1.

Steps to Follow (don't copy these)

- Create three variables naming block, treatment and value
- In block and treatment create the values
- After inputting all the values, click on Analyze and hover on General Linear Model and click on Univariate, place value in dependent field and other two in fixed factor field
- Click on Model and after that click on Custom and drag block and treatments from factors & Covariates window to Model window
- Click on option below type and click on Main Effects and click on Continue
- Click on Post Hoc, follow the step above to drag that two items to right side and enable LSD and click on continue
- Click ok and done.

- Problem to test
  H_{0T} : There is no significant difference between the treatments.

  H_{1T} : There is at least one significant difference between the treatments.

  H_{0B} : There is no significant difference between the blocks.

  H_{1B} : There is at least one significant difference between the blocks.

```
DATASET ACTIVATE DataSet1.

UNIANOVA values BY treatment block

 /METHOD=SSTYPE(3)

 /INTERCEPT=EXCLUDE

 /POSTHOC=treatment block(LSD)

 /CRITERIA=ALPHA(0.05)

 /DESIGN=treatment block.
```

Between-Subjects Factors

		Value Label	N
treatment	1	treatment_1	5
	2	treatment_2	5
	3	treatment_3	5
	4	treatment_4	5
block	1	block_1	4
	2	block_2	4
	3	block_3	4
	4	block_4	4
	5	block_5	4

Tests of Between-Subjects Effects

Dependent Variable: values

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	21689.765[a]	8	2711.221	1085.119	.000
treatment	134.738	3	44.913	17.976	.000
block	21.168	4	5.292	2.118	.141
Error	29.983	12	2.499		
Total	21719.748	20			

a. R Squared = .999 (Adjusted R Squared = .998)

Multiple Comparisons

Dependent Variable: values

LSD

(I) block	(J) block	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
block_1	block_2	-.31	1.118	.783	-2.75	2.12
	block_3	-2.00	1.118	.099	-4.44	.44
	block_4	-1.50	1.118	.204	-3.94	.94
	block_5	-2.75*	1.118	.030	-5.19	-.31
block_2	block_1	.31	1.118	.783	-2.12	2.75
	block_3	-1.69	1.118	.158	-4.12	.75
	block_4	-1.19	1.118	.310	-3.62	1.25
	block_5	-2.44	1.118	.050	-4.87	.00
block_3	block_1	2.00	1.118	.099	-.44	4.44
	block_2	1.69	1.118	.158	-.75	4.12
	block_4	.50	1.118	.663	-1.94	2.94
	block_5	-.75	1.118	.515	-3.19	1.69
block_4	block_1	1.50	1.118	.204	-.94	3.94
	block_2	1.19	1.118	.310	-1.25	3.62
	block_3	-.50	1.118	.663	-2.94	1.94
	block_5	-1.25	1.118	.285	-3.69	1.19
block_5	block_1	2.75*	1.118	.030	.31	5.19
	block_2	2.44	1.118	.050	.00	4.87
	block_3	.75	1.118	.515	-1.69	3.19
	block_4	1.25	1.118	.285	-1.19	3.69

Based on observed means.

The error term is Mean Square(Error) = 2.499.

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

Multiple Comparisons

Dependent Variable: values

LSD

(I) treatment	(J) treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
treatment_1	treatment_2	-.75	1.000	.469	-2.93	1.43
	treatment_3	.65	1.000	.527	-1.53	2.83
	treatment_4	5.85*	1.000	.000	3.67	8.03
treatment_2	treatment_1	.75	1.000	.469	-1.43	2.93
	treatment_3	1.40	1.000	.187	-.78	3.58
	treatment_4	6.60*	1.000	.000	4.42	8.78
treatment_3	treatment_1	-.65	1.000	.527	-2.83	1.53
	treatment_2	-1.40	1.000	.187	-3.58	.78
	treatment_4	5.20*	1.000	.000	3.02	7.38
treatment_4	treatment_1	-5.85*	1.000	.000	-8.03	-3.67
	treatment_2	-6.60*	1.000	.000	-8.78	-4.42
	treatment_3	-5.20*	1.000	.000	-7.38	-3.02

Based on observed means.

The error term is Mean Square(Error) = 2.499.

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

- Decision

  For Treatments; $p=0.0001 < \alpha = 0.05$; Reject H_{0T} at 0.05 level of significance.

  For Blocks ; $p=0.141 > \alpha = 0.05$; Accept H_{0B} at 0.05 level of significance.

- Conclusion

  There is at least one significant difference between the treatments.

  There is no significant difference between the blocks.

2)

The following are the scores which random samples of students from 2 minority groups obtained on a current event test:

Minority group I	73	82	39	68	91	75	89	67	50	86	57	65	70
Minority group II	51	42	36	53	88	59	49	66	25	64	18	76	74

Use Mann Whitney U test at the 0.05 level of significance to test whether or not students from the two minority groups can be expected to score equally well on the test.

Solution :

Steps(don't copy this)

- Analyze/ Non parametric Test/legacy Dialogs/ two independent test
- Place score in test variable and group in grouping variable , as group(1,2)
- Tick Mann Witney U, and click on options and click on descriptive
- And click ok

- Problem to test
  H_0 : The two minority groups score equally.

  H_1 : The two minority groups do not score equally. (2-tailed test)

```
DATASET ACTIVATE DataSet0.

NPAR TESTS

 /M-W= scores BY minority_group(1 2)

 /STATISTICS=DESCRIPTIVES QUARTILES

 /MISSING ANALYSIS.
```

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
scores	26	62.04	19.458	18	91	49.75	65.50	75.25
minority_group	26	1.50	.510	1	2	1.00	1.50	2.00

Ranks

	minority_group	N	Mean Rank	Sum of Ranks
scores	minority group I	13	16.62	216.00
	minority group II	13	10.38	135.00
	Total	26		

Test Statistics[a]

	scores
Mann-Whitney U	44.000
Wilcoxon W	135.000
Z	-2.077
Asymp. Sig. (2-tailed)	.038
Exact Sig. [2*(1-tailed Sig.)]	.039[b]

a. Grouping Variable: minority_group

b. Not corrected for ties.

- Critical Value
  2p = 0.39
- Decision
  2p = 0.39 > $\alpha = 0.05$; Accept H_0 at 0.05 level of significance.
- Conclusion
  The two minority groups score equally.