‹Back to Week 1   ✕Lessons   Prev │ Next

Matrix-Matrix Multiplication

We multiply two matrices by breaking it into several vector multiplications and concatenating the result.

$$\begin{bmatrix} a & b \\ c & d \\ e & f \end{bmatrix} * \begin{bmatrix} w & x \\ y & z \end{bmatrix} = \begin{bmatrix} a*w+b*y & a*x+b*z \\ c*w+d*y & c*x+d*z \\ e*w+f*y & e*x+f*z \end{bmatrix}$$

An **m x n matrix** multiplied by an **n x o matrix** results in an **m x o** matrix. In the above example, a 3 x 2 matrix times a 2 x 2 matrix resulted in a 3 x 2 matrix.

To multiply two matrices, the number of **columns** of the first matrix must equal the number of **rows** of the second matrix.

For example:

```
 1   % Initialize a 3 by 2 matrix
 2   A = [1, 2; 3, 4;5, 6]
 3
 4   % Initialize a 2 by 1 matrix
 5   B = [1; 2]
 6
 7   % We expect a resulting matrix of (3 by 2)*(2 by 1) = (3 by 1)
 8   mult_AB = A*B
 9
10   % Make sure you understand why we got that result
```

                                                        Run

                                                       Reset

```
A =

   1   2
   3   4
   5   6

B =

   1
   2

mult_AB =

    5
   11
   17
```

✓ Complete

👍 👎 🏳