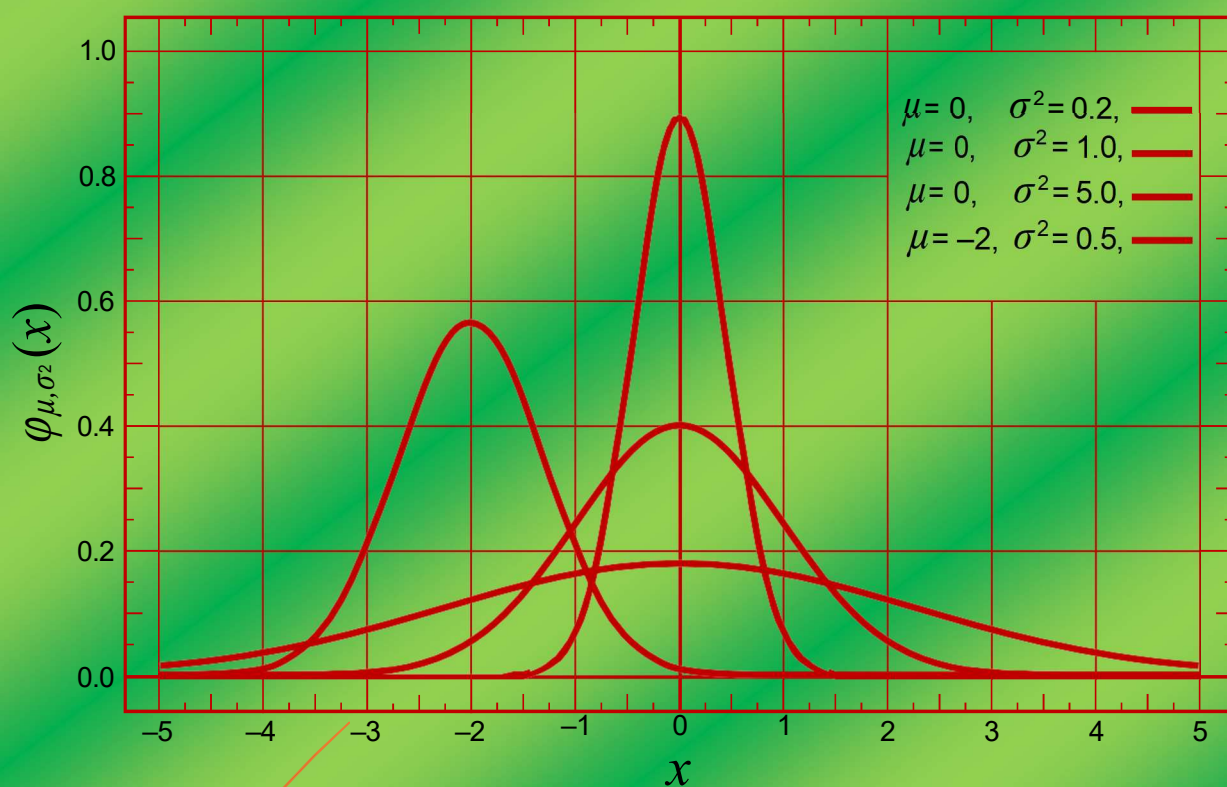


SPSS Practical Manual on Strip-Plot Design



D. S. Dhakre, D. Bhattacharya and Bhola Nath

Institute of Agriculture, Visva-Bharati, Sriniketan
West Bengal -731 236, India

SPSS Practical Manual on Strip-Plot Design

D. S. Dhakre, D. Bhattacharya and Bhola

Institute of Agriculture, Visva-Bharati, Sriniketan

West Bengal -731 236, India

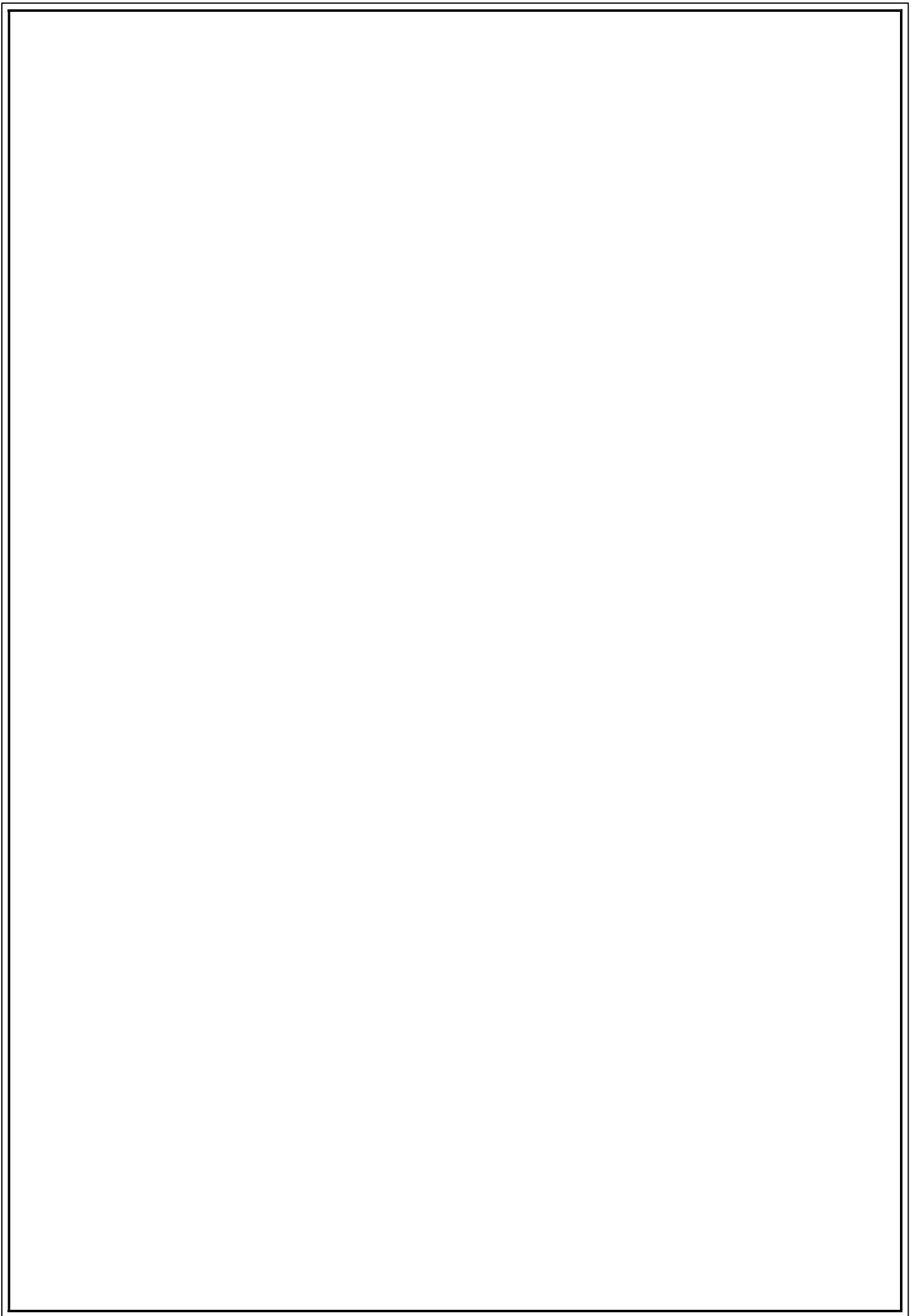
Example:

The yields of a crop per plot under the various treatment combinations in the randomized block design given in