Linear algebra review: matrix

$$\overbrace{\begin{bmatrix} 1 & 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 \end{bmatrix}}^{A:3\times 7}$$

- *dual spaces*: row space and column space of A
- rank, dimension, orthogonal basis of A
- finding orthogonal basis: SVD (Singular Value Decomposition), QR decomposition, etc.
- linear transformation $A\vec{x} = \vec{y}$, that is, $A : R^n \mapsto R^m$

$$\overbrace{\begin{bmatrix} 1 & 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 \end{bmatrix}}^{A:3\times 7} \overbrace{\begin{bmatrix} 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}}^{\vec{x}} = \overbrace{\begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}}^{\vec{y}}$$