Stat 461 HW10. Jiaqi Li

1.

Factor	R/F	N/C
Automatic Transmission	F	
MPG	R	
Horsepower	F	

Model: $Y_{it} = \mu + \alpha_i + \beta \cdot hp_{it} + (\alpha\beta)_i hp_{it} + \varepsilon_{it}$

$\varepsilon_{it} \overset{iid}{\sim} N(0, \sigma^2)$ hp_{it} = horsepower of t^{th} car.

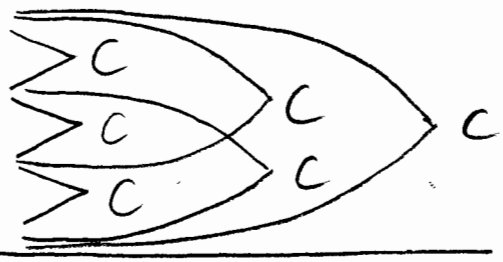
$i = 1, 0$ $t = 1, \ldots, r_i$ $(r_1 = 13, r_0 = 19)$

Y_{it} = the gas mileage of t^{th} car with/without automatic transmission.

Here, we treat horsepower as a continuous covariate

2.

Factor	R/F	N/C
Socio-economic Status	F	
School Type	F	
Write	F	
Math	R	



Model: $Y_{ijt} = \mu + \alpha_i + \beta_j + \gamma\, Write_{ijt} + (\alpha\gamma)_i Write_{ijt}$
$+ (\beta\gamma)_j Write_{ijt} + (\alpha\beta)_{ij} + \varepsilon_{ijt}$, $\varepsilon_{ijt} \overset{iid}{\sim} N(0, \sigma^2)$

$Write_{ijt}$ = t^{th} student's writing score with i^{th} Socio-economic Status and j^{th} School Type.

$i = 1, 2, 3$ $j = 1, 2$ $t = 1, \ldots, r_i$ $(r_1 = 47, r_2 = 95, r_3 = 58)$

Y_{ijt} = the math grade of t^{th} student with i^{th} Socio-economic Status and j^{th} School Type.

Here, we treat writing score as a continuous covariate