table below. There were three levels of Factor A and three levels of the factor B. There were, thus 3×3 or 9 treatment combination tested in a randomized block design with six replications.

Analyze the data and draw your conclusion.

Factor	Level
Factor (A)	A1
	A2
	A3
Factor (B)	B1
	B2
	B3

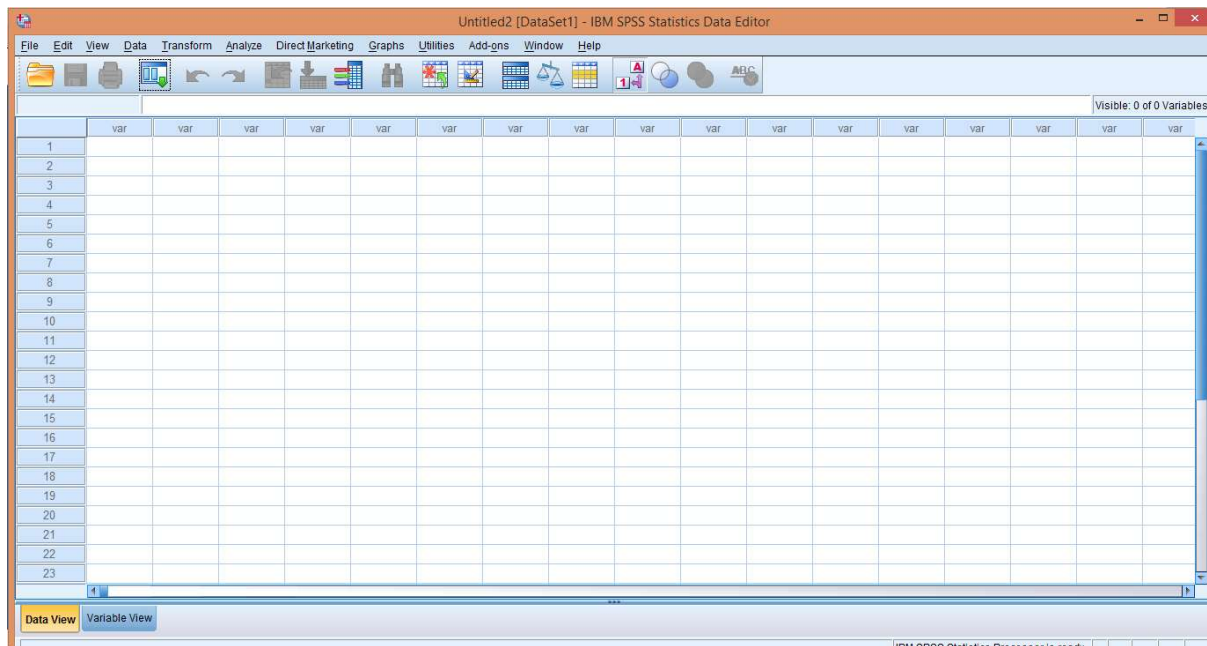
Treatment	A	B	R1	R2	R3
A1B1	1	1	4.1	4.2	4.3
A1B2	1	2	3.9	4	4.1
A1B3	1	3	4	4.1	4.2
A2B1	2	1	4.3	4.4	4.5
A2B2	2	2	4.1	4.2	4.4
A2B3	2	3	4.2	4.3	4.5
A3B1	3	1	3.8	3.9	4
A3B2	3	2	3.5	3.6	3.7
A3B3	3	3	3.7	3.8	3.9



