UNIT-1

1. Find confidence interval of mean assuming normal distribution for following data.
   78 55 68 48 65 76 57 55 65 75 51 61 68 67 76 78 71 56 57 67 58 51 50 58 50 77 55 48 70 55 58 70 56 52 74 61 69 76 61 68 78 56 78 57 66 66 74 66 48 73 71 70 62 74 76 50 69 75 65 48.

Solution:

SYNTAX:

```
EXAMINE VARIABLES=x
/STATISTICS DESCRIPTIVES
/CINTERVAL 95
/MISSING LISTWISE
/NOTOTAL.
```

Output:

Explore

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
height	60	100.0%	0	0.0%	60	100.0%

Descriptives

			Statistic	Std. Error
height	Mean		63.88	1.233
	95% Confidence Interval for Mean	Lower Bound	61.42	
		Upper Bound	66.35	
	5% Trimmed Mean		63.98	
	Median		65.50	
	Variance		91.257	
	Std. Deviation		9.553	
	Minimum		48	
	Maximum		78	
	Range		30	
	Interquartile Range		17	
	Skewness		-.136	.309
	Kurtosis		-1.258	.608

Conclusion:

The 95% confidence interval for mean is 61.42 to 66.35.

UNIT-2

1. Perform one sample test for the following data.

   35 20 30 45 60 40 65 40 25 50

   Solution:

   Problem to test:

   H0: Mean is 30.

   H1: Mean is not equal to 30.

   SYNTAX:

```
DATASET ACTIVATE DataSet0.
T-TEST
  /TESTVAL=30
  /MISSING=ANALYSIS
  /VARIABLES=time
  /CRITERIA=CI(.95).
```

OUTPUT:

T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
time in minutes	10	41.00	14.491	4.583

One-Sample Test

	Test Value = 30					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
time in minutes	2.400	9	.040	11.000	.63	21.37

Decision:

Since 0.04 <0.05, reject H0 at 5% level of significance.

Conclusion:

Mean is not equal to 30.

2. Two kinds of manure were applied to sixteen one-hectare plot, other condition remaining the same. The yields in quintals are given below:

Manure I	18	20	36	50	49	36	34	49	41
Manure II	29	28	26	35	30	44	46		

Is there any significant difference between the mean yields? Use 5% level of significance.

Solution:

Problem to test:

H0: There is no significant difference in mean yields.

H1: There is significance difference in mean yields.

SYNTAX:

```
T-TEST GROUPS=type(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=value
  /CRITERIA=CI(.95).
```

OUTPUT:

T-Test

Group Statistics

	type	N	Mean	Std. Deviation	Std. Error Mean
value	Manure 1	9	37.00	11.906	3.969
	Manure 2	7	34.00	8.021	3.032

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
value	Equal variances assumed	.756	.399	.571	14	.577	3.000	5.251	-8.262	14.262
	Equal variances not assumed			.601	13.797	.558	3.000	4.994	-7.726	13.726

<u>Decision:</u>

Since 0.577 >0.05 and 0.558>0.558, accept H0 at 5% level of significance.

<u>Conclusion:</u>

There is no difference in mean yields.

3. Memory capacity of 10 students was tested before and after training, state whether the training was effective or not from the following scores.

Roll no.	1	2	3	4	5	6	7	8	9	10
Before training	12	14	11	8	7	10	3	0	5	6
After Training	15	16	10	7	5	12	10	2	3	8

Solution:

Problem to test:

H0: The training was not effective.

H1: The training was effective.

SYNTAX:

```
DATASET ACTIVATE DataSet0.
T-TEST PAIRS=BeforeTraining WITH AfterTraining (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

OUTPUT:

T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BeforeTraining	7.60	10	4.300	1.360
	AfterTraining	8.80	10	4.733	1.497

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	BeforeTraining & AfterTraining	10	.815	.004

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	BeforeTraining - AfterTraining	-1.200	2.781	.879	-3.189	.789	-1.365	9	.206

<u>Decision:</u>

Since 0.206>0.05, H0 is accepted at 5% level of significance.

<u>Conclusion:</u>

The training was not effective.

UNIT-3

1. In 30 toss of a coin the following sequence of heads(H) and tails(T) is obtained.

   H T T H T H H H T H H HT T H TH T H H T H T T H T H H T H T

   Test at 0.05 level of significance level whether the sequence is random.

   Solution:

   Problem to test:

   H0: The sequence is in random order.

   H1: The sequence is not in random order.

   SYNTAX:

   DATASET ACTIVATE DataSet1.

   NPAR TESTS
     /RUNS(MEDIAN)=toss
     /STATISTICS DESCRIPTIVES QUARTILES
     /MISSING ANALYSIS.

   OUTPUT:

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
toss of coin	30	.53	.507	0	1	.00	1.00	1.00

Runs Test

	toss of coin
Test Value[a]	1
Cases < Test Value	14
Cases >= Test Value	16
Total Cases	30
Number of Runs	22
Z	2.078
Asymp. Sig. (2-tailed)	.038

a. Median

Decision:

Since 0.038<0.05, reject H0 at 0.05 level of significance.

Conclusion:

The sequence is not in random order.

2. Test whether the coin is unbiased from following observations.head(H) and tails(T).
   H T T H T H H H T H H HT T H TH T H H T H T T H T H H T H T

   Solution:

   Problem to test:

   H0: P=0.5

   H1: P is not equal to 0.5

   SYNTAX:

```
NPAR TESTS
  /BINOMIAL (0.50)=toss
  /STATISTICS DESCRIPTIVES QUARTILES
  /MISSING ANALYSIS.
```

   OUTPUT:

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
toss of coin	30	.53	.507	0	1	.00	1.00	1.00

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
toss of coin	Group 1	h	16	.53	.50	.856
	Group 2	t	14	.47		
	Total		30	1.00		

Decision:

Since 0.856>0.05, accept H0 at 0.05 level of significance.

Conclusion:

Heads and tails are equal in number.

3. The number of disease infected tomato plants in 10 different plots of equal size are given below. Test whether the disease infected plants are uniformly distributed over the entire area use Kolmogorov-Smirnov test.

Plot no.	1	2	3	4	5	6	7	8	9	10
No of infected plants	8	10	9	12	15	7	5	12	13	9

Solution:

Problem to test:

H0: The disease infected plants are uniformly distributed over the entire area.

H1: The disease infected plants are not uniformly distributed over the entire area.

SYNTAX:

```
DATASET ACTIVATE DataSet0.
NPAR TESTS
  /K-S(NORMAL)=Infected
  /STATISTICS DESCRIPTIVES QUARTILES
  /MISSING ANALYSIS.
```

OUTPUT:

NPar Test

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
No of infected plants	10	10.00	3.018	5	15	7.75	9.50	12.25

One-Sample Kolmogorov-Smirnov Test

		No of infected plants
N		10
Normal Parameters[a,b]	Mean	10.00
	Std. Deviation	3.018
Most Extreme Differences	Absolute	.146
	Positive	.130
	Negative	-.146
Test Statistic		.146
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Decision:

Since 0.2>0.05, accept H0 at 0.05 level of significance.

Conclusion:

The disease infected plants are uniformly distributed over the entire area.

4. Test the hypothesis of no difference between the ages of male and female employees of a certain company, using the Mann-Whitney U test for the sample data below. Use alpha=0.1.

   Male 35 43 26 44 40 42 33 38 25 26

   Female 30 41 34 36 32 25 47 28 24

   Solution:

   Problem to test:

   H0: There is no difference between ages.

   H1: There is difference between ages.

   SYNTAX:

