Chapter 7

Split Plot and Split Block Design

Split-Plot Designs

This design is used if we have two factors and their degree of interest is not equal or precision required in one of the factors are different from the other factor.

There are different types of split plot designs can be divided in general based on the factors studied to the following divisions: -

1) Split plot Design once only in this case there are two factors only under study and is the factor A and factor B, and in general use the symbols of the factors, where the symbol A stands for a factor who needs to a lower resolution (ie, less attention) and the symbol B is used for a factor who needs more accurate

2) Split plot Design twice (Split-Split plot Desgin) and in this case we have three factors under study and different degree of attention and precision required of the other factor, as the factor which needs to be less accurate is symbolized by the letter A and the factor that needs to be more accurate signifies him with a letter C and the factor that needs to be moderate degree of accuracy is symbolized by the letter B

3) Split plot design depending on time for the experimen

4) Split plot design according to place

Similarities and differences between and split plot Desgin and factorial experiments

1) In split plot designs, there are more than one type of experimental units are

1) Main Plots

2) Sub Plots

In the case of more factors , was to be three factors there are a third type of experimental units, Sub-Sub Plots

In factorial experiments there is one type of experimental units only

2) Degree of interest equal in factorial experiments and is not equal in the case of split plot design

3) There are more than one type of error in the split plot designs if we have two factors under study, for example, every factor has an error of its own (Error A, Error B) but in The factorial experiments are found in one type of error only.

The Similarities

1) Used in the factorial experiments and split plot designs more than a factor

2) Used both with different designs LSD, RCBD, CRD

Steps to implement the experiment using a split plot designs

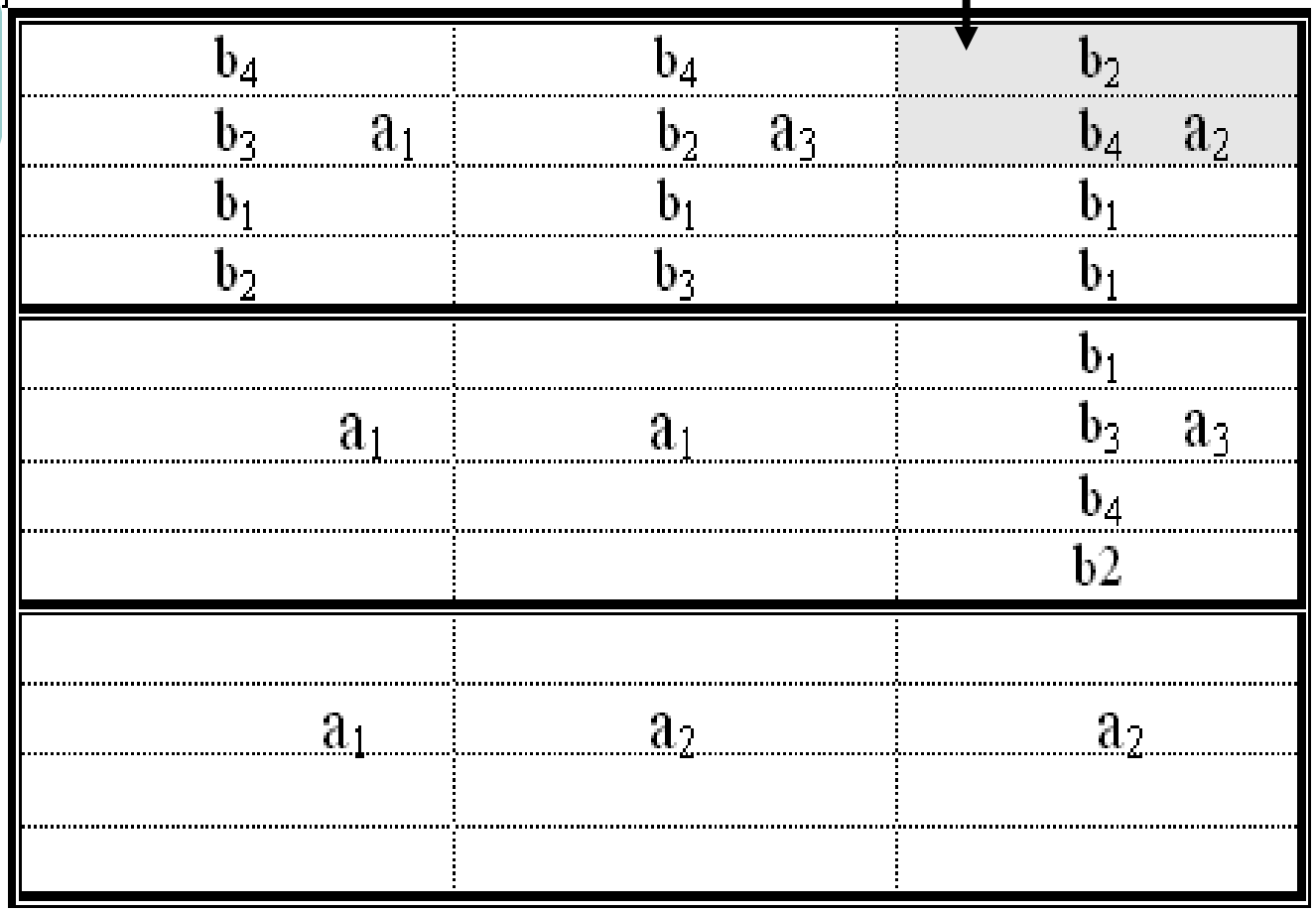
used CRD design to study the two factors , three levels of factor A, and four levels of factor B, note that the precision required for the factor B is more of a factor A and the number of repeaters is equal to (3)