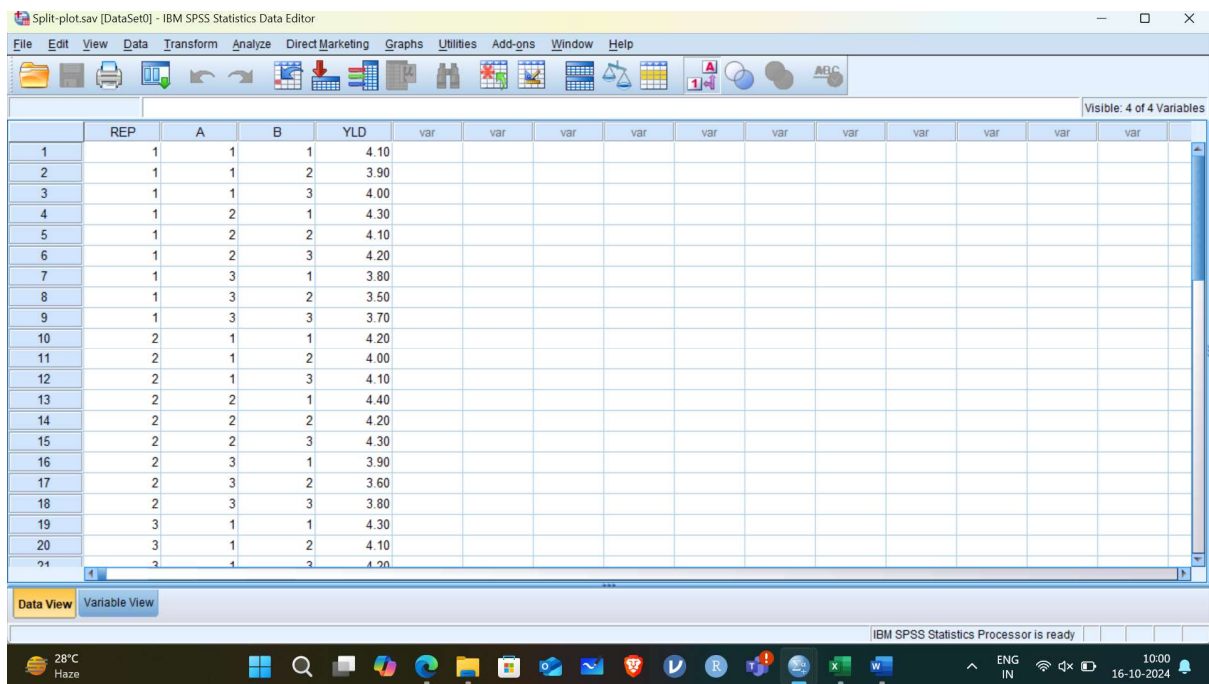
Step 1: Arrange the Data for analysis in this way:

REP	A	B	YLD
1	1	1	4.1
1	1	2	3.9
1	1	3	4
1	2	1	4.3
1	2	2	4.1
1	2	3	4.2
1	3	1	3.8
1	3	2	3.5
1	3	3	3.7
2	1	1	4.2
2	1	2	4
2	1	3	4.1
2	2	1	4.4
2	2	2	4.2
2	2	3	4.3
2	3	1	3.9
2	3	2	3.6
2	3	3	3.8
3	1	1	4.3
3	1	2	4.1
3	1	3	4.2
3	2	1	4.5
3	2	2	4.4
3	2	3	4.5
3	3	1	4
3	3	2	3.7
3	3	3	3.9

