

21001, Section 01, Linear Algebra and applications  
HW 3, DUE Wednesday, February 16  
Instructor: Prof. Artem Zvavitch  
**GOOD LUCK!!!**

**Problem 1.** Find the inverse of the given matrices, if possible. (Note those are so called "bit" matrices, because all elements are 0 or 1)

a)

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}.$$

b)

$$B = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}.$$

**Problem 2.** Let

$$A^{-1} = \begin{bmatrix} 3 & 2 \\ 1 & 3 \end{bmatrix}, B^{-1} = \begin{bmatrix} 2 & 5 \\ 3 & -2 \end{bmatrix}.$$

Find

$$AB$$

**Problem 3.** If  $A$  and  $B$  are invertible are  $A + B$ ,  $A - B$ , and  $-A$  invertible? **EXPLAIN!!**

**Problem 4.** Show that the matrix

$$A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix},$$

is invertible (for any angle  $\theta$ ), and compute its inverse.