General 2^k Factorial Designs (Cont'd)

- Example (cont'd): The measured performance in MIPS

Cache size (KB) (B)	Memory size 4MB (A)		Memory size 16MB (A)	
	1 processor	2 processor (C)	1 processor	2 processor
1	*14*	*46*	*22*	*58*
2	*10*	*50*	*34*	*86*

- Quantify the main effects and all interactions:
  - Regression equations?
  - Sign table?

$y = q_0 + q_A x_A + q_B x_B + q_{AB} x_A \cdot x_B$

Dr. Xing ECE560-Experiment 25

$y = q_0 + q_A x_A + q_B x_B + q_C x_C + q_{AB} x_A x_B + q_{AC} x_A x_C + q_{BC} x_B x_C + q_{ABC} x_A x_B x_C$

C_3^0 C_3^1 main effects C_3^2 2-factor interactions C_3^3 3-factor interactions

$y_1 \sim y_8$ known in table (P22) $\Rightarrow q_0, q_A, q_B \ldots$

TABLE 17.9 An Example Sign Table

I	A	B	C	AB	AC	BC	ABC	y
1	−1	−1	−1	1	1	1	−1	14
1	1	−1	−1	−1	−1	1	1	22
1	−1	1	−1	−1	1	−1	1	10
1	1	1	−1	1	−1	−1	−1	34
1	−1	−1	1	1	−1	−1	1	46
1	1	−1	1	−1	1	−1	−1	58
1	−1	1	1	−1	−1	1	−1	50
1	1	1	1	1	1	1	1	86
320	80	40	160	40	16	24	9	Total
40	10	5	20	5	2	3	1	Total/8
q_0	q_A	q_B	q_C	q_{AB}	q_{AC}	q_{BC}	q_{ABC}	

8