```
DATASET ACTIVATE DataSet1.
NPAR TESTS
  /M-W= age BY gender(1 2)
  /MISSING ANALYSIS.
```

OUTPUT:

NPar Tests

Mann-Whitney Test

Ranks

	gender	N	Mean Rank	Sum of Ranks
age	male	10	11.65	116.50
	female	10	9.35	93.50
	Total	20		

Test Statistics[a]

	age
Mann-Whitney U	38.500
Wilcoxon W	93.500
Z	-.870
Asymp. Sig. (2-tailed)	.384
Exact Sig. [2*(1-tailed Sig.)]	.393[b]

a. Grouping Variable: gender

b. Not corrected for ties.

Decision:

Since 0.393>0.1, accept H0 at 0.05 level of significance.

Conclusion:

There is no difference between ages of male and female.

5. Data below shows one week growth (in cm) of maize plant from two different localities(sample I & sample II)

Sample I	10	11	8	8	14		
Sample II	9	12	13	9	15	9	17

Test whether the two samples have come from the same population with respect to their medians. Use median test at 0.05 level of significance.

Solution:

Problem to test:

H0: There is no difference between medians.

H1: There is difference between medians.

SYNTAX:

```
DATASET ACTIVATE DataSet0.
NPAR TESTS
  /MEDIAN=growth BY sample(1 2)
  /STATISTICS DESCRIPTIVES QUARTILES
  /MISSING ANALYSIS.
```

OUTPUT:

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
growth	12	11.25	2.958	8	17	9.00	10.50	13.75
sample	12	1.58	.515	1	2	1.00	2.00	2.00

Median Test

Frequencies

		sample	
		1	2
growth	> Median	2	4
	<= Median	3	3

Test Statistics[a]

	growth
N	12
Median	10.50
Exact Sig.	1.000

a. Grouping Variable: sample

Decision:

Since 1>0.05, accept H0 at 0.05 level of significance.

Conclusion:

There is no difference between median growths.

6. Use Wilcoxon Matched pair signed rank test to determine the equality of effectiveness of two types of drugs in suppressing pain from following data.

Patient No.	Drug A	Drug B	Patient No.	Drug A	Drug B
1	6.5	3.5	11	5.4	5.5
2	3.7	3.7	12	4	4.1
3	3.9	4.7	13	5.7	4.1
4	6.7	5	14	3.9	4.2
5	6.2	5.6	15	3.6	3.7
6	6.7	4.3	16	4.9	4.1
7	6.1	5.4	17	3.9	5.4
8	4.3	5.8	18	5.8	3.7
9	5.5	4.3	19	4.9	4.1
10	6.8	4.3	20	4.9	4.1

Solution

Problem to test:

H0: Drugs are equally effective

H1: Drugs are no equally effective

SYNTAX:

```
NPAR TESTS
  /WILCOXON=DrugA WITH DrugB (PAIRED)
  /STATISTICS DESCRIPTIVES QUARTILES
  /MISSING ANALYSIS.
```

OUTPUT:

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
Drug A	20	5.170	1.1164	3.6	6.8	3.925	5.150	6.175
Drug B	20	4.480	.7157	3.5	5.8	4.100	4.250	5.300

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
DrugB - DrugA	Negative Ranks	12[a]	12.21	146.50
	Positive Ranks	7[b]	6.21	43.50
	Ties	1[c]		
	Total	20		

a. DrugB < DrugA

b. DrugB > DrugA

c. DrugB = DrugA

Test Statistics[a]

	DrugB - DrugA
Z	-2.076[b]
Asymp. Sig. (2-tailed)	.038

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Decision:

Since 0.038<0.05, reject H0 at 0.05 level of significance.

Conclusion:

Drugs are not equally effective.

7. Five housewives were asked for the acceptability of four brands og lipsticks for daily use. The response of acceptability (A) and rejection (R) are given below:

Housewives	Lipstick Brands			
	Alfa	Beta	Gamma	Delta
H1	A	R	A	R
H2	R	A	A	R
H3	R	A	R	A
H4	A	R	R	R
H5	A	A	R	A

Solution:

Problem to test:

H0: There is no difference in acceptability

H1: There is difference in acceptability.

SYNTAX:

```
NPAR TESTS
  /COCHRAN=Alfa Beta Gamma Delta
  /MISSING LISTWISE.
```

OUTPUT:

NPar Tests

Cochran Test

Frequencies

	Value	
	0	1
Alfa	2	3
Beta	2	3
Gamma	3	2
Delta	3	2

Test Statistics

N	5
Cochran's Q	.667[a]
df	3
Asymp. Sig.	.881

a. 1 is treated as a success.

Decision:

Since 0.881>0.05, accept H0 at 0.05 level of significance.

Conclusion:

There is no difference in acceptability.

8. Following are the scores obtained by trainees in 3 different categories. Test whether 3 categories have performed equally.

Categories	Scores									
A	68	65	92	50	62	64	68	92	86	64
B	93	86	73	87	76	85	67	79	75	75
C	95	72	85	70	80	80	78	85	72	90

Solution:

Problem to test:

H0: There is no difference in performances.

H1: There is difference in performances.

SYNTAX:

```
NPAR TESTS
  /K-W=Scores BY Categories(1 3)
  /STATISTICS DESCRIPTIVES QUARTILES
  /MISSING ANALYSIS.
```

OUTPUT:

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
Scores	30	78.20	9.739	62	95	69.50	78.50	86.00
Categories	30	2.00	.830	1	3	1.00	2.00	3.00

Kruskal-Wallis Test

Ranks

	Categories	N	Mean Rank
Scores	A	10	12.05
	B	10	16.95
	C	10	17.50
	Total	30	

Test Statistics[a,b]

	Scores
Chi-Square	2.329
df	2
Asymp. Sig.	.312

a. Kruskal Wallis Test

b. Grouping Variable: Categories

Decision:

Since 0.312>0.05, accept H0 at 0.05 level of significance.

Conclusion:

There is no difference in performance.

9. A survey was conducted in four hospitals in a particular city to obtain the number of babies born over a12 month's period. This time period was divided into four seasons to test the hypothesis that the birth rate is constant over all the four seasons. The results of the survey were as follows.

Hospital	No of Births			
	Winter	Spring	Summer	Fall
A	92	72	94	77
B	15	16	10	17
C	58	71	51	62
D	19	26	20	18

Analyze the data using Friedman two way ANOVA test.

<u>Solution:</u>

<u>Problem to test:</u>

H0: Birth rate is constant over all seasons.

H1: Birth rate is not constant over all seasons.

SYNTAX:

```
NPAR TESTS
  /FRIEDMAN=Winter Spring Summer Fall
  /MISSING LISTWISE.
```

OUTPUT:

NPar Tests

Friedman Test

Ranks

	Mean Rank
Winter	2.25
Spring	3.00
Summer	2.25
Fall	2.50

Test Statistics[a]

N	4
Chi-Square	.900
df	3
Asymp. Sig.	.825

a. Friedman Test

Decision:

Since 0.825>0.05, accept H0 at 0.05 level of significance.

Conclusion:

Birth rate is constant over all seasons.

UNIT-4

1. A developer of food for pig wish to determine what relationship exists among age of a pig when it starts receiving a newly developed food supplement, the initial weight of the pig and the amount of weight it gains in a week period with the food supplement. The following information is the result of study of eight pigs.

Piglet number	Initial weight(pounds) x1	Initial age(weeks) X2	Weight gain y
1	39	8	7
2	52	6	6
3	49	7	8
4	46	12	10
5	61	9	9
6	35	6	5
7	25	7	3
8	55	4	4

I. Determine the least square equation that best describes these three variables.

II. Calculate the standard error

III. How much gain in weight of a pig in a week can we expect with the food supplement if it were 9 weeks old and weighs 48 pounds?

IV. Test the significance of regression coefficients and overall fit of the regression equation

V. Conduct the residual analysis

VI. Determine partial correlation, multiple correlation and coefficient of multiple determinations. Interpret.

<u>Solution:</u>

SYNTAX:

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT WeightGain
  /METHOD=ENTER Initialweight Initialage
  /PARTIALPLOT ALL
  /RESIDUALS NORMPROB(ZRESID)
  /SAVE PRED RESID.
```

