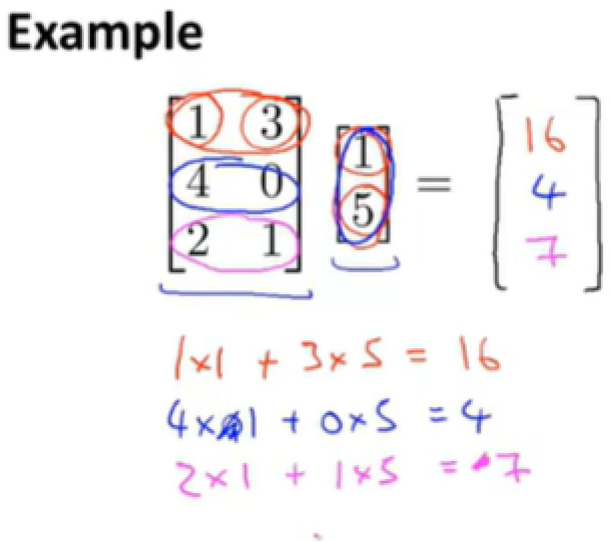
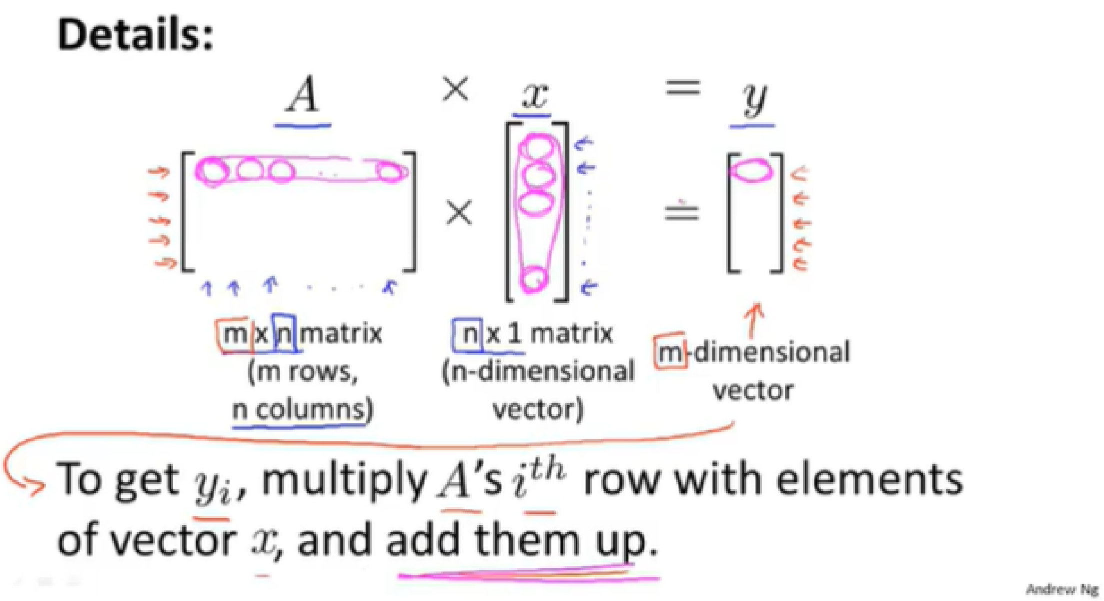
矩阵乘法

矩阵和向量相乘:



3X2矩阵和2X1的向量相乘 得到 3X1的向量



矩阵和矩阵相乘:

