

PUB/PAD 504  
 Final: Solution Hints: Spring 2006

- (2) Activity variables are how many students transported on each path
- (A)  $X_1 = \text{Clarks} - \text{Glen}$   
 $X_2 = \text{Clarks} - \text{BHS}$   
 $X_3 = \text{HayInd} - \text{Glen}$   
 $X_4 = \text{HayInd} - \text{BHS}$   
 $X_5 = \text{BHS} - \text{Glen}$   
 $X_6 = \text{BHS} - \text{BHS}$
- $X_2$  &  $X_6$  are problematic because students in transport very likely to be hit by a flood.
- Large "M" assures  $X_2$  or  $X_6$  not chosen

$$7 \cdot X_1 + M \cdot X_2 + 11 \cdot X_3 + 9 \cdot X_4 + 17 \cdot X_5 + M \cdot X_6$$

$$X_1 + X_2 \geq 225$$

$$X_3 + X_4 \geq 150$$

$$X_5 + X_6 \geq 300$$

$$X_1 + X_2 + X_3 + X_4 + X_5 + X_6 \leq 750$$

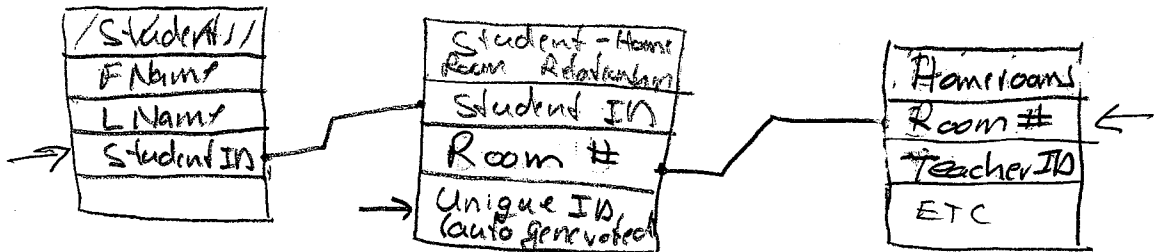
$$X_1 + X_2 + X_3 + X_4 + X_5 + X_6 \leq 225$$

$$X_6 = 0$$

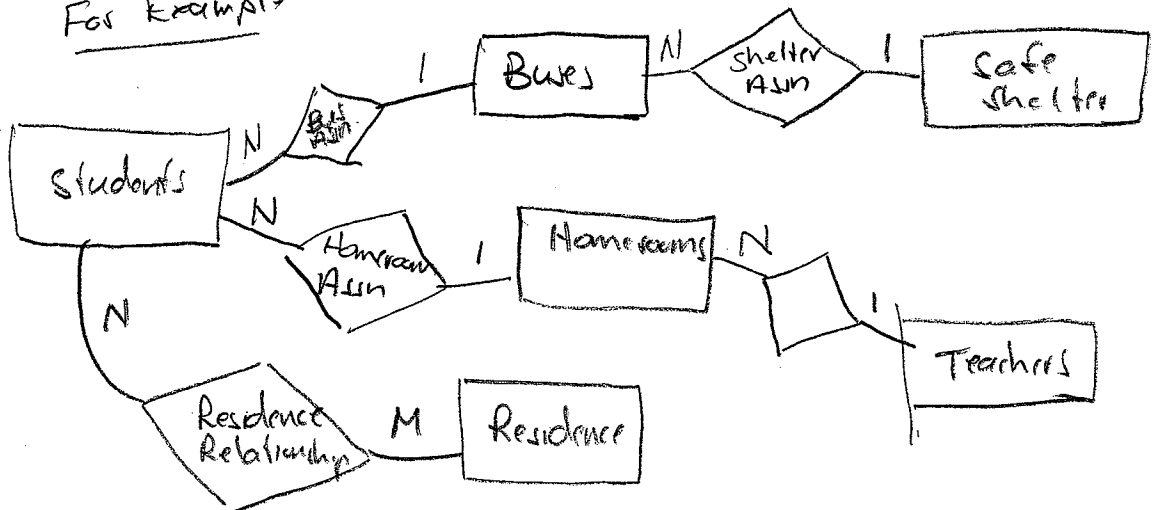
All variables  $> 0$

Minimizing Total Travel Time might be a good goal except that  $X_6$  students would drown. Need some way to assure "Optimal" solution does not lead to students drowning.

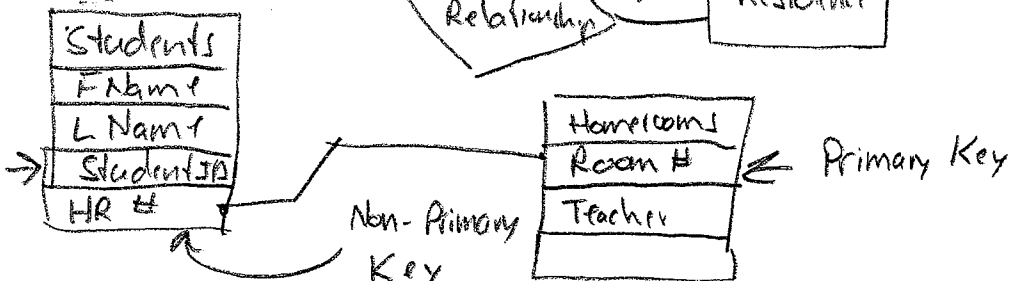
(3)



For Example



OR



④ ①

$$\frac{4}{28} \frac{11}{28}$$

$$E2 = ((B2 - \text{MIN}(B2:B5)) / (\text{MAX}(B2:B5) - \text{MIN}(B2:B5))) * 100$$

$$H2 = E2 * B8 + F2 * C8 + G2 * D8$$

$$B7 = 1186$$

$$B8 = B7 / \text{SUM}(B8:D8)$$

$$\frac{11 - 4}{28 - 4}$$

$$\frac{\text{SCORE} - \text{MIN}}{\text{MAX} - \text{MIN}}$$

② A MAC Model would not be so good in this case because it "trades off" time against cost.

Three Options Library, Police Station, and Fire Station all have fixed times that could put children at risk.

The town hall, because of its higher cost might not be chosen, but it is surely the safest.

What price safety?