星期一（4/15）各隊報告事項：

1. Generate a set of random data. In Matlab, it can be easily done by the m file called “randn”. The data length must be >= 2048.
2. Form a set of input data with the set of random data followed by an equal length of zeros (see Page 35 of the lecture note FRF1). Use the set of input data to excite your simple mass-spring model to obtain three sets of output data for displacement, velocity, and acceleration measurements.
3. Compute the discrete Fourier transforms (DFT) of the input and output data. Calculate the frequency response functions (FRF) at every frequency point, i.e. DFT of output divided by DFT of input at every frequency point.
4. Repeat Step 1 (with a different set of random data) to Step 3 to generate at least 10 sets of FRFs for displacement, velocity, and acceleration measurements.
5. Perform averaging to obtain averaged FRFs for displacement, velocity, and acceleration measurements.
6. Take inverse of discrete Fourier transform of the averaged FRFs to obtain three sets of pulse response for displacement, velocity, acceleration. In Matlab, the m file “ifft” will do the job.
7. Use ERA to identify the system matrices A, B, C, and D. Note that zero singular values may not exist. You may divide all singular values by the largest singular value, and treat all small ratios (<0.01 for example) to be zero singular values to reduce the size of system order.
8. Verify system matrices A, B, C, and D by comparing the system Markov parameters with the pulse response.