21001, Section 03, Linear Algebra and applications
HW 3, DUE Thursday, September 20
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 θ), and compute it inverse.