### Example: Using QR Decomposition for Orthogonalization

The qr function in R can be used to compute the QR decomposition of a matrix, where Q is the orthogonal matrix, and R is the upper triangular matrix.

### Explanation

**Matrix Definition**:

* 1. The matrix A is defined where each column represents a vector to be orthogonalized.

**QR Decomposition**:

* 1. The qr function computes the QR decomposition of A. It returns an object containing the orthogonal matrix Q and the upper triangular matrix R.

**Extracting** Q **and** R:

* 1. The qr.Q function extracts the orthogonal matrix Q from the QR decomposition object.
  2. The qr.R function extracts the upper triangular matrix R from the QR decomposition object.

**Output**:

* 1. The orthogonal matrix Q and the upper triangular matrix R are printed.
  2. The orthogonality of Q is verified by computing QT∗QQ^T \* QQT∗Q, which should be the identity matrix if Q is orthogonal.

### Conclusion

Using the qr function for QR decomposition significantly simplifies the process of orthogonalizing a set of vectors. This concise approach leverages R's built-in functions to achieve the same result with less code and improved readability.