CS 1173: MATLAB sum function

The sum function returns the sum along an array dimension.

**Example 1: Different ways to apply sum to array A**

\[
A = \begin{bmatrix}
1 & 2 & 6 \\
4 & -7 & 0
\end{bmatrix}
\]

B = sum(A, 1) = \[
\begin{bmatrix}
5 \\
-5 \\
6
\end{bmatrix}
\]

C = sum(A, 2) = \[
\begin{bmatrix}
9 \\
-3
\end{bmatrix}
\]

In MATLAB:

```matlab
A = [1, 2, 6; 4, -7, 0];
B = sum(A, 1);
C = sum(A, 2);
```
CS 1173: MATLAB sum function (1 argument)

When you don’t include the dimension argument, sum adds along the first non-singleton dimension. For a single row or column, the result is just one number.

Example 1: A has both rows and columns

\[ A = \begin{bmatrix} 1, & 2, & 6; & 4, & -7, & 0 \end{bmatrix}; \]
\[ B = \text{sum}(A); \]
\[ C = \text{sum}(A(:)); \]

The first non-singleton dimension is 1

\[ B = \text{sum}(A) = \begin{bmatrix} 5 & -5 & 6 \end{bmatrix} \]
\[ C = \text{sum}(A(:)) = 6 \]

Example 2: A has just one row

\[ A = \begin{bmatrix} 1, & 2, & 6 \end{bmatrix}; \]
\[ B = \text{sum}(A); \]

The first non-singleton dimension is 2

\[ B = \text{sum}(A) = 9 \]

Example 3: A has just one column

\[ A = \begin{bmatrix} 1; & 4 \end{bmatrix}; \]
\[ B = \text{sum}(A); \]

The first non-singleton dimension is 1

\[ B = \text{sum}(A) = 5 \]