## PRACTICAL SIX: ANALYSIS TOOLPAK OF MICROSOFT EXCEL (V)

1. Generate two-way ANOVA problem (with and without replications) and corresponding data enervate a one-way problem and corresponding data.
2. Set the hypothesis for the problem
3. Give a step by step procedure for running the analysis with Analysis Toolpak of Microsoft Excel
4. Give the Microsoft Excel data structure for the analysis
5. Run the Analysis and give the ANOVA table
6. Give the decision rule and conclusion based on the result in (e) above

SOLUTION

Two schools were represented by 12 students each in an inter-school competition test on two subjects. The following are the results of each participant representing each school.

|  |  |  |
| --- | --- | --- |
| Group | Mathematics | English |
| School A | 90 | 54 |
|  | 45 | 66 |
|  | 77 | 86 |
|  | 54 | 89 |
|  | 23 | 12 |
|  | 98 | 43 |
|  | 36 | 34 |
|  | 86 | 65 |
|  | 12 | 23 |
|  | 22 | 65 |
|  | 19 | 99 |
|  | 33 | 45 |
| School B | 56 | 34 |
|  | 9 | 72 |
|  | 90 | 81 |
|  | 56 | 34 |
|  | 88 | 28 |
|  | 76 | 29 |
|  | 56 | 32 |
|  | 65 | 40 |
|  | 23 | 61 |
|  | 77 | 45 |
|  | 12 | 73 |
|  | 55 | 73 |
|  |  |  |

Null Hypothesis, Ho**: School A performed better than School B**.

Alternative hypothesis, Hi**: School A performed less than School B**.

TWO-WAY ANALYSIS WITH REPLICATION

After inputting your data in the excel analysis toolpak, then you follow the following procedures:

* From the menus, select

Data > Data Analysis > Anova: Two-Factor with Replication

* Click OK
* Then it brings you a dialog box where you input the range of data you are to work with (input the headings too). Then you input the row per sample to be 2 since we are working with just 2 rows. You leave the Alpha to be 0.05.
* Then click on the output range to select sheet2 and click on A1 where you want the analysis to be displayed.
* Click OK.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ANOVA |  |  |  |  |  |  |
| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
| Sample | 6244.563 | 11 | 567.6875 | 0.906517 | 0.548652 | 2.216309 |
| Columns | 13.02083 | 1 | 13.02083 | 0.020792 | 0.88655 | 4.259677 |
| Interaction | 10285.73 | 11 | 935.0663 | 1.493169 | 0.198195 | 2.216309 |
| Within | 15029.5 | 24 | 626.2292 |  |  |  |
|  |  |  |  |  |  |  |
| Total | 31572.81 | 47 |  |  |  |  |

Since, F-value (*F*) is lesser than F critical value and p-value is larger than your chosen alpha level. We accept the Null Hypothesis, Ho that says “**School A performed better than School B**”.

TWO-WAY ANALYSIS WITHOUT REPLICATION

After inputting your data in the excel analysis toolpak, then you follow the following procedures:

* From the menus, select

Data > Data Analysis > Anova: Two-Factor without Replication

* Click OK
* Then it brings you a dialog box where you input the range of data you are to work with (input the headings too). Then you select labels. You leave the Alpha to be 0.05.
* Then click on the output range to select sheet3 and click on A1 where you want the analysis to be displayed.
* Click OK.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ANOVA |  |  |  |  |  |  |
| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
| Rows | 14728.31 | 23 | 640.3614 | 0.875046 | 0.624187 | 2.014425 |
| Columns | 13.02083 | 1 | 13.02083 | 0.017793 | 0.895045 | 4.279344 |
| Error | 16831.48 | 23 | 731.8034 |  |  |  |
|  |  |  |  |  |  |  |
| Total | 31572.81 | 47 |  |  |  |  |

Since, F-value (*F*) is lesser than F critical value and p-value is larger than your chosen alpha level. We accept the Null Hypothesis, Ho that says“**School A performed better than School B**”.