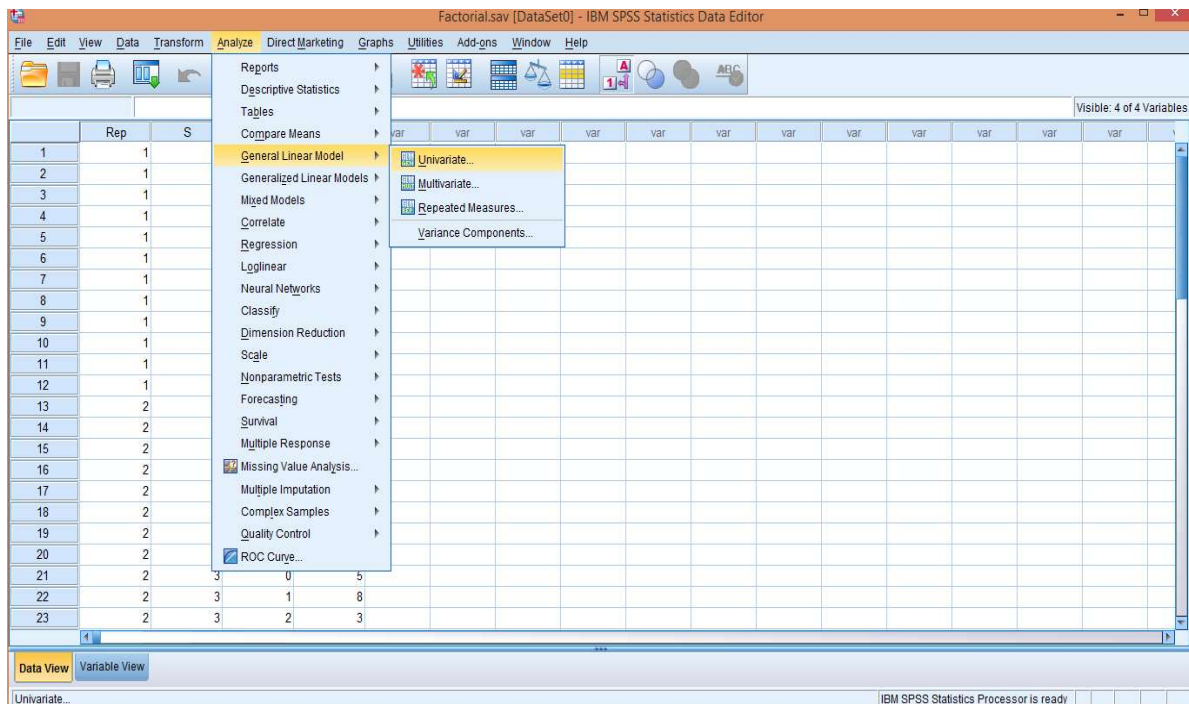
Step 2: Start → All Programs → All Programs → SPSS



