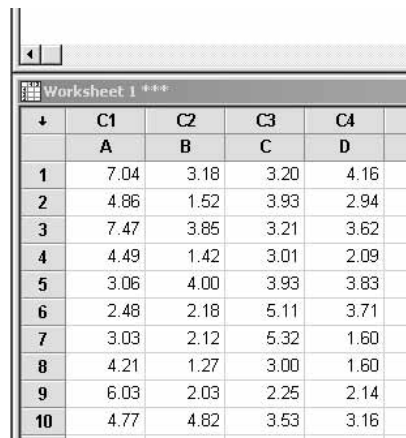

7.6. Tukey's test following a parametric one-way ANOVA

This calculation follows on from those outlined in BOXES 7.5. and 7.6. and is illustrated from Example 7.4.

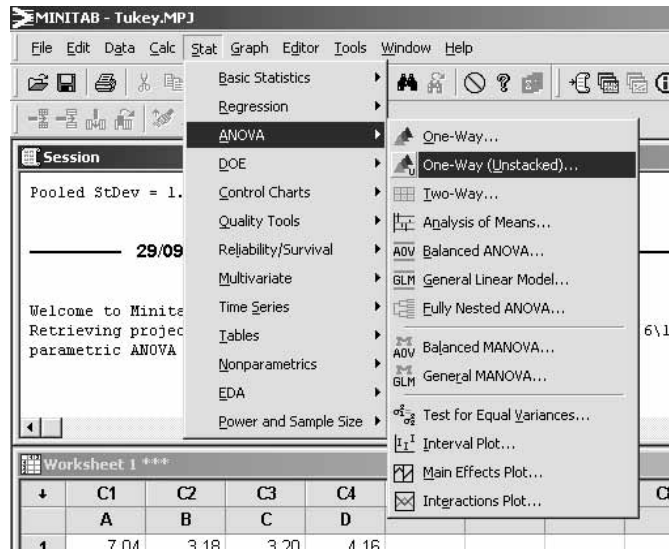
BOX 7.7. How to carry out a Tukey's test after a significant one-way parametric ANOVA with equal replicates

Step 1. Enter your data into the worksheet part of the Minitab display, using sensible column headings.

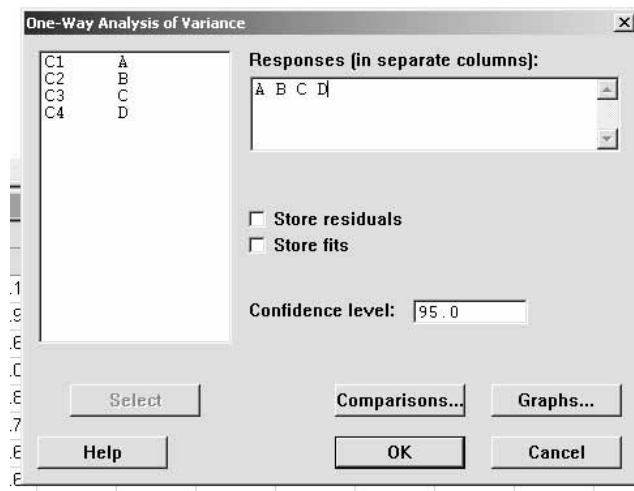


	C1	C2	C3	C4
	A	B	C	D
1	7.04	3.18	3.20	4.16
2	4.86	1.52	3.93	2.94
3	7.47	3.85	3.21	3.62
4	4.49	1.42	3.01	2.09
5	3.06	4.00	3.93	3.83
6	2.48	2.18	5.11	3.71
7	3.03	2.12	5.32	1.60
8	4.21	1.27	3.00	1.60
9	6.03	2.03	2.25	2.14
10	4.77	4.82	3.53	3.16

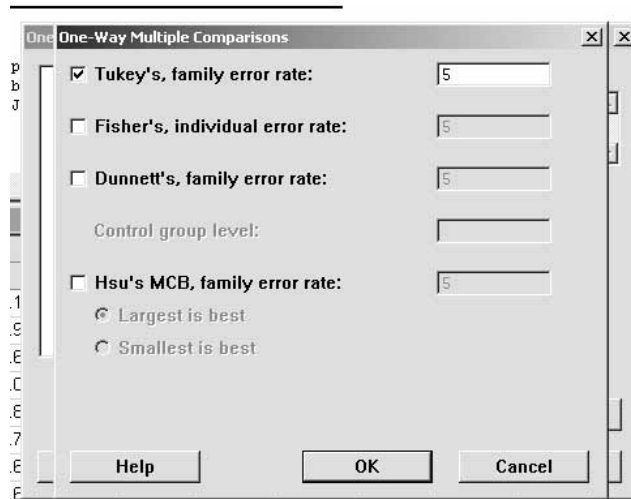
Step 2. Perform the analysis. Go to 'Stat', 'ANOVA', 'One-Way (Unstacked)'.



Transfer all four columns across to the 'Responses' window by first highlighting them (one at a time) and then clicking on 'Select'.



Click on 'Comparisons', and select 'Tukey's'.



The default 'family error rate' is 5%, which is equivalent to $p = 0.05$. Click on 'OK'. Click on 'OK' again, and the results will appear in the 'Session' window.

One-way ANOVA: A, B, C, D

Source	DF	SS	MS	F	P
Factor	3	26.88	8.96	5.76	0.003
Error	36	56.04	1.56		
Total	39	82.91			

S = 1.248 R-Sq = 32.41% R-Sq(adj) = 26.78%

Individual 95% CIs For Mean Based on Pooled StDev

Level	N	Mean	StDev	CI	
A	10	4.744	1.687	(-----*-----)	
B	10	2.639	1.240	(-----*-----)	
C	10	3.649	0.959	(-----*-----)	
D	10	2.885	0.961	(-----*-----)	

-----+-----+-----+-----
2.0 3.0 4.0 5.0

Pooled StDev = 1.248

Tukey 95% Simultaneous Confidence Intervals
All Pairwise Comparisons

Individual confidence level = 98.93%

A subtracted from:

	Lower	Center	Upper	---+-----+-----+-----+-----
B	-3.608	-2.105	-0.602	(-----*-----)
C	-2.598	-1.095	0.408	(-----*-----)
D	-3.362	-1.859	-0.356	(-----*-----)
				---+-----+-----+-----+-----
				-3.2 -1.6 -0.0 1.6

B subtracted from:

	Lower	Center	Upper	---+-----+-----+-----+-----
C	-0.493	1.010	2.513	(-----*-----)
D	-1.257	0.246	1.749	(-----*-----)
				---+-----+-----+-----+-----
				-3.2 -1.6 -0.0 1.6

C subtracted from:

	Lower	Center	Upper	---+-----+-----+-----+-----
D	-2.267	-0.764	0.739	(-----*-----)
				---+-----+-----+-----+-----
				-3.2 -1.6 -0.0 1.6

Step 3. Decide what the results mean. For a significant difference, the confidence range must not include zero. This is only true when comparing A with B, and when comparing A with D. The significant difference detected by ANOVA (Box 7.6.) is accounted for by the significant differences ($p = 0.05$) between the performances of composts A and B, and between composts A and D.