This problem set on lectures 11 – 14 is due Wednesday (March 10th), at 4 PM, at 2-106. Make sure to include your name and recitation number in your homework! The numbers of the sections and exercises refer to “Introduction to Linear Algebra, 3rd Edition, by Gilbert Strang.”.

Lecture 11:
- **Work**: book section 3.6 (exercises 4, 25, 26, 28 and 29)

Lecture 12:
- **Read**: book section 8.2.
- **Work**: book section 8.2 (exercises 8, 11 and 17).

Lecture 13:
- **Work**: book section 4.1 (exercises 3, 6, 7, 26 and 28).

Lecture 14:
- **Read**: book section 4.2.
- **Work**: book section 4.2 (exercises 4, 13, 17, 19, 25, 27 and 29).

**Challenge Problem** Let $A$ be a $3 \times 3$ matrix. Prove that if $A^3$ is not the zero matrix, then $A^n$ is not zero for all positive integer $n$.

**Hint**: Divide the problem into cases, according to the possible ranks this matrix can have. You may use without proving the very nice fact that any matrix $B$ can be written as the sum of rank one matrices: $B = u_1v_1^T + \ldots + u_kv_k^T$, where $k$ is the rank of the matrix $B$.

Please staple your solution as first page of your homework.