<u>OUTPUT:</u>

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
WeightGain	6.50	2.449	8
Initialweight	45.25	11.696	8
Initialage	7.38	2.387	8

Correlations

		WeightGain	Initialweight	Initialage
Pearson Correlation	WeightGain	1.000	.514	.794
	Initialweight	.514	1.000	.017
	Initialage	.794	.017	1.000
Sig. (1-tailed)	WeightGain	.	.096	.009
	Initialweight	.096	.	.484
	Initialage	.009	.484	.
N	WeightGain	8	8	8
	Initialweight	8	8	8
	Initialage	8	8	8

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Initialage, Initialweight[b]	.	Enter

a. Dependent Variable: WeightGain

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.939[a]	.881	.834	.999	.881	18.539	2	5	.005

a. Predictors: (Constant), Initialage, Initialweight

b. Dependent Variable: WeightGain

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.009	2	18.505	18.539	.005[b]
	Residual	4.991	5	.998		
	Total	42.000	7			

a. Dependent Variable: WeightGain

b. Predictors: (Constant), Initialage, Initialweight

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations		
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-4.192	1.888		-2.220	.077	-9.045	.662			
	Initialweight	.105	.032	.501	3.247	.023	.022	.188	.514	.824	.500
	Initialage	.807	.158	.786	5.097	.004	.400	1.213	.794	.916	.786

a. Dependent Variable: WeightGain

Residuals Statistics[a]

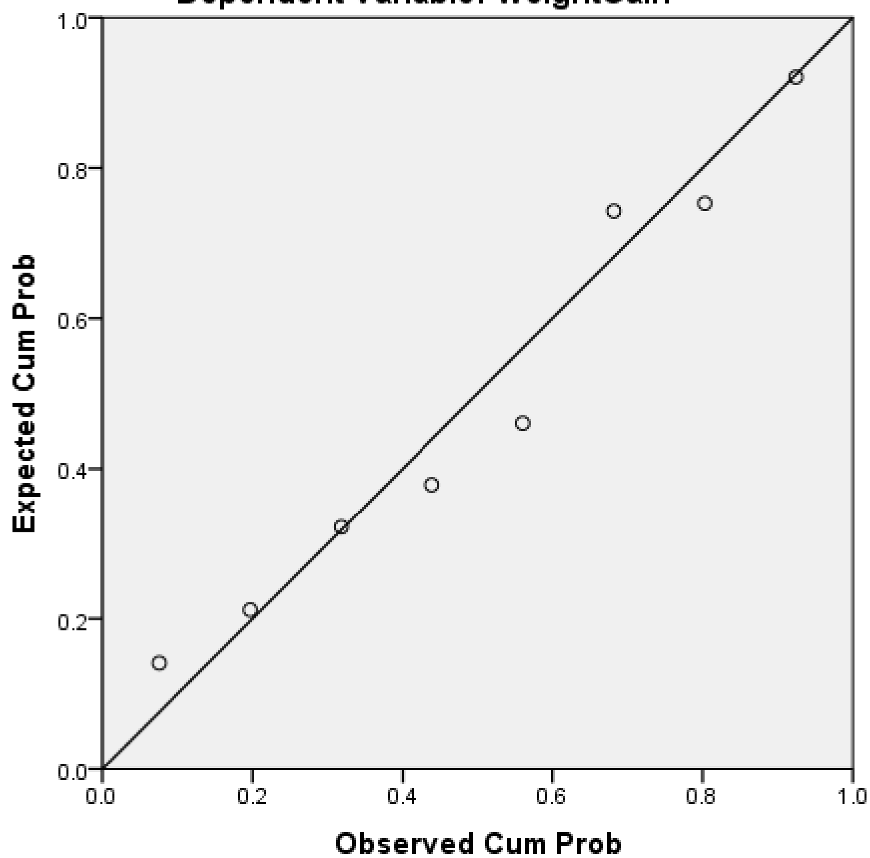
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.07	10.31	6.50	2.299	8
Residual	-1.075	1.409	.000	.844	8
Std. Predicted Value	-1.055	1.656	.000	1.000	8
Std. Residual	-1.076	1.411	.000	.845	8

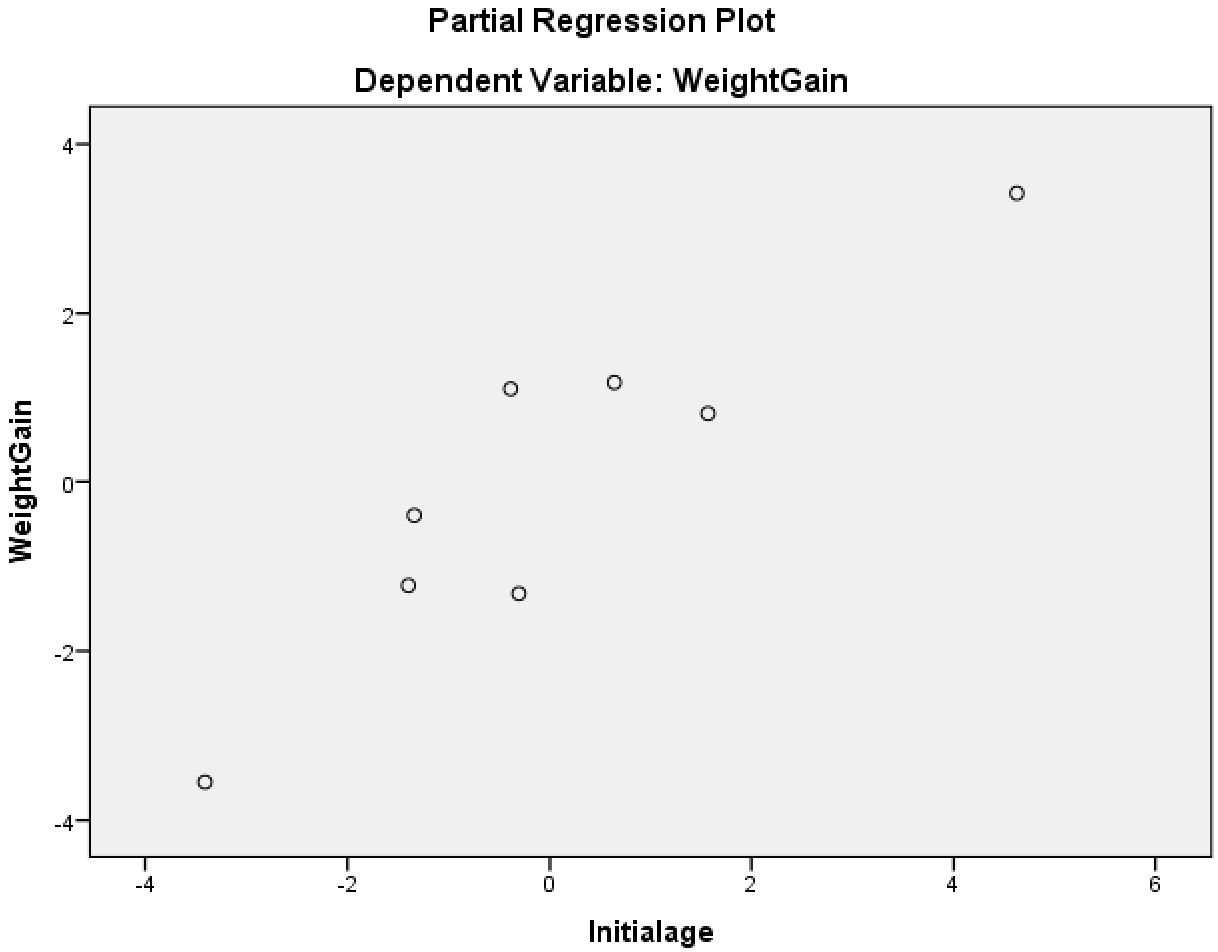
a. Dependent Variable: WeightGain

Charts

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: WeightGain





Conclusion:

I. The regression equations of weight gain on initial weight(pounds) and initial age(weeks) is:
$Y= (-4.1917) + (0.1048)\ x1 + (0.8065)\ x2$

II. Standard error = 0.9991

III. Weight gain is 35.4639 units

IV. For testing null hypothesis B0=0, since p value = 0.077. It is insignificant.
For testing null hypothesis B1=0, since p value = 0.023. It is significant.
For testing null hypothesis B2=0, since p value = 0.004. It is significant.
For testing null hypothesis: overall fit of the regression coefficient = 0, since here the p value=0.0048 for F test, that indicates overall fit is significant.

