 : There is no significant importance of allocation of Job Level based on last promotion.
- H1 : There is significant importance of allocation of Job Level based on last promotion.
- stats, p = wilcoxon(dataset.JobLevel,dataset.YearsSinceLastPromotion)
- print(stats,p)---------> 3214848.0 6.812102728932221e-16
- As p=6.81e-16, hence we reject the H0 and accept H1.

d) Comparison between Job Level and Years with current manager :

- H0 : There is significant impact of Job Level and Current manager.
- H1 : There is no significant impact of Job Level and Current manager.
- stats, p = wilcoxon(dataset.JobLevel,dataset.YearsWithCurrManager)

- print(stats,p)---------->1641100.5 1.304286552546532e-198
- As p=1.304e-198, hence we reject H0 and accept H1.

2) Firedman Test:

a) Comparison between Age, Education, Job Level:

- H0 : There is significant impact of employee age, Education and their Job Level.
- H1 : There is no significant impact of employee age, Education and their Job Level.
- stats,p=friedmanchisquare(dataset.Age,dataset.Education,dataset.JobLevel)
- print(stats,p)----------> 7450.355619286613 0.0
- As p=0.0, hence we accept the H0.

b) Comparison between Monthly Income, Education and Job Level:

- H0 : There is significant difference in monthly income based on education and Job Level.
- H1 : There is no significant difference in monthly income based on education and Job Level.
- stats,p=friedmanchisquare(dataset.MonthlyIncome,dataset.Education,dataset.JobLevel)
- print(stats,p)----------->7450.355619286613 0.0
- As p=0.0, hence we accept the H0.

c) Comparison between Monthly Income, Number of companies worked, Percent of Salary Hike:

- H0 : There is significant difference in monthly income based on companies worked and salary hike.
- H1 : There is no significant difference in monthly income based on companies worked and salary hike.
- stats,p=friedmanchisquare(dataset.MonthlyIncome,dataset.NumCompaniesWorked,dataset.PercentSalaryHike)
- print(stats,p)---------->8706.491156462587 0.0
- As p=0.0, hence we accept the H0.

d) Comparison between Monthly Income, Years Since Last Promotion, Percent of Salary Hike:

- H0 : There is significant difference in monthly income based on last promotion and salary hike
- H1 : There is no significant difference in monthly income based on last promotion and salary hike.

- stats,p=friedmanchisquare(dataset.MonthlyIncome,dataset.YearsSinceLastPromotion,dataset PercentSalaryHike)
- print(stats,p)---------->8719.42740286299 0.0
- As p=0.0, hence we accept the H0

3) Mann-Whitney Test:

a) Comparison between Age and Number of companies worked:

- H0 : There is no significance of age on number of companies worked.
- H1 : There is significance of age on number of companies worked.
- stats,p=mannwhitneyu(dataset.Age,dataset.NumCompaniesWorked)
- print(stats,p)---------->83790.0 0.0
- As p=0.0, hence we accept the H0

b) Comparison between Attrition and Age:

- H0 : There is no significance of age on attrition.
- H1 : There is significance of age on attrition.
- stats,p=mannwhitneyu(dataset.Age,dataset.Attrition1)
- print(stats,p)---------->8820.0 0.0
- As p=0.0, hence we accept H0.

c) Comparison between Age and Distance From Home:

- H0 : There is no significance of age on distance from home.
- H1 : There is significance of age on distance from home.
- stats,p=mannwhitneyu(dataset.Age,dataset.DistanceFromHome)
- print(stats,p)---------->255456.0 0.0
- As p=0.0, hence we accept H0.

4) Chi-Square Test:

a) Comparison between Gender and Business Travel:

- H0 : There is no significance of Gender on Business Travel.
- H1 : There is significance of Gender on Business Travel.

- chitable=pd.crosstab(dataset.Gender,dataset.BusinessTravel)
- chitable

BUSINESS TRAVEL	Non-Travel	Travel_Frequently	Travel_Rarely
GENDER			
Female	153	330	1281
Male	297	501	1848

- stats,p,dot,expected=chi2_contingency(chitable)
- print(stats,p)---------->7.929887577835395 0.01896910285626416
- As p=0.018, hence we reject H0 and accept H1.

b) Comparison between Gender and Attrition :

- H0 : There is no significance of Gender on Attrition.
- H1 : There is significance of Gender on Attrition.
- chitable=pd.crosstab(dataset.Gender,dataset.Attrition)
- chitable

ATTRITION	Yes	No
GENDER		
Female	1494	270
Male	2205	441

- stats,p,dot,expected=chi2_contingency(chitable)
- print(stats,p)---------> 1.349904410246582 0.24529482862926827
- As p=0.245, hence we accept H0.

c) Comparison between Attrition and Department:

- H0 : There is no significant impact of Attrition on Department.
- H1 : There is significant impact of Attrition on Department.
- chitable=pd.crosstab(dataset.Department,dataset.Attrition)
- chitable

ATTRITION	No	Yes
DEPARTMENT		
Human Resources	132	57
Research & Development	2430	453
Sales	1137	201

- stats,p,dot,expected=chi2_contingency(chitable)
- print(stats,p)---------->29.090274924488263 4.820888218170407e-07

- As p=4.82e-07, hence we reject H0 and accept H1.

d) Comparison between Attrition and Education Field:

- H0 : There is no significance of Education Field on Attrition.
- H1 : There is significance of Education Field on Attrition.
- chitable=pd.crosstab(dataset.EducationField,dataset.Attrition)
- chitable

ATTRITION	No	Yes
EDUCATION FIELD		
Human Resources	48	33
Life Sciences	1515	303
Marketing	402	75
Medical	1167	225
Other	216	30
Technical Degree	351	45

- stats,p,dot,expected=chi2_contingency(chitable)
- print(stats,p)----------->46.194921001730584 8.288917469574179e-09
- As p=8.28e-09, hence we reject H0 and accept H1.

e) Comparison between Attrition and Job Role:

- H0 : There is no significant impact of Job role on Attrition.
- H1 : There is significant impact of Job role on Attrition.
- chitable=pd.crosstab(dataset.JobRole,dataset.Attrition)

ATTRITION	No	Yes
JOB ROLE		
Healthcare Representative	336	57
Human Resources	135	21
Laboratory Technician	651	126
Manager	264	42
Manufacturing Director	387	48
Research Director	183	57
Research Scientist	717	159
Sales Executive	813	165
Sales Representative	213	36

- stats,p,dot,expected=chi2_contingency(chitable)
- print(stats,p)----------> 25.11631367460407 0.0014855447448152669

- As p=0.001, hence we reject the H0 and accept H1.