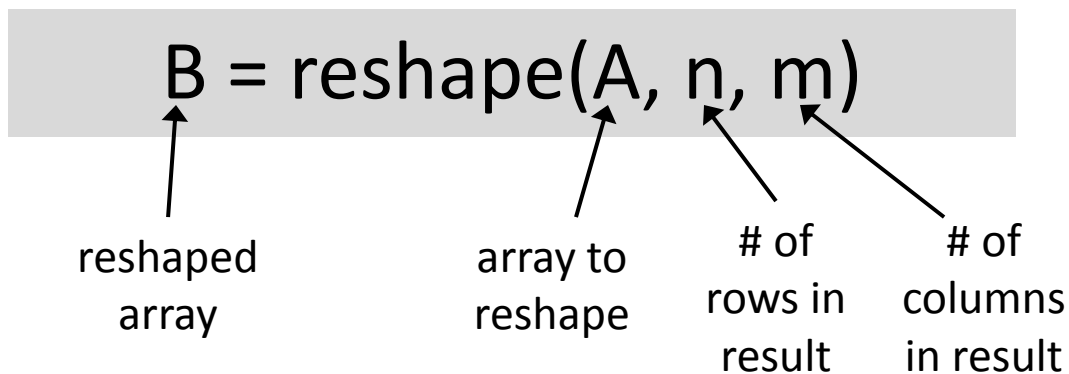


CS 1173: MATLAB reshape function

The reshape function returns a new array with n rows and m columns (n*m must equal the number of elements in the original array). The new array has the same elements as the original.



Reshaping strategy: find the linear representation and re-cut based on the number of rows in the reshaped array.

Example 1: Different ways to apply reshape to array A

```
A = [1, 2, 3; 4, 5, 6];  
B = reshape(A, 3, 2);  
C = reshape(A, 2, 3);
```

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} \quad A(:) = \begin{bmatrix} 1 \\ 4 \\ 2 \\ 5 \\ 3 \\ 6 \end{bmatrix}$$

$$B = \text{reshape}(A, 3, 2)$$

recut

$$C = \text{reshape}(A, 2, 3)$$

recut

Example 2: Two more ways to reshape to array A

```
A = [1, 2, 3; 4, 5, 6];  
B = reshape(A, 6, 1);  
C = reshape(A, 1, 6);
```

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$$

$$A(:) = \begin{bmatrix} 1 \\ 4 \\ 2 \\ 5 \\ 3 \\ 6 \end{bmatrix}$$

$B = \text{reshape}(A, 6, 1)$

$C = \text{reshape}(A, 1, 6)$

$$\begin{bmatrix} 1 \\ 4 \\ 2 \\ 5 \\ 3 \\ 6 \end{bmatrix} \Rightarrow B = \begin{bmatrix} 1 \\ 4 \\ 2 \\ 5 \\ 3 \\ 6 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ 4 \\ 2 \\ 5 \\ 3 \\ 6 \end{bmatrix} \Rightarrow C = [1 \ 4 \ 2 \ 5 \ 3 \ 6]$$

recut

recut

Example 3: Reshaping a row vector

```
A = [1, 2, 3, 4, 5, 6];  
B = reshape(A, 2, 3);  
C = reshape(A, 3, 2);
```

$$A = [1 \ 2 \ 3 \ 4 \ 5 \ 6]$$

$B = \text{reshape}(A, 2, 3)$

$C = \text{reshape}(A, 3, 2)$

$$\begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \end{bmatrix} \Rightarrow B = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 6 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \end{bmatrix} \Rightarrow C = \begin{bmatrix} 1 & 4 \\ 2 & 5 \\ 3 & 6 \end{bmatrix}$$

recut

recut