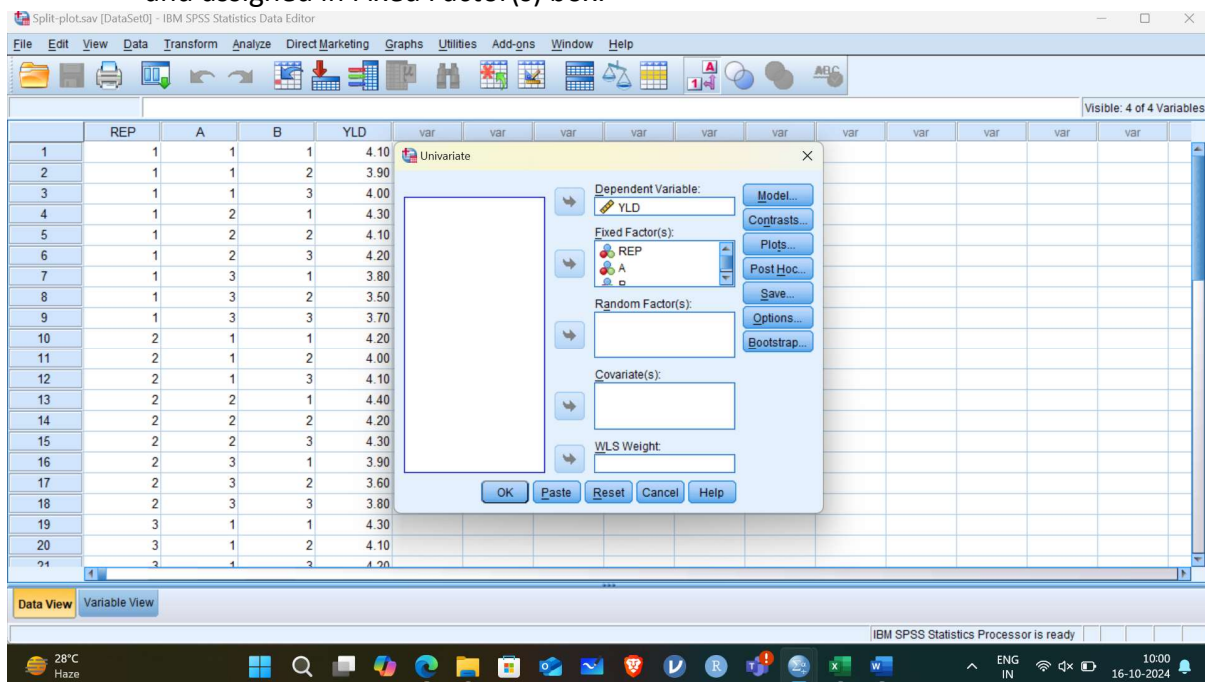
Step 3: Enter data in SPSS Data Editor



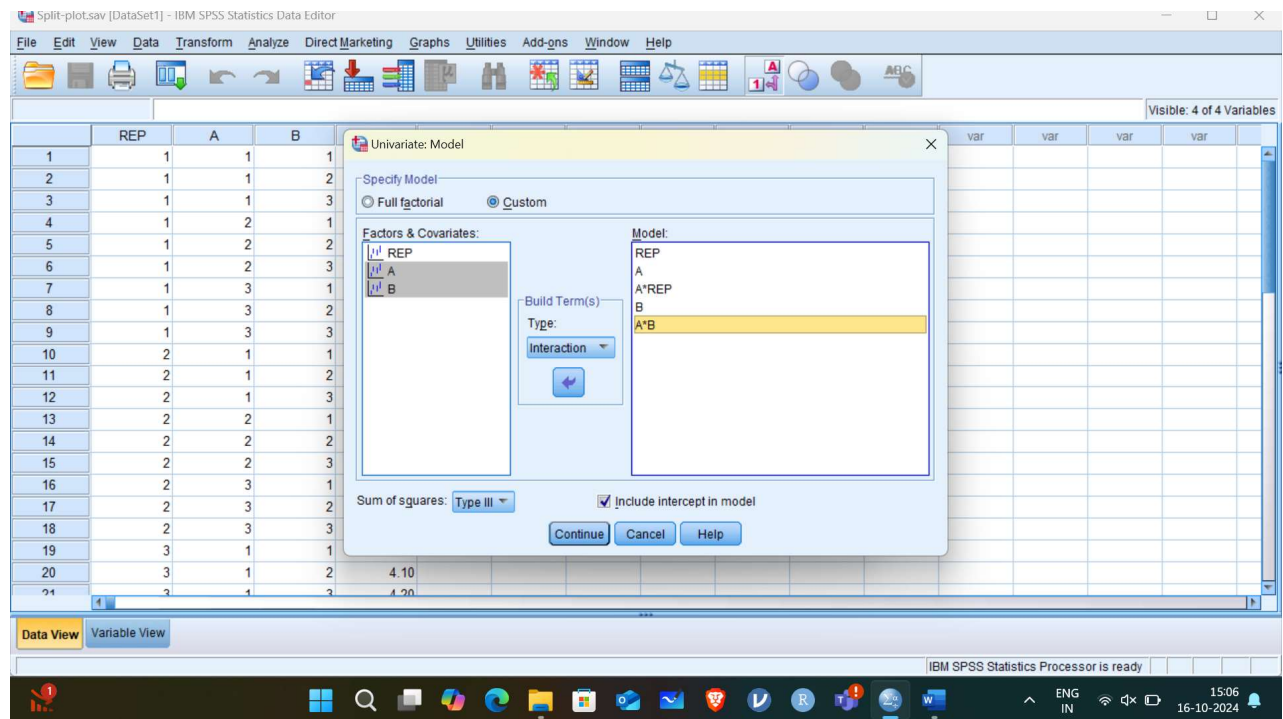
Step 4: Analyze → General Linear Model → Univariate.