Example

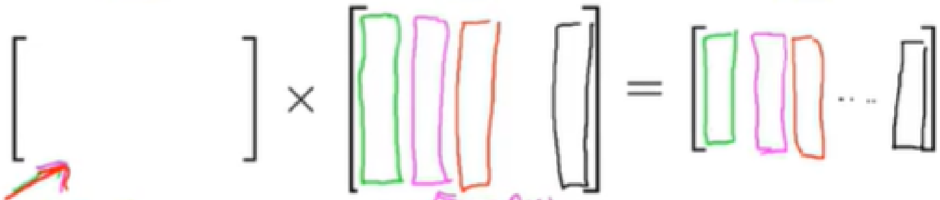
$$\underbrace{\begin{bmatrix}1 & 3 & 2\\4 & 0 & 1\end{bmatrix}}_{2\times 3}\underbrace{\begin{bmatrix}1 & 3\\0 & 1\\5 & 2\end{bmatrix}}_{3\times 2}=\underbrace{\begin{bmatrix}11 & 10\\9 & 14\end{bmatrix}}_{2\times 2}$$

$$\begin{bmatrix}1 & 3 & 2\\4 & 0 & 1\end{bmatrix}\times\begin{bmatrix}1\\0\\5\end{bmatrix}=\begin{bmatrix}11\\9\end{bmatrix}$$

$$\begin{bmatrix}1 & 3 & 2\\4 & 0 & 1\end{bmatrix}\times\begin{bmatrix}3\\1\\2\end{bmatrix}=\begin{bmatrix}10\\14\end{bmatrix}$$

Details:

$$A \quad \times \quad B \quad = \quad C$$



A	B	C
m x n matrix (m rows, n columns)	n x o matrix (n rows, o columns)	m x o matrix

n x 1

The i^{th} column of the matrix C is obtained by multiplying A with the i^{th} column of B. (for i = 1,2,…,o)

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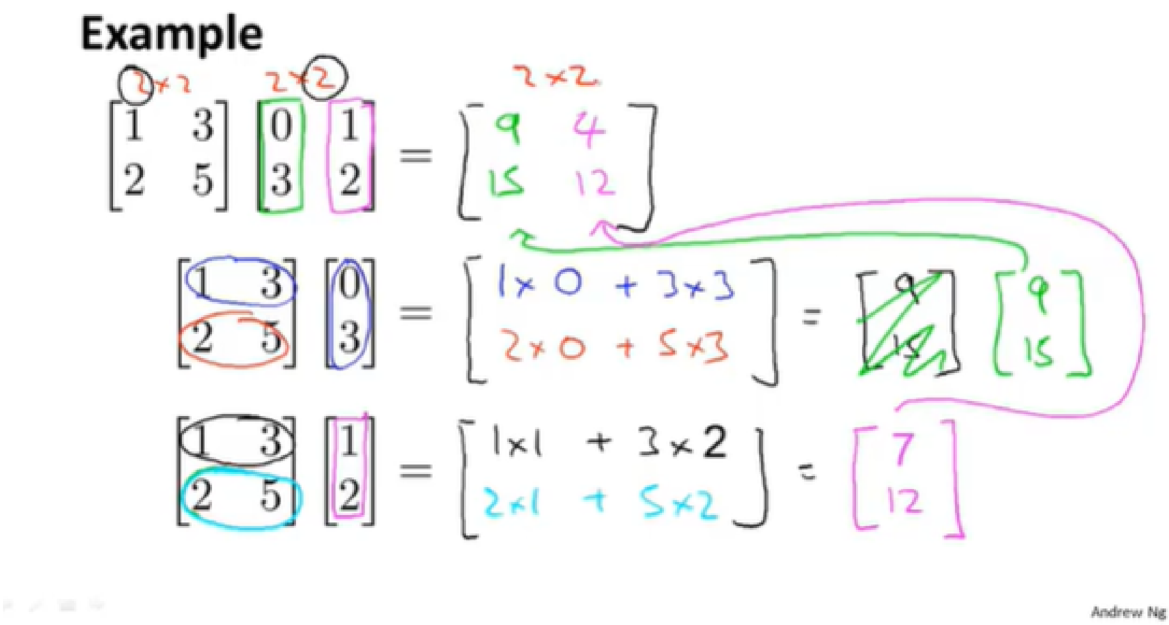
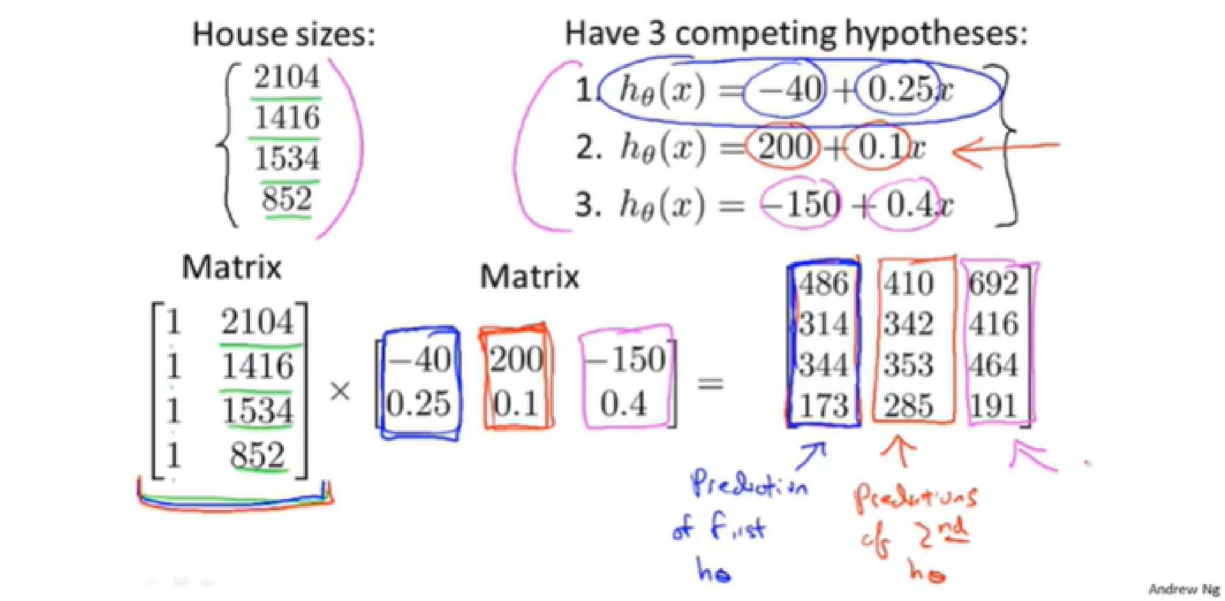


