

## Two Way ANOVA - No Replicates

	B Level 1	B Level 2	.....	B Level $c$
A Level 1	....	....	.....	....
A Level 2	....	....	.....	....
.....				
A Level $r$	....	....	....	.....

- You will given the variance of row means  $S_R^2$  and column means  $S_C^2$
- You will also be given the variance of the response variable :  $\text{Var}(Y)$  ( You may be given the standard deviation).
- In the formula sheet you will given the formula for the Mean Squares for both treatments, but not the Mean Square for Error.

Source	DF	SS	MS	F
Factor A	$\text{df}_A =$  $r - 1$	$SS_{\text{Factor A}} =$  $(r - 1) \times c \times S_R^2$	$MS_{\text{Factor A}} =$  $c \times S_R^2$	$F_1 =$  $\frac{MS_{\text{Factor A}}}{MS_{\text{Error}}}$
Factor B	$\text{df}_B =$  $c - 1$	$SS_{\text{Trt B}} =$  $(c - 1) \times r \times S_C^2$	$MS_{\text{Factor B}} =$  $r \times S_C^2$	$F_2 =$  $\frac{MS_{\text{Factor B}}}{MS_{\text{Error}}}$
Error	$\text{df}_{\text{Error}}$	$SS_{\text{Error}}$	$MS_{\text{Error}}$	
Total	$n - 1$	$SS_{\text{Total}}$		

- $\text{df}_{\text{Error}} = (r - 1) \times (c \times 1)$
- $SS_{\text{Trt A}} = SS_{\text{Trt A}} + SS_{\text{Trt B}} + SS_{\text{Error}}$
- The total sample size  $n = r \times c$