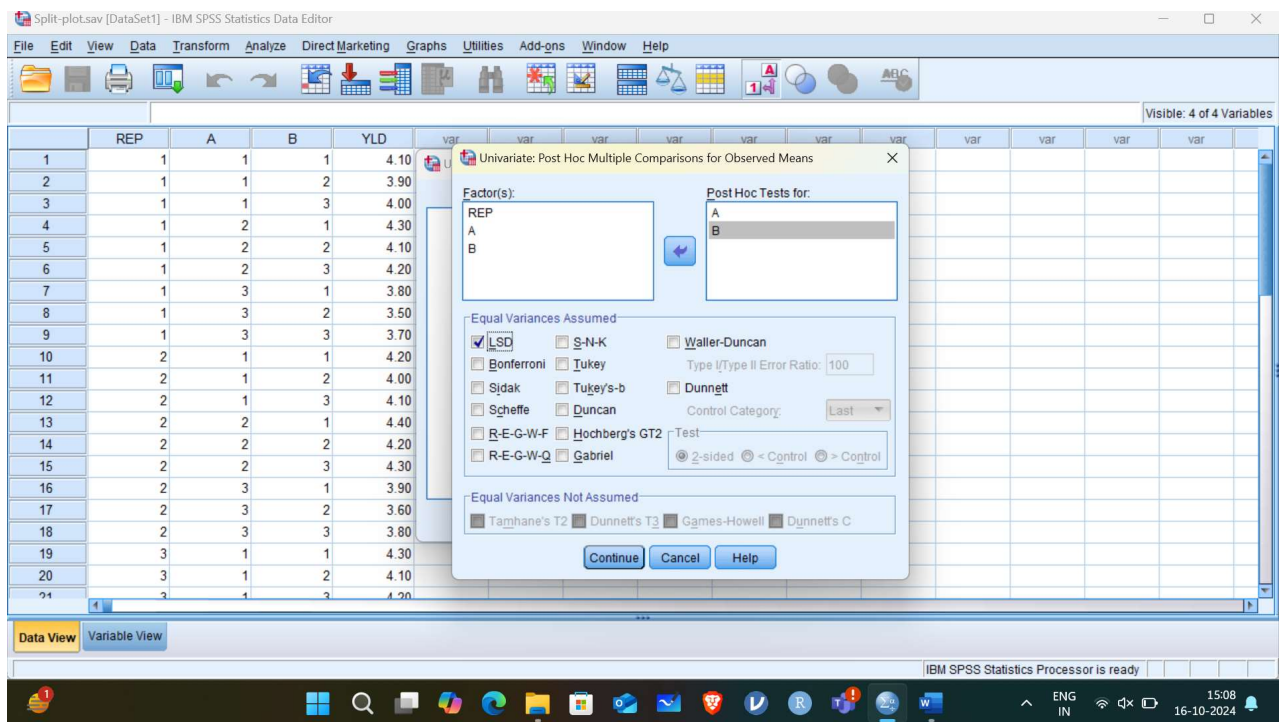
Step 5: Select YLD and send it to the Dependent Variable box; REP, A and B may be selected and assigned in Fixed Factor(s) box.



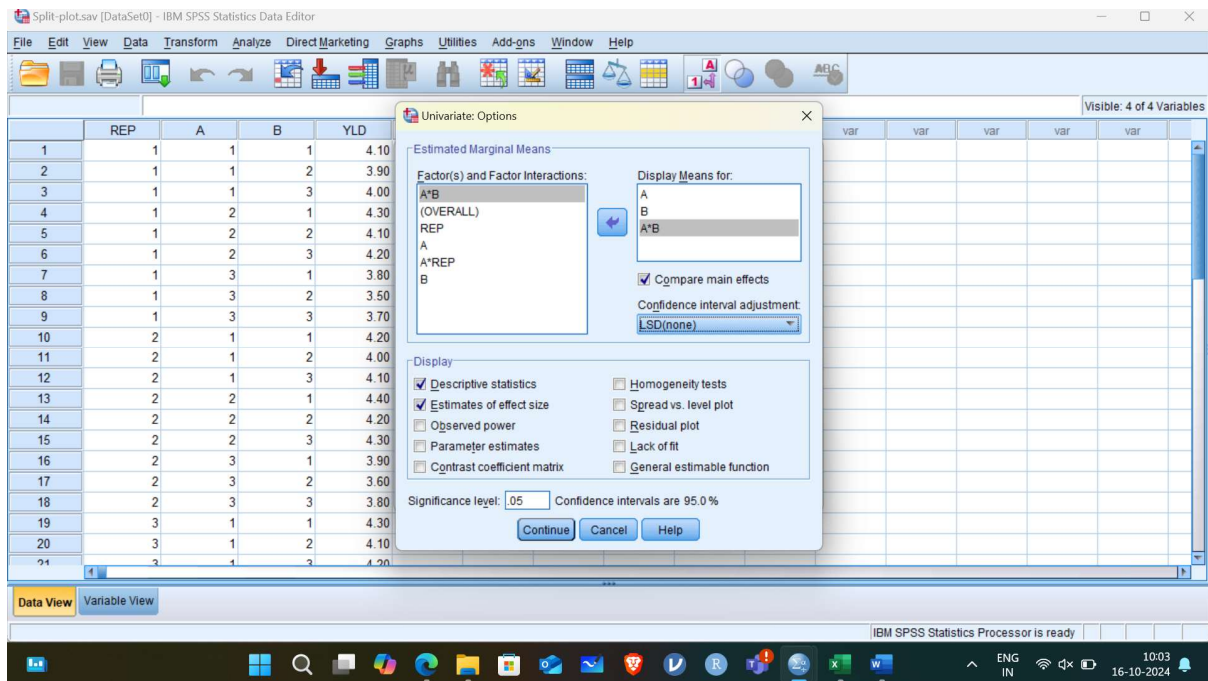
Step 6: Model → Custom → select Main effect → Put REP, A, B into model box → select Interaction → A×REP and A×B to Model → continue



