



ASQ CRE Prep course

Lesson III. A. 7. d.

Design of Experiments

Only the Right Experiments

All combinations, 7 factors w/ 2 levels

				A ₁				A ₂			
				B ₁		B ₂		B ₁		B ₂	
				C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂
D ₁	E ₁	F ₁	G ₁								
			G ₂								
		F ₂	G ₁								
			G ₂								
	E ₂	F ₁	G ₁								
			G ₂								
		F ₂	G ₁								
			G ₂								
D ₂	E ₁	F ₁	G ₁								
			G ₂								
		F ₂	G ₁								
			G ₂								
	E ₂	F ₁	G ₁								
			G ₂								
		F ₂	G ₁								
			G ₂								

No. of cells = 8 x 16 = 128

All combinations, 7 factors w/ 2 levels

				A ₁				A ₂			
				B ₁		B ₂		B ₁		B ₂	
				C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂
D ₁	E ₁	F ₁	G ₁								
			G ₂								
		F ₂	G ₁								
			G ₂								
	E ₂	F ₁	G ₁								
			G ₂								
		F ₂	G ₁								
			G ₂								
D ₂	E ₁	F ₁	G ₁								
			G ₂								
		F ₂	G ₁								
			G ₂								
	E ₂	F ₁	G ₁								
			G ₂								
		F ₂	G ₁								
			G ₂								

No. of cells = 8 x 16 = 128

[illegible]

No. of cells = 8

Sample Size Comparison

No. of factors	No. of levels	Full factorial Total Runs	Taguchi fractional factorial	
			Array name	Total Runs
3	2	$2^3 = 8$	L_4	4
7	2	$2^7 = 128$	L_8	8
11	2	$2^{11} = 2,048$	L_{12}	12
15	2	$2^{15} = 32,768$	L_{16}	16
4	3	$3^4 = 81$	L_9	9
5	4	$4^5 = 1,024$	L_{16}	16
1	2	$2^1 3^7 = 4,378$	L_{18}	18
7	3			

What is given up
with this
approach?



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Steps to Accomplish