V. Adj. R2 = 0.836. That indicates this regression equation can represent 83.33% of the true observation

2. The following information has been gathered from a random sample of apartment renters in a city. We are trying to predict rent (in dollars per month) based on the size of apartment (number of rooms) and the distance from downtown (in miles).

Rent(Dollars)	Number of rooms	Distance from downtown
360	2	1
1000	6	1
450	3	2
525	4	3
350	2	10
300	1	4

i. Obtain the multiple regression models that best relate these variables
ii. Interpret the obtained regression coefficients.
iii. If someone is looking for a two bed apartment 2 miles from down town, what rent should he expect to pay?

Solution:

SYNTAX:

```
DATASET ACTIVATE DataSet0.
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT RentY
  /METHOD=ENTER NumberofRoomsX1 distancefromdwontownX2
  /PARTIALPLOT ALL
  /RESIDUALS NORMPROB(ZRESID).
```

OUTPUT:

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
RentY	497.50	258.916	6
NumberofRoomsX1	3.00	1.789	6
distancefromdwontownX2	3.50	3.391	6

Correlations

		RentY	NumberofRoomsX1	distancefromdwontownX2
Pearson Correlation	RentY	1.000	.956	-.436
	NumberofRoomsX1	.956	1.000	-.429
	distancefromdwontownX2	-.436	-.429	1.000
Sig. (1-tailed)	RentY	.	.001	.194
	NumberofRoomsX1	.001	.	.198
	distancefromdwontownX2	.194	.198	.
N	RentY	6	6	6
	NumberofRoomsX1	6	6	6
	distancefromdwontownX2	6	6	6

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	distancefromdwontownX2, NumberofRoomsX1[b]	.	Enter

a. Dependent Variable: RentY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.957[a]	.916	.859	97.086	.916	16.280	2	3	.025

a. Predictors: (Constant), distancefromdwontownX2, NumberofRoomsX1

b. Dependent Variable: RentY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	306910.203	2	153455.102	16.280	.025[b]
	Residual	28277.297	3	9425.766		
	Total	335187.500	5			

a. Dependent Variable: RentY

b. Predictors: (Constant), distancefromdwontownX2, NumberofRoomsX1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	96.458	118.121		.817	.474			
	NumberofRoomsX1	136.485	26.864	.943	5.081	.015	.956	.947	.852
	distancefromdwontownX2	-2.403	14.171	-.031	-.170	.876	-.436	-.097	-.028

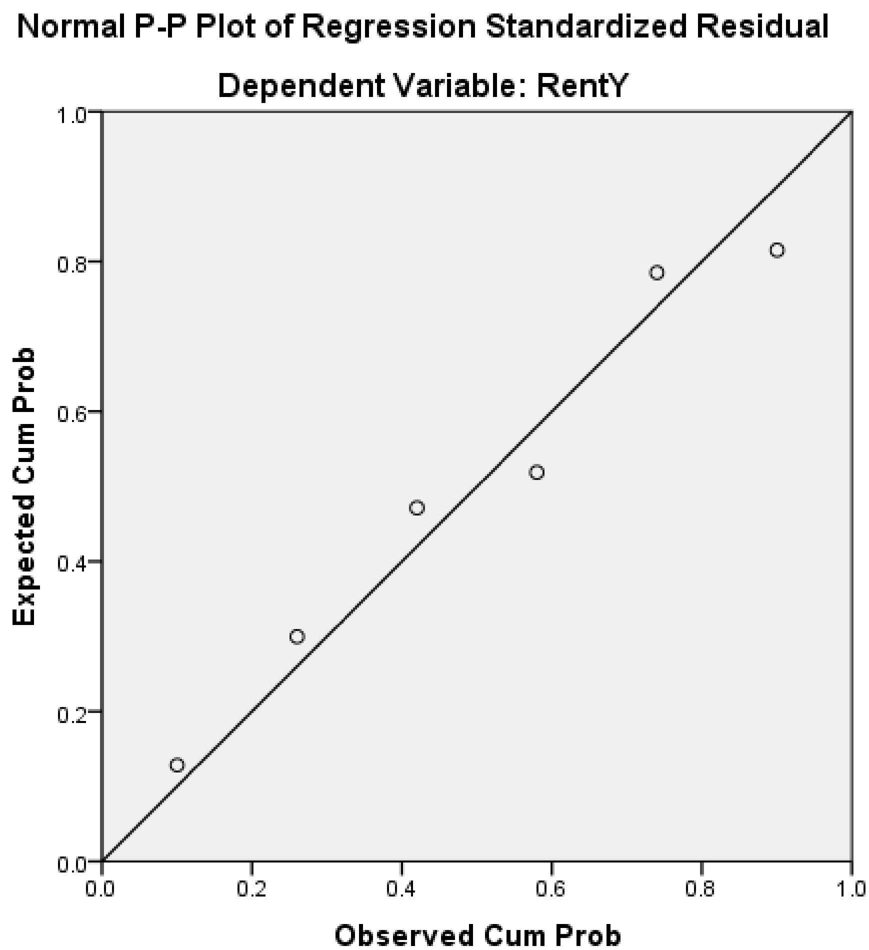
a. Dependent Variable: RentY

Residuals Statistics[a]

