**Name:** Saugat Bikram Thapa

**Roll Number**: 80117731

Subject: Statistics II, (Bsc. CSIT III Sem)

Lab QN 12

**Working Expression:**

FT=

MST=

MSE=

**Working Procedure:**

Define treatments and values in variable view → label treatments as treatments A,B,C,D→ Insert data in data view → Analyze → compare means → one way ANOVA → Put value in dependent list → Put treatment in factor→ post HOC→ LSD →continue → OK

**SPSS OUTPUT**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ANOVA** | | | | | |
| values | | | | | |
|  | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 4265689.961 | 3 | 1421896.654 | 11.253 | .001 |
| Within Groups | 1768941.150 | 14 | 126352.939 |  |  |
| Total | 6034631.111 | 17 |  |  |  |

**Testing procedure:**

**Setting up Hypothesis:**

H0: There is no significance difference between treatments

H1: There is significance difference between treatments

**Level of significance:**

α = 0.05

**Decision:**

For treatment, p = 0.001< α = 0.05, Hence we accept H1 and H0 is rejected

**Conclusion:**

Hence, we conclude that there is significant difference between treatments.

**Name:** Saugat Bikram Thapa

**Roll Number**: 80117731

Subject: Statistics II, (Bsc. CSIT III Sem)

Lab QN 13

**Working Expression:**

FT=

MST=

MSE=

**Working Procedure:**

Define treatments and values in variable view → label treatments as treatments A,B,C,D→ Insert data in data view → Analyze → compare means → one way ANOVA → Put value in dependent list → Put treatment in factor→ post HOC→ LSD →continue → OK

**SPSS OUTPUT**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ANOVA** | | | | | |
| values | | | | | |
|  | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 95.467 | 3 | 31.822 | .251 | .858 |
| Within Groups | 1013.200 | 8 | 126.650 |  |  |
| Total | 1108.667 | 11 |  |  |  |

**Testing procedure:**

**Setting up Hypothesis:**

H0: There is no significance difference between treatments

H1: There is significance difference between treatments

**Level of significance:**

α = 0.05

**Decision:**

For treatment, p = 0.858>α = 0.05, Hence we accept H0 and H1 is rejected

**Conclusion:**

Hence, we conclude that there is no significant difference between treatments.

**Name:** Saugat Bikram Thapa

**Roll Number**: 80117731

Subject: Statistics II, (Bsc. CSIT III Sem)

Lab QN 14

**Working Expression:**

*FT=*

*FB*

*MST=*

*MSE=*

**Working procedure:**

Define Blocks, treatments and values in variable view → Assign type as numeric for blocks, string for treatments and numeric for values → Assign width 8, 8, 8 for block, treatment and values→ Assign measure scale for blocks, nominal for treatments and scale for values → Insert data in data view → Analyze → General linear model → Univariate → Put values in the dependent variable →Put block and treatment in fixed factors → Click model → Go to custom → Block and treatment in factor and covariates send to model → Type main effects → Sum of

square type III → continue → click post Hoc → Send block and treatments in factors in Post Hoc tests for → click LSD → continue → ok

**SPSS Output:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tests of Between-Subjects Effects** | | | | | |
| Dependent Variable: values | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 155.700a | 7 | 22.243 | 9.048 | .001 |
| Intercept | 21516.800 | 1 | 21516.800 | 8752.597 | .000 |
| blocks | 21.700 | 4 | 5.425 | 2.207 | .130 |
| treatments | 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) | | | | | |

**Testing procedure**

**Setting up hypothesis:**

H0: There is no significance difference between treatments and blocks

H1: There is significance difference between treatments and blocks

**Level of significance:**

α=0.05

**Decision:**

For treatment, p = 0.000 < α = 0.05, Hence we accept H1 and H0 is rejected

For block, p = 0.130 > α = 0.05, Hence we accept H0 and H1 is rejected

**Conclusion:**

Hence, we conclude that there is significant difference between treatments but there is no significant difference in blocks.

**Name:** Saugat Bikram Thapa

**Roll Number**: 80117731

Subject: Statistics II, (Bsc. CSIT III Sem)

Lab QN 15

**Working Expression:**

*FT=*

*FB*

*MST=*

*MSE=*

**Working procedure:**

Define Blocks, treatments and values in variable view → Assign type as numeric for blocks, string for treatments and numeric for values → Assign width 8, 8, 8 for block, treatment and values→ Assign measure scale for blocks, nominal for treatments and scale for values → Insert data in data view → Analyze → General linear model → Univariate → Put values in the dependent variable →Put block and treatment in fixed factors → Click model → Go to custom → Block and treatment in factor and covariates send to model → Type main effects → Sum of

square type III → continue → click post Hoc → Send block and treatments in factors in Post Hoc tests for → click LSD → continue → ok

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SPSS Output:**  **Tests of Between-Subjects Effects** | | | | | |
| Dependent Variable: values | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 22.750a | 5 | 4.550 | 1.071 | .459 |
| Intercept | 816.750 | 1 | 816.750 | 192.176 | .000 |
| treatments | 6.500 | 2 | 3.250 | .765 | .506 |
| blocks | 16.250 | 3 | 5.417 | 1.275 | .365 |
| Error | 25.500 | 6 | 4.250 |  |  |
| Total | 865.000 | 12 |  |  |  |
| Corrected Total | 48.250 | 11 |  |  |  |
| a. R Squared = .472 (Adjusted R Squared = .031) | | | | | |

**Testing procedure**

**Setting up hypothesis:**

H0: There is no significance difference between treatments and blocks

H1: There is significance difference between treatments and blocks

**Level of significance:**

α=0.05

**Decision:**

For treatment, p = 0.506 >α = 0.05, Hence we accept H0 and H1 is rejected

For block, p = 0.365> α = 0.05, Hence we accept H0 and H1 is rejected

**Conclusion:**

Hence, we conclude that there is significant difference between treatments and blocks.