1)Numbers of Main Plots = 3 X 3 = 9

2) Numbers of Sub Plots = 4 X 9 = 36

3)

Sub Plot



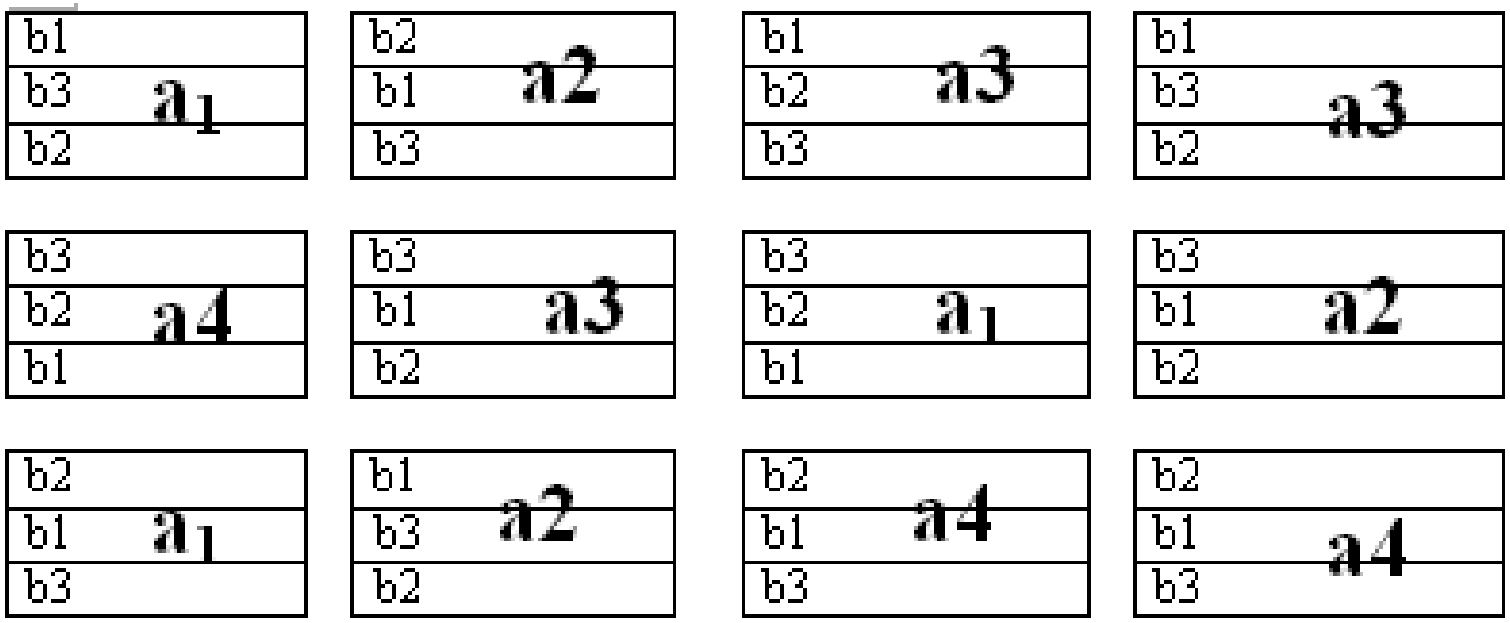
Main Plot

4) Distribution the levels of the main factor (A) randomly assigned to experimental units are the main plots and must be repeated every three times the level of factor A. (a1) three times and (a2) three times and (a3) three times.

