Step-1

Consider the matrix:

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

Calculate eigenvalues of A by $|A - \lambda I| = 0$,

This implies;

$$\begin{bmatrix} 1\text{-}\lambda & 1 \\ 1 & 1\text{-}\lambda \end{bmatrix} = 0$$

This implies;

$$(1-\lambda)^2 - 1 = 0$$
$$(1-\lambda)^2 = 1$$
$$(1-\lambda) = \pm 1$$

This implies;

$$\lambda_1 = 2$$
$$\lambda_2 = 0$$

Thus, the Jordan form of A is given by,

$$J = \begin{bmatrix} 2 & 0 \\ 0 & 0 \end{bmatrix}$$

Step-2

Consider the matrix:

$$B = \begin{bmatrix} 0 & 1 & 2 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$
$$= \begin{bmatrix} 0 & \mathrm{C} \\ 0 & 0 \end{bmatrix}$$

Thus,

$$C = \begin{bmatrix} 1 & 2 \\ 0 & 0 \end{bmatrix}$$

Calculate eigenvalues of C by $|C-\lambda I|=0$,

This implies;

$$\begin{bmatrix} 1\text{-}\lambda & 2 \\ 0 & \text{-}\lambda \end{bmatrix} = 0$$

This implies;

$$-\lambda(1-\lambda)=0$$

This implies;

$$\lambda_1 = 1$$
$$\lambda_2 = 0$$

Thus, the Jordan form of *B* is given by,

$$J = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Step-3

Thus, $\boxed{J = \begin{bmatrix} 2 & 0 \\ 0 & 0 \end{bmatrix}}$ and $\boxed{J = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}}$.