Step 7: Univariate → Post Hoc → select Factors A, B → Post Hoc Test → LSD → continue → OK

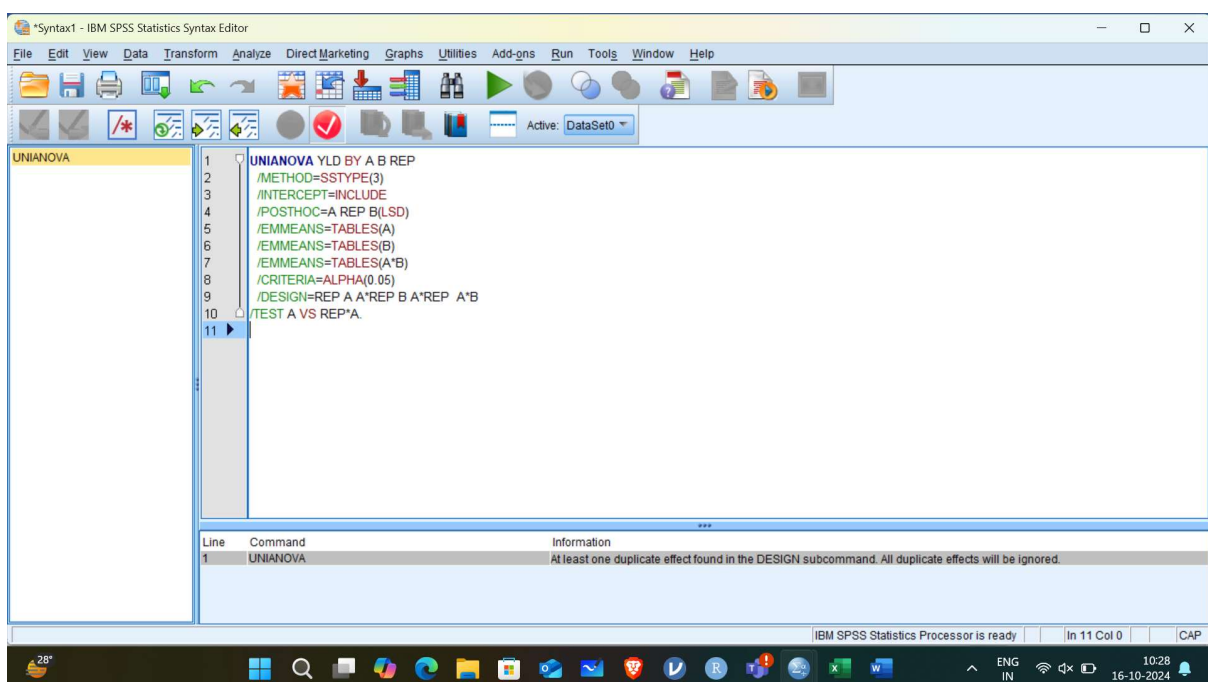


Step 8: Option →



Step 9: File → Syntax → paste this syntax in open window and run

```
UNIANOVA YLD BY A B REP
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /POSTHOC=A REP B(LSD)
  /EMMEANS=TABLES(A)
  /EMMEANS=TABLES(B)
  /EMMEANS=TABLES(A*B)
  /CRITERIA=ALPHA(0.05)
  /DESIGN=REP A A*REP B A*REP A*B
  /TEST A VS REP*A
```



Output:

Between-Subjects Factors

		N
A	1	9
	2	9
	3	9
B	1	9
	2	9
	3	9
REP	1	9
	2	9
	3	9

Tests of Between-Subjects Effects

Dependent Variable: YLD

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.879 ^a	14	.134	362.286	.000
Intercept	445.707	1	445.707	1203409.000	.000
REP	.223	2	.111	301.000	.000
A	1.407	2	.704	1900.000	.000
Contrast (A)	1.407	2	.704	475.000	.000
A * REP	.006	4	.001	4.000	.027
B	.225	2	.113	304.000	.000
A * B	.017	4	.004	11.500	.000
Error	.004	12	.000		
Total	447.590	27			
Corrected Total	1.883	26			

a. R Squared = .998 (Adjusted R Squared = .995)