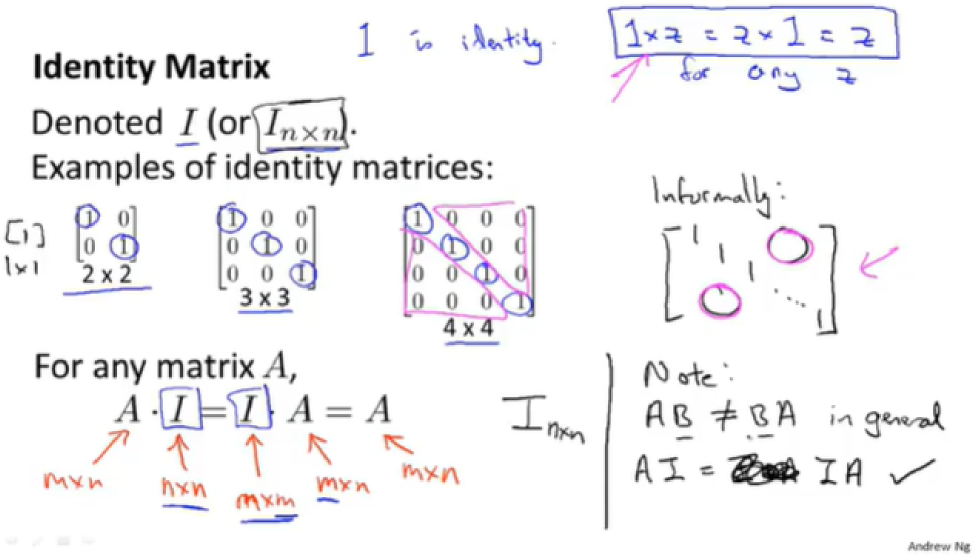


矩阵乘法特征：

1.矩阵乘法不服从交换律，不可交换

2.矩阵乘法服从结合律 mxn nxi ixj = mxj

单位矩阵：



单位矩阵和其他矩阵的乘法符合交换律