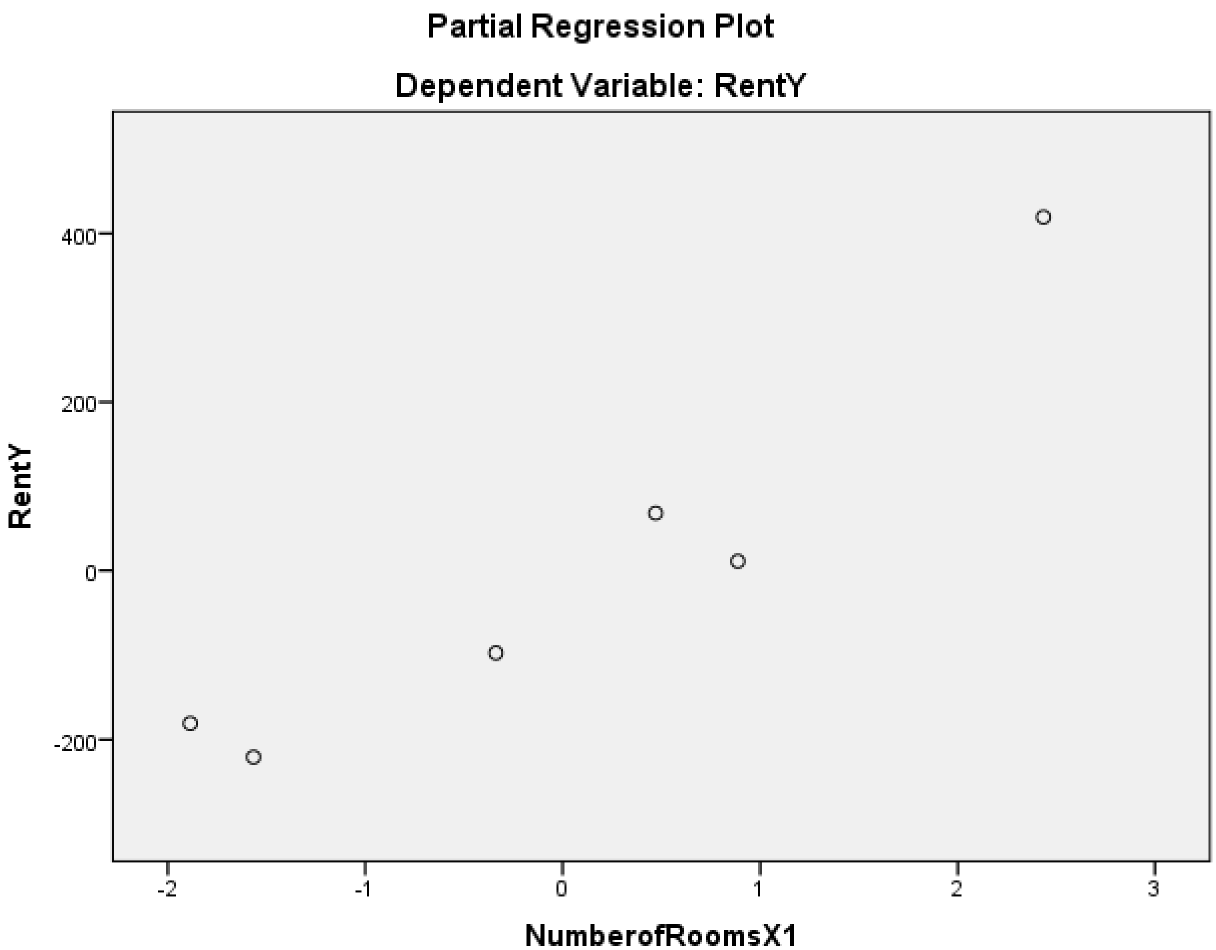
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	223.33	912.96	497.50	247.754	6
Residual	-110.186	87.037	.000	75.203	6
Std. Predicted Value	-1.107	1.677	.000	1.000	6
Std. Residual	-1.135	.896	.000	.775	6

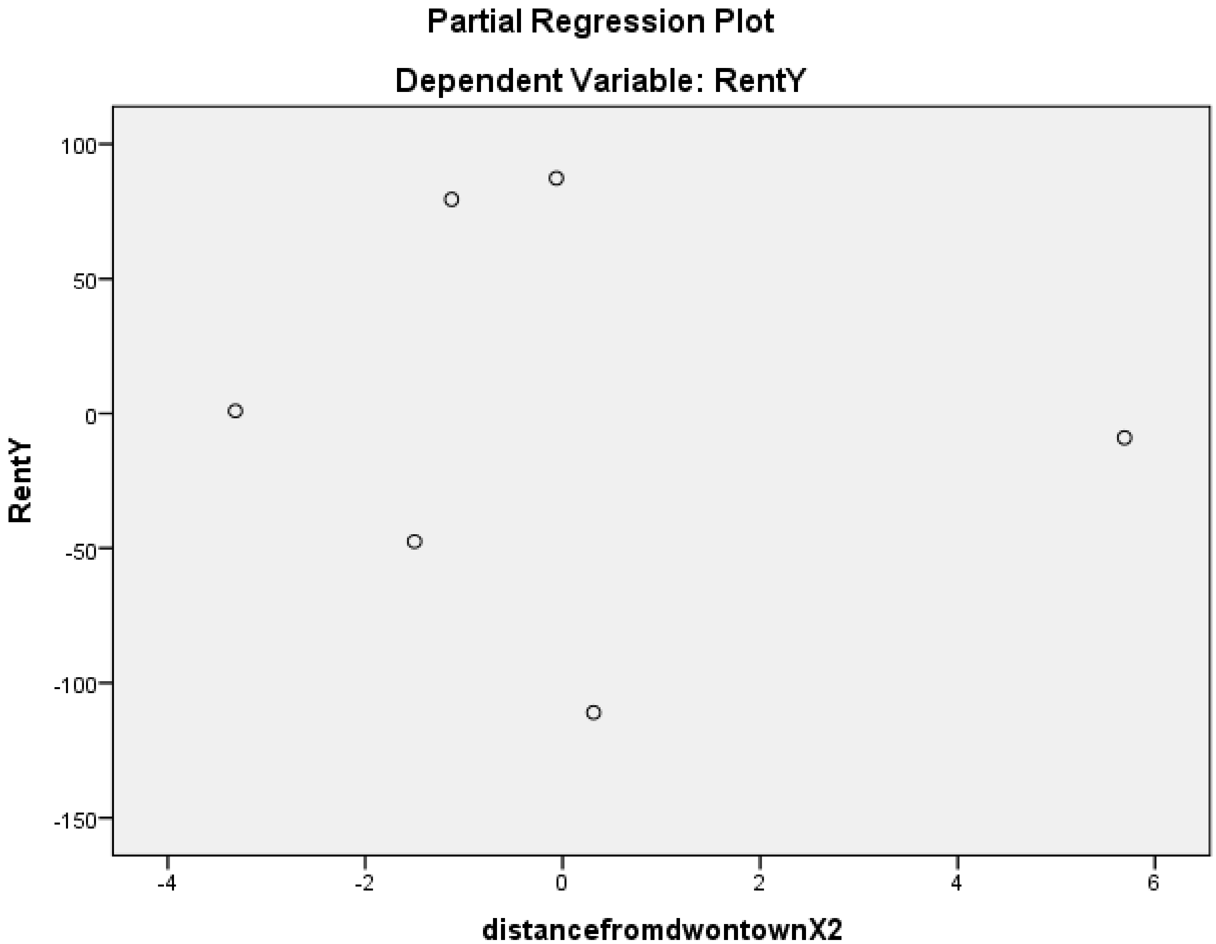
a. Dependent Variable: RentY

Charts



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: RentY
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Partial Regression Plot
Dependent Variable: RentY
400
200
0
-200
RentY
-2
-1
0
1
2
3
NumberofRoomsX1



Conclusion:

i. Y=96.458+136.484x1-2.403x2

ii. b1= 136.484 means on average rent is increased by 136.484 when room is increased by1 holding the effect of distance from down town constant

iii. b2= -2.403 means average rent is decreased by 2.403 when the distance from downtown is increased by 1 holding the effect of number of rooms constant.

iv. When x1=2 and x2=2,

v. Y=96.458 +136.484x1 -2.403x2

=96.458 +136.484 x 2 -2.403 x 2 = 364.62

Expected rent for two bedroom apartment 2 miles from downtown is 364.62 dollars.

UNIT-5

1. The yields of treatments in different plots are as shown below. Carry out analysis.

D 1401	C 2536	C 2459	A 2537	C 2827	A 2069
B 2211	A 1797	D 1170	D 1516	D 2104	C 2385
B 3366	A 2104	B 2591	C 2460	D 1077	B 2544

Solution:

Syntax:

```
ONEWAY Values BY Treatment
  /MISSING ANALYSIS
  /POSTHOC=LSD ALPHA(0.05).
```

OUTPUT:

Oneway

ANOVA

Values

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4269878.850	3	1423292.950	11.091	.001
Within Groups	1796521.150	14	128322.939		
Total	6066400.000	17			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Values

LSD

(I) Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A	B	-561.250*	253.301	.044	-1104.53	-17.97
	C	-416.650	240.303	.105	-932.05	98.75
	D	663.150*	240.303	.015	147.75	1178.55
B	A	561.250*	253.301	.044	17.97	1104.53
	C	144.600	240.303	.557	-370.80	660.00
	D	1224.400*	240.303	.000	709.00	1739.80
C	A	416.650	240.303	.105	-98.75	932.05
	B	-144.600	240.303	.557	-660.00	370.80
	D	1079.800*	226.559	.000	593.88	1565.72
D	A	-663.150*	240.303	.015	-1178.55	-147.75
	B	-1224.400*	240.303	.000	-1739.80	-709.00
	C	-1079.800*	226.559	.000	-1565.72	-593.88

*. The mean difference is significant at the 0.05 level.

