**Lab no. 17**

1. **The Following table represents the layout of CRD of four treatments.**

|  |  |  |  |
| --- | --- | --- | --- |
| **A (9)** | **B (14)** | **D (11)** | **C (10)** |
| **D (8)** | **A (14)** | **B (13)** | **C (16)** |
| **B (7)** | **C (12)** | **D (5)** | **A (11)** |
| **A (14)** | **B (12)** | **C (6)** | **D (5)** |

**At 5% level of significance test whether there is significant difference between mean of 4 treatments.**

**Solution:**

**Hypothesis:**

**H0: There is no significant difference between treatment.**

**H1: There is significant difference between treatment.**

**Alpha = 5%**

**Test statistics:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Anova: Single Factor** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | **SUMMARY** |  |  |  |  |  |  |  |
|  | ***Groups*** | ***Count*** | ***Sum*** | ***Average*** | ***Variance*** |  |  |  |
|  | **A** | **4** | **48** | **12** | **6** |  |  |  |
|  | **B** | **4** | **46** | **11.5** | **9.666667** |  |  |  |
|  | **C** | **4** | **44** | **11** | **17.33333** |  |  |  |
|  | **D** | **4** | **39** | **9.75** | **18.25** |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | **ANOVA** |  |  |  |  |  |  |  |
|  | ***Source of Variation*** | ***SS*** | ***df*** | ***MS*** | ***F*** | ***P-value*** | ***F crit*** |  |
|  | **Between Groups(treatment)** | **11.1875** | **3** | **3.729167** | **0.291057** | **0.831069** | **3.490295** |  |
|  | **ERROR** | **153.75** | **12** | **12.8125** |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | **Total** | **164.9375** | **15** |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | **Decision,** |  |  |  |  |  |  |  |

**Since Fcal<Ftab so we accept H0.**

**Hence we conclude that there is no significance difference between mean of 4 treatments.**

**Lab no 18:**

1. **There are three brands of computers namely dell, Lenovo, and HP. The following are the lifetime of 15 computers in years.**

|  |  |  |
| --- | --- | --- |
| **Serial Number** | **Computer Brand** | **Lifetime in Years** |
| **1** | **Dell** | **15** |
| **2** | **Lenovo** | **10** |
| **3** | **HP** | **9** |
| **4** | **Dell** | **12** |
| **5** | **Lenovo** | **6** |
| **6** | **HP** | **7** |
| **7** | **Dell** | **4** |
| **8** | **Lenovo** | **8** |
| **9** | **HP** | **13** |
| **10** | **Dell** | **11** |
| **11** | **HP** | **5** |
| **12** | **Lenovo** | **7** |
| **13** | **Dell** | **3** |
| **14** | **HP** | **5** |
| **15** | **Lenovo** | **4** |

**Apply appropriate statistical tests to identify whether the average lifetime (in years) is significantly different across three brands of computers at a 5% level of significance. You can again tabulate the data initially in the required format for statistical analysis.**

**Hypothesis:**

**H0: There is no significance difference among average lifetime of three brands of computers.**

**H1: There is significance difference among average lifetime of three brands of computers.**

**Alpha = 5%**

**Test statistics:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Anova: Single Factor** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **SUMMARY** |  |  |  |  |  |  |
|  | ***Groups*** | ***Count*** | ***Sum*** | ***Average*** | ***Variance*** |  |  |
|  | **Row 1** | **5** | **45** | **9** | **27.5** |  |  |
|  | **Row 2** | **5** | **35** | **7** | **5** |  |  |
|  | **Row 3** | **5** | **39** | **7.8** | **11.2** |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **ANOVA** |  |  |  |  |  |  |
|  | ***Source of Variation*** | ***SS*** | ***df*** | ***MS*** | ***F*** | ***P-value*** | ***F crit*** |
|  | **Between Groups** | **10.13333333** | **2** | **5.066666667** | **0.347826087** | **0.713111407** | **3.885294** |
|  | **ERROR** | **174.8** | **12** | **14.56666667** |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **Total** | **184.9333333** | **14** |  |  |  |  |

**Decision,**

**Fcal<ftab, so we accept H0,**

**Hence we conclude that There is no significance difference among average lifetime of three brands of computers.**