# 18.06 (Fall '13) Problem Set 9

This problem set is due Thursday, November 21, 2013 by 4pm in E17-131.

1. Do Q6 from 6.6. It's not necessary for solving the problem, but you can make Julia conveniently list the 16 matrices together with their eigenvalues using the following code:

```
for i=0:15
    A=reshape(digits(i,2,4),2,2);
    println("Matrix ",i,":")
    println(A);
    println("eigs: ",eigvals(float(A))')
end
```

2. Do Q17 from 6.6.

3. Do Q24 from 6.6.

4. Do Q4 from 6.7.

5. Now calculate the singular values of

$$A = \begin{pmatrix} 0 & 1 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{pmatrix}$$

   How is this connected to the previous problem?

6. Explain the answer to problem 5 without forming $A^T A$ or $A A^T$.

7. Do Q6 from 8.1. (By "column times row multiplcation", the book means taking the outer product of a column of $A$ and a row of $A^T$.)