Conclusion:

Here, according to the F_{cal} value,

$F_{cal} = 11.091$

From table, we have $F_{tab}=5.66$

Since $F_{cal} > F_{tab}$, there is significant difference between treatments.

Again,

From the significance table,

We get significance = 0.001 < 0.05, so there is significant difference is treatments so we perform post hoc test to determine the cause of difference.

2. The yields of treatments in different plots are as shown below. Carry out analysis.

D 140	C 253	C 245	A 253	C 282	A 206
B 221	A 179	D 117	D 151	D 210	C 238
B 336	A 210	B 259	C 246	D 107	B 254

Solution:

SYNTAX:

```
ONEWAY Values BY Treatment
  /MISSING ANALYSIS
  /POSTHOC=LSD ALPHA(0.05).
```

OUTPUT:

Oneway

ANOVA

Values

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	27128.500	3	9042.833	3.787	.035
Within Groups	33432.000	14	2388.000		
Total	60560.500	17			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Values

LSD

(I) Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A	B	-19.250	31.544	.551	-86.90	48.40
	C	7.000	31.544	.828	-60.65	74.65
	D	87.250*	31.544	.015	19.60	154.90
B	A	19.250	31.544	.551	-48.40	86.90
	C	26.250	34.554	.460	-47.86	100.36
	D	106.500*	34.554	.008	32.39	180.61
C	A	-7.000	31.544	.828	-74.65	60.65
	B	-26.250	34.554	.460	-100.36	47.86
	D	80.250*	34.554	.036	6.14	154.36
D	A	-87.250*	31.544	.015	-154.90	-19.60
	B	-106.500*	34.554	.008	-180.61	-32.39
	C	-80.250*	34.554	.036	-154.36	-6.14

*. The mean difference is significant at the 0.05 level.

Conclusion:

Here, according to the F_{cal} value,

$F_{cal} = 3.787$

From table, we have $F_{tab}=5.66$

Since $F_{cal} < F_{tab}$, there is no significant difference between treatments.

Again,

From the significance table,

We get significance = 0.035 < 0.05, so there is significant difference is treatments so we perform post hoc test to determine the cause of difference.

3. The following table gives the result of the experiment on four varieties of a crop in 5 blocks of plot.

Block I	Block II	Block III	Block IV	Block V
A 32	B 33	D 30	A 35	C 36
B 34	C 34	C 35	C 32	D 29
C 31	A 34	B 36	B 37	A 37
D 29	D 26	A 33	D 28	B 35

Analyze the above result to test whether there is significant difference between yields of four varieties.

Solution:

SYNTAX

```
UNIANOVA values BY block treatment
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /POSTHOC=block treatment(LSD)
  /CRITERIA=ALPHA(0.05)
  /DESIGN=block treatment.
```

OUTPUT:

Univariate Analysis of Variance

Tests of Between-Subjects Effects

Dependent Variable: values

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	155.700[a]	7	22.243	9.048	.001
Intercept	21516.800	1	21516.800	8752.597	.000
block	21.700	4	5.425	2.207	.130
treatment	134.000	3	44.667	18.169	.000
Error	29.500	12	2.458		
Total	21702.000	20			
Corrected Total	185.200	19			

a. R Squared = .841 (Adjusted R Squared = .748)

Post Hoc Test

Block

Multiple Comparisons

Dependent Variable: values

LSD

(I) block	(J) block	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
I	II	-.25	1.109	.825	-2.67	2.17
	III	-2.00	1.109	.096	-4.42	.42
	IV	-1.50	1.109	.201	-3.92	.92
	V	-2.75*	1.109	.029	-5.17	-.33
II	I	.25	1.109	.825	-2.17	2.67
	III	-1.75	1.109	.140	-4.17	.67
	IV	-1.25	1.109	.282	-3.67	1.17
	V	-2.50*	1.109	.044	-4.92	-.08
III	I	2.00	1.109	.096	-.42	4.42
	II	1.75	1.109	.140	-.67	4.17
	IV	.50	1.109	.660	-1.92	2.92
	V	-.75	1.109	.512	-3.17	1.67
IV	I	1.50	1.109	.201	-.92	3.92
	II	1.25	1.109	.282	-1.17	3.67
	III	-.50	1.109	.660	-2.92	1.92
	V	-1.25	1.109	.282	-3.67	1.17
V	I	2.75*	1.109	.029	.33	5.17

II	2.50*	1.109	.044	.08	4.92
III	.75	1.109	.512	-1.67	3.17
IV	1.25	1.109	.282	-1.17	3.67

Based on observed means.

The error term is Mean Square(Error) = 2.458.

*. The mean difference is significant at the 0.05 level.

Homogeneous Subsets

treatment

Multiple Comparisons

Dependent Variable: values

LSD

(I) treatment	(J) treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A	B	-.80	.992	.436	-2.96	1.36
	C	.60	.992	.556	-1.56	2.76
	D	5.80*	.992	.000	3.64	7.96
B	A	.80	.992	.436	-1.36	2.96
	C	1.40	.992	.183	-.76	3.56
	D	6.60*	.992	.000	4.44	8.76
C	A	-.60	.992	.556	-2.76	1.56
	B	-1.40	.992	.183	-3.56	.76

	D	5.20*	.992	.000	3.04	7.36
D	A	-5.80*	.992	.000	-7.96	-3.64
	B	-6.60*	.992	.000	-8.76	-4.44
	C	-5.20*	.992	.000	-7.36	-3.04

Based on observed means.

The error term is Mean Square(Error) = 2.458.

*. The mean difference is significant at the 0.05 level.

CONCLUSION:

Here, according to the F_{cal} value,

$F_B = 2.207$

$F_T = 18.169$

From table, we have $F_{Btab}=3.26$ and $F_{Ttab}=3.49$

Since $F_B < F_{Btab}$ and $F_T > F_{Ttab}$, there is no significant difference between block and there is significant difference between treatments.

Again,

From the significance table,

We get block significance = 0.130 > 0.05, so there is no significant difference between blocks and treatment significance =0.000 <0.05, so there is significant difference is treatments so we perform post hoc test to determine the cause of difference.

4. The following table gives the result of the experiment on four varieties of a crop in 5 blocks of plot.

Block I	Block II	Block III	Block IV	Block V
A 22	B 23	D 20	A 25	C 26
B 24	C 24	C 25	C 22	D 19
C 21	A 24	B 26	B 27	A 27
D 19	D 16	A 23	D 18	B 25

Analyze the above result to test whether there is significant difference between yields of four varieties.

Solution:

SYNTAX

```
UNIANOVA values BY block treatment
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /POSTHOC=block treatment(LSD)
  /CRITERIA=ALPHA(0.05)
  /DESIGN=block treatment.
```

OUTPUT:

Univariate Analysis of Variance

Tests of Between-Subjects Effects

Dependent Variable: values

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	154.250[a]	7	22.036	8.964	.001
Intercept	10351.250	1	10351.250	4210.678	.000
Block	24.500	4	6.125	2.492	.099
Treatment	129.750	3	43.250	17.593	.000
Error	29.500	12	2.458		
Total	10535.000	20			
Corrected Total	183.750	19			

a. R Squared = .839 (Adjusted R Squared = .746)

Post Hoc Tests

block

Multiple Comparisons

Dependent Variable: values

LSD

(I) block	(J) block	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
I	II	-.50	1.109	.660	-2.92	1.92
	III	-2.25	1.109	.065	-4.67	.17

	IV	-1.75	1.109	.140	-4.17	.67
	V	-3.00*	1.109	.019	-5.42	-.58
II	I	.50	1.109	.660	-1.92	2.92
	III	-1.75	1.109	.140	-4.17	.67
	IV	-1.25	1.109	.282	-3.67	1.17
	V	-2.50*	1.109	.044	-4.92	-.08
III	I	2.25	1.109	.065	-.17	4.67
	II	1.75	1.109	.140	-.67	4.17
	IV	.50	1.109	.660	-1.92	2.92
	V	-.75	1.109	.512	-3.17	1.67
IV	I	1.75	1.109	.140	-.67	4.17
	II	1.25	1.109	.282	-1.17	3.67
	III	-.50	1.109	.660	-2.92	1.92
	V	-1.25	1.109	.282	-3.67	1.17
V	I	3.00*	1.109	.019	.58	5.42
	II	2.50*	1.109	.044	.08	4.92
	III	.75	1.109	.512	-1.67	3.17
	IV	1.25	1.109	.282	-1.17	3.67

Based on observed means.