5) Distribution the levels o f the factor (B) randomly assigned to experimental units within each sub plot individually for example, the first experimental unit dividid into a numbers of Sub plot

Whole Plots in a Complete Random Design (C.R.D)

Planning for the 3x4 factorial experiment in split plot design with application complete random desgin So that each treatment is repeated three times

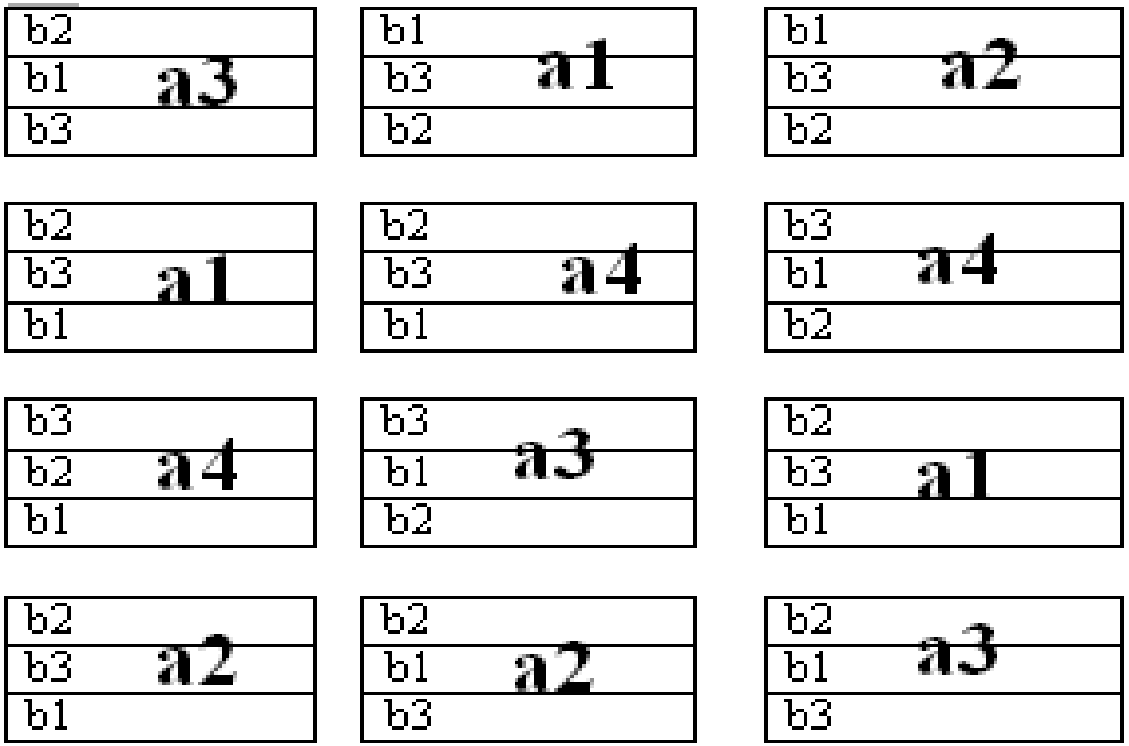


ANOVA TABLE

S.O.V	d.f	S.S
A	(a-1)	SS(A)=A-C.F
Error (a)	a(r-1)	SS(E_a)=RA-A
B	(b-1)	SSB=B-C.F
AB	(a-1)(b-1)	SS(AB)=AB-A-B+C.F
Error (b)	a (b-1)(r-1)	SS(E_b)=RAB-AB-RA+A
Total	abr-1	SST=RAB-C.F

Whole Plots in a Complete Random Design (R.C.B.D)

Planning for the Factorial experience of the type (3X4) in the split plot designs with application randomized complete blocks designs using the full three plots



Whole Plots in a Complete Random Design (R.C.B.D)

S.O.V	d.f	S.S
Replication A	(r-1) (a-1)	SSr=R-C.F SS(A)=A-C.F
Error (a)	(a-1)(r-1)	$SS(E_a)$=RA-A-R+C.F
B	(b-1)	SSB=B-C.F
AB	(a-1)(b-1)	SS(AB)=AB-A-B+C.F
Error (b)	a(b-1)(r-1)	$SS(E_b)$=RAB-RA-AB+A
Total	abr-1	SST=RAB-C.F

Whole Plots in a Complete Random Design (L.S)

S.O.V	d.f	S.S
Row Columns A	(a-1) (a-1) (a-1)	SSR=R-C.F SSC=C -C.F SSA=A-C.F
Error(a)	(a-1)(a-2)	$SS(E_a)=RC-A-C-R+2C.F$
B	(b-1)	SSB=B-C.F
AB	(a-1)(b-1)	SS(AB)=AB-A-B+C.F
Error(b)	a(a-1)(b -1)	$SS(E_b)=RCB-RC-AB+A$
Total	a^2b-1	SST=RCB-C.F