

ECE560 Homework#1 Solution (Spring 2024)

total: 45 points

The sign table (30 points)

I	A	B	C	D	AB	AC	AD	BC	BD	CD	ABC	ABD	ACD	BCD	ABCD	Y
1	-1	-1	-1	-1	1	1	1	1	1	1	-1	-1	-1	-1	1	43
1	1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	-1	-1	97
1	-1	1	-1	-1	-1	1	1	-1	-1	1	1	1	-1	1	-1	69
1	1	1	-1	-1	1	-1	-1	-1	-1	1	-1	-1	1	1	1	143
1	-1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	1	-1	60
1	1	-1	1	-1	-1	1	-1	-1	1	-1	-1	1	-1	1	1	138
1	-1	1	1	-1	-1	-1	1	1	-1	-1	-1	1	1	-1	1	80
1	1	1	1	-1	1	1	-1	1	-1	-1	1	-1	-1	-1	-1	200
1	-1	-1	-1	1	1	1	-1	1	-1	-1	-1	1	1	1	-1	41
1	1	-1	-1	1	-1	-1	1	1	-1	-1	1	-1	-1	1	1	76
1	-1	1	-1	1	-1	1	-1	-1	1	-1	1	-1	1	-1	1	52
1	1	1	-1	1	1	-1	1	-1	1	-1	-1	1	-1	-1	-1	137
1	-1	-1	1	1	1	-1	-1	-1	-1	1	1	1	-1	-1	1	70
1	1	-1	1	1	-1	1	1	-1	-1	1	-1	-1	1	-1	-1	185
1	-1	1	1	1	-1	-1	-1	1	1	1	-1	-1	-1	1	-1	110
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	260
1761	711	341	445	101	147	215	59	53	33	193	7	23	75	33	-37	Total
110.06	44.438	21.313	27.813	6.3125	9.1875	13.4375	3.6875	3.3125	2.0625	12.063	0.4375	1.4375	4.6875	2.0625	-2.313	Total/16

a) The mean performance of the system is 110.06 (2 points)

b) The main effects of factor A is 44.438 MIPS (5 points)

The main effects of factor B is 21.313 MIPS

The main effects of factor C is 27.813 MIPS

The main effects of factor D is 6.3125 MIPS

Therefore, factor A (number of processors) affects the system performance the most; factor D (Operating system) affects the system performance the least.

c) The effects of interactions between (8 points; 2 points each)

A and C: 13.4375 MIPS

B and D: 2.0625 MIPS

A, B and D: 1.4375 MIPS

A, C, and D: 4.6875 MIPS

