

$$\left(\begin{array}{c|c} | & \dots & | \end{array} \right) = B$$

$$A = \left(\begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \\ \vdots \\ \text{---} \end{array} \right) \left(\begin{array}{c} \bullet & \bullet & \dots & \bullet \\ \bullet & \bullet & \dots & \bullet \\ \bullet & \bullet & \dots & \bullet \\ \vdots & \vdots & \dots & \vdots \\ \bullet & \bullet & \dots & \bullet \end{array} \right) = C = AB$$

$$\text{Row}_i A \cdot \text{Col}_k B = C_{ik}$$

Notice: if $\text{Row}_i A = 0$ then $\text{Row}_i AB = 0$
 if $\text{Col}_k B = 0$ then $\text{Col}_k AB = 0$

$$A = \begin{pmatrix} 3 & 0 \\ -2 & 0 \end{pmatrix} \begin{pmatrix} 2 & -1 \\ -4 & 2 \end{pmatrix} = C = AB \quad \left\| \begin{array}{c} \begin{pmatrix} 3 & 0 \\ -2 & 0 \end{pmatrix} \\ \begin{pmatrix} 2 & -1 \\ 0 & 0 \end{pmatrix} \\ \begin{pmatrix} 8 & 0 \\ 0 & 0 \end{pmatrix} \end{array} \right.$$

$$\begin{matrix} A & \cdot & B & = & C \\ m \times n & & n \times p & & m \times p \end{matrix}$$

Matrix Multiplication 2