Question 1: Generate a white noise vector $V_1$ of size 1000 that each of the element has standard normal distribution. Calculate the mean, standard deviation and variance of this vector.

Question 2: Generate a Gaussian white noise matrix $M_1$ of size 10x10 that has mean 3 and variance 5. Calculate the mean and variance of all the values in $M_1$; Calculate the covariance and correlation matrices.

Question 3: Generate a Gaussian white noise matrix $M_2$ of size 10x8 that has mean 0 and standard deviation 5. Calculate the correlation matrix between $M_1$ and $M_2$.

Question 4: Plot $V_1$. Plot the histogram of all the values in $V_1$ and $M_2$ separately, and set bin to 20.

Solution:

Question 1:

$V_1 = \text{randn}(1000,1);
\text{mean}(V1);
\text{std}(V1);
\text{var}(V1);
$

Question 2:

$M_1 = 3 + \sqrt{5} \times \text{randn}(10,10);
\text{mean}(M1(:));
\text{var}(M1(:));
\text{cov}(M1);
corr(M1);

Q 3:
M2 = 5*randn(10,8);
corr(M1,M2);

Q 4:
plot(V1)
hist(V1,20)
hist(M2(:,20))