Custom Hypothesis Tests

Test Results

Dependent Variable: YLD

Source	Sum of Squares	df	Mean Square	F	Sig.
Contrast (A)	1.407	2	.704	475.000	.000
Error ^a	.006	4	.001		

a. A * REP

Estimated Marginal Means

1. A

Dependent Variable: YLD

A	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	4.100	.006	4.086	4.114
2	4.322	.006	4.308	4.336
3	3.767	.006	3.753	3.781

2. B

Dependent Variable: YLD

B	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	4.167	.006	4.153	4.181
2	3.944	.006	3.930	3.958
3	4.078	.006	4.064	4.092

3. A * B

Dependent Variable: YLD

A	B	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1	1	4.200	.011	4.176	4.224
	2	4.000	.011	3.976	4.024
	3	4.100	.011	4.076	4.124
2	1	4.400	.011	4.376	4.424
	2	4.233	.011	4.209	4.258
	3	4.333	.011	4.309	4.358
3	1	3.900	.011	3.876	3.924
	2	3.600	.011	3.576	3.624
	3	3.800	.011	3.776	3.824

Post Hoc Tests

A

Multiple Comparisons

Dependent Variable: YLD

LSD

(I) A	(J) A	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-.2222*	.00907	.000	-.2420	-.2025
	3	.3333*	.00907	.000	.3136	.3531
2	1	.2222*	.00907	.000	.2025	.2420
	3	.5556*	.00907	.000	.5358	.5753
3	1	-.3333*	.00907	.000	-.3531	-.3136
	2	-.5556*	.00907	.000	-.5753	-.5358

Based on observed means.

The error term is Mean Square(Error) = .000.

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

Homogeneous Subsets

REP

Multiple Comparisons

Dependent Variable: YLD

LSD

(I) REP	(J) REP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-.1000*	.00907	.000	-.1198	-.0802
	3	-.2222*	.00907	.000	-.2420	-.2025
2	1	.1000*	.00907	.000	.0802	.1198
	3	-.1222*	.00907	.000	-.1420	-.1025
3	1	.2222*	.00907	.000	.2025	.2420
	2	.1222*	.00907	.000	.1025	.1420

Based on observed means.

The error term is Mean Square(Error) = .000.

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

Homogeneous Subsets

B

Multiple Comparisons

Dependent Variable: YLD

LSD

(I) B	(J) B	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	.2222*	.00907	.000	.2025	.2420
	3	.0889*	.00907	.000	.0691	.1087
2	1	-.2222*	.00907	.000	-.2420	-.2025
	3	-.1333*	.00907	.000	-.1531	-.1136
3	1	-.0889*	.00907	.000	-.1087	-.0691
	2	.1333*	.00907	.000	.1136	.1531

Based on observed means.

The error term is Mean Square(Error) = .000.

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

Do Yourself

Replication	Irrigation	Fertilizer Type	Yield (tons/ha)
1	1	1	3
1	1	2	3.2
1	1	3	2.8
1	2	1	3.5
1	2	2	3.6
1	2	3	3.1
1	3	1	4
1	3	2	4.2
1	3	3	3.8
2	1	1	3.1
2	1	2	3.3
2	1	3	2.9
2	2	1	3.6
2	2	2	3.7
2	2	3	3.2
2	3	1	4.1
2	3	2	4.3
2	3	3	3.9
3	1	1	3.2
3	1	2	3.4
3	1	3	3
3	2	1	3.7
3	2	2	3.8
3	2	3	3.3
3	3	1	4.2
3	3	2	4.4
3	3	3	4

Reference Books:

1. A Hand Book of Agricultural Statistics, S. R. S. Chandel, Achal Prakashan Mandir, Kanpur.
2. A Text book of Agricultural Statistics, R. Rangaswamy, New Age International (P) Limited, publishers.
3. Biometrical Methods in Quantitative Genetic Analysis, R.K. Singh and B. D. Chaudhary, Kalyani Publishers.
4. Design Resources Server: www.iasri.res.in
5. E-Manual Winter School IASRI.
6. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand & Sons Educational Publications.
7. Fundamentals Applied Statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand & Sons Educational Publications.
8. Programmed Statistics, B.L. Agarwal, New Age International (P) Limited, publishers.
9. Probability and Statistical Inference Theory and Practice, D. Bhattacharya and S. Roy Chowdhury, U. N. Dhur & Sons.
10. Statistics Theory and Practice, D. Bhattacharya and S. Roy Chowdhury, U. N. Dhur & Sons.
11. Statistical Methods, K.P. Dhamu and K. Ramamoorthy, AGROBIOS (INDIA)
12. Statistics for Agricultural Sciences, G. Nageswara Rao, Second Edition, BS Publications, Hyderabad.