The error term is Mean Square(Error) = 2.458.

*. The mean difference is significant at the 0.05 level.

Homogeneous Subsets

treatment

Multiple Comparisons

Dependent Variable: values

LSD

(I) treatment	(J) treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
	B	-.60	.992	.556	-2.76	1.56
A	C	.60	.992	.556	-1.56	2.76
	D	5.80*	.992	.000	3.64	7.96
	A	.60	.992	.556	-1.56	2.76
B	C	1.20	.992	.250	-.96	3.36
	D	6.40*	.992	.000	4.24	8.56
	A	-.60	.992	.556	-2.76	1.56
C	B	-1.20	.992	.250	-3.36	.96
	D	5.20*	.992	.000	3.04	7.36

	A	-5.80*	.992	.000	-7.96	-3.64
D	B	-6.40*	.992	.000	-8.56	-4.24
	C	-5.20*	.992	.000	-7.36	-3.04

Based on observed means.

The error term is Mean Square(Error) = 2.458.

*. The mean difference is significant at the 0.05 level.

CONCLUSION:

Here, according to the F_{cal} value,

$F_B = 2.492$

$F_T = 17.593$

From table, we have $F_{Btab}=3.26$ and $F_{Ttab}=3.49$

Since $F_B < F_{Btab}$ and $F_T > F_{Ttab}$, there is no significant difference between block and there is significant difference between treatments.

Again,

From the significance table,

We get block significance = 0.099 > 0.05, so there is no significant difference between blocks and treatment significance =0.000 <0.05, so there is significant difference is treatments so we perform post hoc test to determine the cause of difference.

5. The following is the 5x5 Latin square design for data taken from a manorial experiment with sugarcane. The five treatments were A = no manure; B = an inorganic manure; C, D and E = three levels of farm yard manure. Plan and yield of sugarcane (in a suitable unit) per plot.

Row	Column				
	I	II	III	IV	V
I	A 52.5	E 46.3	D 44.1	C 48.1	B 40.9
II	D 44.2	B 42.9	A 51.3	E 49.3	C 32.6
III	B 49.1	A 47.3	C 38.1	D 41.0	E 47.2
IV	C 43.2	D 42.5	E 67.2	B 55.1	A 45.3
V	E 47.0	C 43.2	B 46.7	A 46.0	D 43.2

Analyze the above data to find if there are any treatment effects.

SOLUTION:

SYNTAX

```
UNIANOVA Value BY Row Column Treatment
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /POSTHOC=Row Column Treatment(LSD)
  /CRITERIA=ALPHA(0.05)
  /DESIGN=Row Column Treatment.
```

OUTPUT:

Univariate Analysis of Variance

Tests of Between-Subjects Effects

Dependent Variable: Value

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	673.075[a]	12	56.090	2.213	.092
Intercept	53296.340	1	53296.340	2103.144	.000
Row	141.078	4	35.270	1.392	.295
Column	183.758	4	45.940	1.813	.191
Treatment	348.238	4	87.060	3.435	.043
Error	304.095	12	25.341		
Total	54273.510	25			
Corrected Total	977.170	24			

a. R Squared = .689 (Adjusted R Squared = .378)

Post Hoc Tests

Row

Multiple Comparisons

Dependent Variable: Value

LSD

(I) Row	(J) Row	Mean	Std. Error	Sig.	95% Confidence Interval

		Difference (I-J)			Lower Bound	Upper Bound
I	II	2.320	3.1838	.480	-4.617	9.257
	III	1.840	3.1838	.574	-5.097	8.777
	IV	-4.280	3.1838	.204	-11.217	2.657
	V	1.160	3.1838	.722	-5.777	8.097
II	I	-2.320	3.1838	.480	-9.257	4.617
	III	-.480	3.1838	.883	-7.417	6.457
	IV	-6.600	3.1838	.060	-13.537	.337
	V	-1.160	3.1838	.722	-8.097	5.777
III	I	-1.840	3.1838	.574	-8.777	5.097
	II	.480	3.1838	.883	-6.457	7.417
	IV	-6.120	3.1838	.079	-13.057	.817
	V	-.680	3.1838	.834	-7.617	6.257
IV	I	4.280	3.1838	.204	-2.657	11.217
	II	6.600	3.1838	.060	-.337	13.537
	III	6.120	3.1838	.079	-.817	13.057
	V	5.440	3.1838	.113	-1.497	12.377
V	I	-1.160	3.1838	.722	-8.097	5.777
	II	1.160	3.1838	.722	-5.777	8.097
	III	.680	3.1838	.834	-6.257	7.617
	IV	-5.440	3.1838	.113	-12.377	1.497

Based on observed means.

The error term is Mean Square(Error) = 25.341.

Homogeneous Subsets

Column

Multiple Comparisons

Dependent Variable: Value

LSD

(I) Column	(J) Column	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
I	II	2.760	3.1838	.403	-4.177	9.697
	III	-2.280	3.1838	.488	-9.217	4.657
	IV	-.700	3.1838	.830	-7.637	6.237
	V	5.360	3.1838	.118	-1.577	12.297
II	I	-2.760	3.1838	.403	-9.697	4.177
	III	-5.040	3.1838	.139	-11.977	1.897
	IV	-3.460	3.1838	.298	-10.397	3.477
	V	2.600	3.1838	.430	-4.337	9.537
III	I	2.280	3.1838	.488	-4.657	9.217
	II	5.040	3.1838	.139	-1.897	11.977
	IV	1.580	3.1838	.629	-5.357	8.517
	V	7.640*	3.1838	.034	.703	14.577

IV	I	.700	3.1838	.830	-6.237	7.637
	II	3.460	3.1838	.298	-3.477	10.397
	III	-1.580	3.1838	.629	-8.517	5.357
	V	6.060	3.1838	.081	-.877	12.997
V	I	-5.360	3.1838	.118	-12.297	1.577
	II	-2.600	3.1838	.430	-9.537	4.337
	III	-7.640*	3.1838	.034	-14.577	-.703
	IV	-6.060	3.1838	.081	-12.997	.877

Based on observed means.

The error term is Mean Square(Error) = 25.341.

*. The mean difference is significant at the 0.05 level.

Homogeneous Subset

Treatment

Multiple Comparisons

Dependent Variable: Value

LSD

(I) Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A	B	1.540	3.1838	.637	-5.397	8.477
	C	7.440*	3.1838	.038	.503	14.377
	D	5.480	3.1838	.111	-1.457	12.417

	E	-2.920	3.1838	.377	-9.857	4.017
B	A	-1.540	3.1838	.637	-8.477	5.397
	C	5.900	3.1838	.089	-1.037	12.837
	D	3.940	3.1838	.240	-2.997	10.877
	E	-4.460	3.1838	.187	-11.397	2.477
C	A	-7.440*	3.1838	.038	-14.377	-.503
	B	-5.900	3.1838	.089	-12.837	1.037
	D	-1.960	3.1838	.550	-8.897	4.977
	E	-10.360*	3.1838	.007	-17.297	-3.423
D	A	-5.480	3.1838	.111	-12.417	1.457
	B	-3.940	3.1838	.240	-10.877	2.997
	C	1.960	3.1838	.550	-4.977	8.897
	E	-8.400*	3.1838	.022	-15.337	-1.463
E	A	2.920	3.1838	.377	-4.017	9.857
	B	4.460	3.1838	.187	-2.477	11.397
	C	10.360*	3.1838	.007	3.423	17.297
	D	8.400*	3.1838	.022	1.463	15.337

Based on observed means.