**Name:** Saugat Bikram Thapa

**Roll Number**: 80117731

Subject: Statistics II, (Bsc. CSIT III Sem)

Lab QN 16

**Working Expression:**

*FR*

*FC*

*FT=*

*MSR=*

*MSC=*

*MST=*

*MSE=*

**Working procedure:**

Define variable in Name (Row, Column, Treatment, Value) → Make Treatment to string and other Numeric→ Give decimal 1 for Values other 0→Make Label same as Name →Make it all align to center →Measure for all scale except put treatment in Nominal → Analyze → General linear model → Univariate → Put values in the dependent variable → Put row, column and treatment in fixed factors → Click model → Go to custom → row, column and treatment in factor and covariates send to model → Type main effects → Sum of square type III → continue → click post Hoc → Send row, column and treatment in factors in Post Hoc tests for → click LSD → continue → ok

**SPSS Output:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tests of Between-Subjects Effects** | | | | | |
| Dependent Variable: values | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 675.141a | 12 | 56.262 | 2.228 | .090 |
| Intercept | 53305.574 | 1 | 53305.574 | 2111.078 | .000 |
| treatments | 351.366 | 4 | 87.841 | 3.479 | .042 |
| column | 183.966 | 4 | 45.991 | 1.821 | .190 |
| rows | 139.810 | 4 | 34.952 | 1.384 | .297 |
| Error | 303.005 | 12 | 25.250 |  |  |
| Total | 54283.720 | 25 |  |  |  |
| Corrected Total | 978.146 | 24 |  |  |  |
| **a. R Squared = .690 (Adjusted R Squared = .380)** | | | | | |

**Testing procedure:**

**Setting up Hypothesis**

H0: There is no significance difference between rows, columns and

treatments

H1: There is significance difference between rows, columns and treatments

**Level of significance**

α=0.05

**Decision**

For row, p = 0.297> α = 0.05, hence we accept H0 and H1 is rejected

For column, p = 0.190 > α = 0.05, hence we accept H0 and H1 is rejected

For treatment, p = 0.042 < α = 0.05, hence we accept H1 and H0 is rejected

**Conclusion:**

Hence, we conclude that there is no significant difference between rows and columns but there is significant difference between treatments.

**Name:** Saugat Bikram Thapa

**Roll Number**: 80117731

Subject: Statistics II, (Bsc. CSIT III Sem)

Lab QN 17

**Working Expression:**

*FR*

*FC*

*FT=*

*MSR=*

*MSC=*

*MST=*

*MSE=*

**Working procedure:**

Define variable in Name (Row, Column, Treatment, Value) → Make Treatment to string and other Numeric→ Give decimal 1 for Values other 0→Make Label same as Name →Make it all align to center →Measure for all scale except put treatment in Nominal → Analyze → General linear model → Univariate → Put values in the dependent variable → Put row, column and treatment in fixed factors → Click model → Go to custom → row, column and treatment in factor and covariates send to model → Type main effects → Sum of square type III → continue → click post Hoc → Send row, column and treatment in factors in Post Hoc tests for → click LSD → continue → ok

**SPSS Output:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tests of Between-Subjects Effects** | | | | | |
| Dependent Variable: values | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 16.062a | 9 | 1.785 | .675 | .714 |
| Intercept | 5513.063 | 1 | 5513.063 | 2083.677 | .000 |
| rows | 1.187 | 3 | .396 | .150 | .926 |
| treatments | 5.187 | 3 | 1.729 | .654 | .609 |
| column | 9.687 | 3 | 3.229 | 1.220 | .381 |
| Error | 15.875 | 6 | 2.646 |  |  |
| Total | 5545.000 | 16 |  |  |  |
| Corrected Total | 31.937 | 15 |  |  |  |
| a. R Squared = .503 (Adjusted R Squared = -.243) | | | | | |

**Testing procedure:**

**Setting up Hypothesis**

H0: There is no significance difference between rows, columns and

treatments

H1: There is significance difference between rows, columns and treatments

**Level of significance**

α=0.05

**Decision**

For row, p = 0.926> α = 0.05, hence we accept H0 and H1 is rejected

For column, p = 0.381 > α = 0.05, hence we accept H0 and H1 is rejected

For treatment, p = 0.609 >α = 0.05, hence we accept H0 and H1 is rejected

**Conclusion:**

Hence, we conclude that there is no significant difference between rows, columns and treatments.