1. Refer to Example 6.30 in [LeGar08] (Diversity Receiver).
   (a) Perform a simulation of the received signals by generating $10^5$ samples of $X$, $N_1$ and $N_2$ and creating the resulting received signals $(Y_1, Y_2)'$. Show by means of the simulation that the estimator,
   
   \[ \hat{X} = 0.4Y_1 + 0.4Y_2, \]
   
   indeed achieves an MSE of 0.4.
   (b) Consider now estimators of the form $\hat{X}_c = cY_1 + cY_2$ for $c \in [0.2, 0.8]$. Show by means of repeated simulations that the minimal $MSE$ is achieved when $c = 0.4$.
   (c) Generalize the problem to the case of 3 antennas. (Perhaps nicer to assume now that $Var(X) = 3$). Find the LMSE, $\hat{X}(Y_1, Y_2, Y_3)$. Find the MSE of this estimator.

2. Do Exercise 6.90 from [LeGar08]. This exercise refers to Example 6.31.

Good Luck.