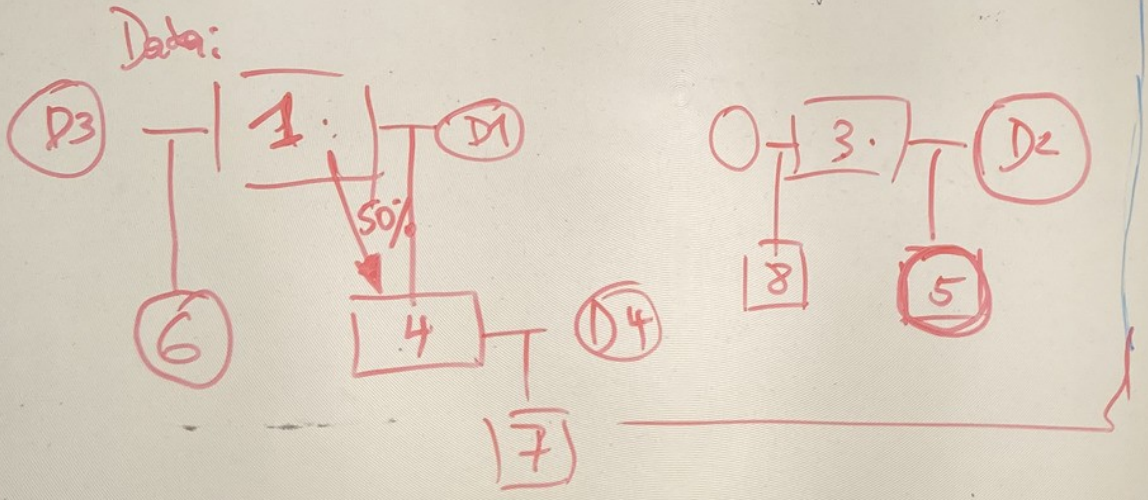
A_S : Sire relationship matrix

$D = var(s)$; Example $s = \begin{bmatrix} s_1 \\ s_3 \\ s_4 \end{bmatrix}$

$$D = var(s) = \begin{bmatrix} var(s_1) & cov(s_1,s_3) & cov(s_1,s_4) \\ cov(s_3,s_1) & var(s_3) & cov(s_3,s_4) \\ cov(s_4,s_1) & cov(s_4,s_3) & var(s_4) \end{bmatrix}$$

$var(s_4) = var(s_3) = var(s_4) = \sigma_S^2$



$$D = \begin{bmatrix} \sigma_S^2 & 0 & \frac{1}{2}\cdot\sigma_S^2 \\ 0 & \sigma_S^2 & 0 \\ \frac{1}{2}\cdot\sigma_S^2 & 0 & \sigma_S^2 \end{bmatrix} = A_S \cdot \sigma_S^2$$