The error term is Mean Square(Error) = 25.341.

*. The mean difference is significant at the 0.05 level.

CONCLUSION:

Here, according to the F_{cal} value,

$F_R = 1.392$

$F_C = 1.813$

$F_T = 3.435$

From table, we have $F_{Rtab}=4.76$, $F_{Ctab}=4.76$ and $F_{Ttab}=4.76$

Since $F_R < F_{Rtab}$, $F_C < F_{Ctab}$ and $F_T < F_{Ttab}$, there is no significant difference between block and there is significant difference between treatments.

Again,

From the significance table,

We get row significance = 0.295 > 0.05 and column significance = 0.191>0.05, so there is no significant difference between row and columns and treatment significance =0.043 <0.05, so there is significant difference is treatments so we perform post hoc test to determine the cause of difference.

6. The following is the 5x5 Latin square design for data taken from a manorial experiment with sugarcane. The five treatments were A = no manure; B = an inorganic manure; C, D and E = three levels of farm yard manure. Plan and yield of sugarcane (in a suitable unit) per plot.

Row	Column				
	I	II	III	IV	V
I	A 2.5	E 6.3	D 4.1	C 8.1	B 0.9
II	D 4.2	B 2.9	A 1.3	E 9.3	C 2.6
III	B 9.1	A 7.3	C 8.1	D 1.0	E 7.2
IV	C 3.2	D 2.5	E 7.2	B 5.1	A 5.3
V	E 7.0	C 3.2	B 6.7	A 6.0	D 3.2

Analyze the above data to find if there are any treatment effects.

SOLUTION:

SYNTAX

```
UNIANOVA Value BY Row Column Treatment
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /POSTHOC=Row Column Treatment(LSD)
  /CRITERIA=ALPHA(0.05)
  /DESIGN=Row Column Treatment.
```

OUTPUT:

Univariate Analysis of Variance

Tests of Between-Subjects Effects

Dependent Variable: Value

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	81.880[a]	12	6.823	1.073	.452
Intercept	615.040	1	615.040	96.755	.000
Row	19.432	4	4.858	.764	.568
Column	13.268	4	3.317	.522	.722
Treatment	49.180	4	12.295	1.934	.169
Error	76.280	12	6.357		

Total	773.200	25				
Corrected Total	158.160	24				

a. R Squared = .518 (Adjusted R Squared = .035)

Post Hoc Tests

Row

Multiple Comparisons

Dependent Variable: Value

LSD

(I) Row	(J) Row	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
I	II	.360	1.5946	.825	-3.114	3.834
	III	-2.160	1.5946	.201	-5.634	1.314
	IV	-.260	1.5946	.873	-3.734	3.214
	V	-.840	1.5946	.608	-4.314	2.634
II	I	-.360	1.5946	.825	-3.834	3.114
	III	-2.520	1.5946	.140	-5.994	.954
	IV	-.620	1.5946	.704	-4.094	2.854
	V	-1.200	1.5946	.466	-4.674	2.274
III	I	2.160	1.5946	.201	-1.314	5.634
	II	2.520	1.5946	.140	-.954	5.994
	IV	1.900	1.5946	.256	-1.574	5.374
	V	1.320	1.5946	.424	-2.154	4.794

IV	I	.260	1.5946	.873	-3.214	3.734
	II	.620	1.5946	.704	-2.854	4.094
	III	-1.900	1.5946	.256	-5.374	1.574
	V	-.580	1.5946	.722	-4.054	2.894
V	I	.840	1.5946	.608	-2.634	4.314
	II	1.200	1.5946	.466	-2.274	4.674
	III	-1.320	1.5946	.424	-4.794	2.154
	IV	.580	1.5946	.722	-2.894	4.054

Based on observed means.

The error term is Mean Square(Error) = 6.357.

Homogeneous Subsets

Column

Multiple Comparisons

Dependent Variable: Value

LSD

(I) Column	(J) Column	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
I	II	.740	1.5946	.651	-2.734	4.214
	III	-.300	1.5946	.854	-3.774	3.174
	IV	-.680	1.5946	.677	-4.154	2.794
	V	1.340	1.5946	.417	-2.134	4.814

II	I	-.740	1.5946	.651	-4.214	2.734
	III	-1.040	1.5946	.527	-4.514	2.434
	IV	-1.420	1.5946	.391	-4.894	2.054
	V	.600	1.5946	.713	-2.874	4.074
III	I	.300	1.5946	.854	-3.174	3.774
	II	1.040	1.5946	.527	-2.434	4.514
	IV	-.380	1.5946	.816	-3.854	3.094
	V	1.640	1.5946	.324	-1.834	5.114
IV	I	.680	1.5946	.677	-2.794	4.154
	II	1.420	1.5946	.391	-2.054	4.894
	III	.380	1.5946	.816	-3.094	3.854
	V	2.020	1.5946	.229	-1.454	5.494
V	I	-1.340	1.5946	.417	-4.814	2.134
	II	-.600	1.5946	.713	-4.074	2.874
	III	-1.640	1.5946	.324	-5.114	1.834
	IV	-2.020	1.5946	.229	-5.494	1.454

Based on observed means.

The error term is Mean Square(Error) = 6.357.

Homogeneous Subsets

Treatment

Multiple Comparisons

Dependent Variable: Value

LSD

(I) Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A	B	-.460	1.5946	.778	-3.934	3.014
	C	-.540	1.5946	.741	-4.014	2.934
	D	1.480	1.5946	.372	-1.994	4.954
	E	-2.880	1.5946	.096	-6.354	.594
B	A	.460	1.5946	.778	-3.014	3.934
	C	-.080	1.5946	.961	-3.554	3.394
	D	1.940	1.5946	.247	-1.534	5.414
	E	-2.420	1.5946	.155	-5.894	1.054
C	A	.540	1.5946	.741	-2.934	4.014
	B	.080	1.5946	.961	-3.394	3.554
	D	2.020	1.5946	.229	-1.454	5.494
	E	-2.340	1.5946	.168	-5.814	1.134
D	A	-1.480	1.5946	.372	-4.954	1.994
	B	-1.940	1.5946	.247	-5.414	1.534
	C	-2.020	1.5946	.229	-5.494	1.454
	E	-4.360*	1.5946	.018	-7.834	-.886
E	A	2.880	1.5946	.096	-.594	6.354
	B	2.420	1.5946	.155	-1.054	5.894
	C	2.340	1.5946	.168	-1.134	5.814
	D	4.360*	1.5946	.018	.886	7.834

Based on observed means.

The error term is Mean Square(Error) = 6.357.

*. The mean difference is significant at the 0.05 level.

CONCLUSION:

Here, according to the F_{cal} value,

$F_R = 0.764$

$F_C = 0.522$

$F_T = 1.934$

From table, we have $F_{Rtab}=4.76$, $F_{Ctab}=4.76$ and $F_{Ttab}=4.76$

Since $F_R < F_{Rtab}$, $F_C < F_{Ctab}$ and $F_T < F_{Ttab}$, there is no significant difference between block and there is significant difference between treatments.

Again,

From the significance table,

We get row significance = 0.568 > 0.05, column significance = 0.722>0.05 and treatment significance =0.169>0.05, so there is no significant difference between row, columns and treatments.