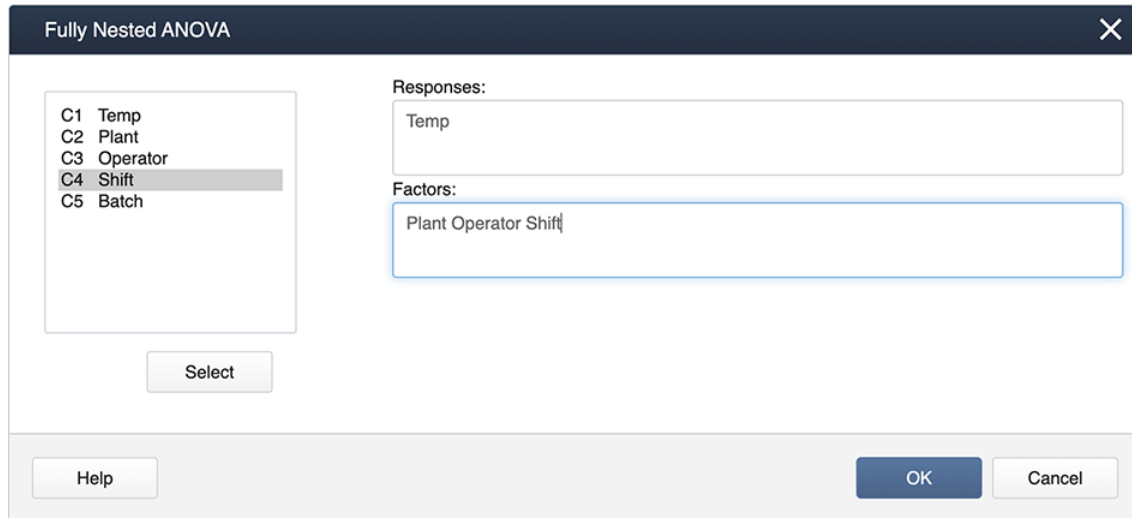


6.5.1: Using Minitab

Minitab has a separate program just for this type of analysis for our example ([Quality Data](#)), under:

Stat > ANOVA > Fully Nested ANOVA

and you specify the model in the boxes provided:



The dialog box titled "Fully Nested ANOVA" contains a list of variables on the left: C1 Temp, C2 Plant, C3 Operator, C4 Shift (highlighted), and C5 Batch. Below this list is a "Select" button. On the right, there are two input fields: "Responses:" with "Temp" entered, and "Factors:" with "Plant Operator Shift" entered. At the bottom, there are "Help", "OK", and "Cancel" buttons.

Figure 6.5.1.1: Fully Nested ANOVA pop-up window.

The output you get is very comprehensive and includes the variance components expressed as percentages.

Nested ANOVA: Temp versus Plant, Operator, Shift

Analysis of Variance for Temp

Source	DF	SS	MS	F	P
Plant	3	731.5156	243.8385	5.854	0.011
Operator	12	499.8125	41.6510	1.303	0.248
Shift	48	1534.9167	31.9774	2.578	0.000
Error	128	1588.0000	12.4062		
Total	191	4354.2448			

Variance Components

Source	Var Comp.	# of Total	StDev
Plant	4.212	17.59	2.052
Operator	0.806	3.37	0.898
Shift	6.524	27.24	2.554
Error	12.406	51.80	3.522
Total	23.948		4.894

Expected Mean Squares

1	Plant	$1.00(4) + 3.00(3) + 12.00(2) + 48.00(1)$
2	Operator	$1.00(4) + 3.00(3) + 12.00(2)$

3	Shift	$1.00(4) + 3.00(3)$
4	Error	$1.00(4)$

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