UQ Genetics and Genomics Winter School, Practical notes
Basics, session 1

For the following matrices A-I:

a. Write down the dimensions of the matrices
b. Are there any special matrices (e.g. identity matrices).
c. Are any matrices not full rank? What does 'full rank' mean?

$$A = \begin{bmatrix} 1 & 1 & -2 \\ 3 & 3 & 0 \\ 2 & -1 & 1 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix} \qquad C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$D = \begin{bmatrix} 2 & 1 \\ 0 & 4 \\ 1 & 2 \end{bmatrix} \qquad E = D' \qquad F = \begin{bmatrix} 3 & 0 \\ 1 & 2 \end{bmatrix}$$

$$G = \begin{bmatrix} 1 \\ 3 \end{bmatrix} \qquad H = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \qquad I = \begin{bmatrix} 1 & 2 \\ 3 & 6 \\ 0 & 0 \end{bmatrix}$$

Calculate the following, by hand. If the operation cannot be done note why.

a. $2B$
b. BC
c. BD
d. CB
e. $B - E$
f. C'
g. AH
h. Which matrices have an inverse? Use R to calculate the inverse and show that (for example $A^{-1}A = I$

Check your answers using the R code provided.