NumPy Tasks

1. Basic Vector Operations

Create two random vectors of size 3 and perform the following operations:

- Addition
- Subtraction
- Element-wise Multiplication
- Scalar Multiplication (Multiply by a constant)
- Compute the norm (magnitude) of each vector

2. Compute the Dot Product & Angle Between Vectors

Given two vectors, compute:

- The dot product
- The cosine similarity
- The angle (in degrees) between them

3. Compute Vector Projection

Find the projection of one vector onto another.

4. Cross Product (For 3D Vectors)

Compute the cross product of two 3D vectors and verify if the result is perpendicular to both vectors.

5. Checking Linear Dependence

Determine whether two vectors are linearly dependent.

6. Normalize a Vector

Convert a non-zero vector into a unit vector.

7. Solve a Vector Equation

Given a vector equation of the form `xA + yB = C`, solve for `x` and `y` when `A`, `B`, and `C` are given vectors.

8. Find the Closest Vector

Given a list of vectors, find which vector is closest to a given target vector using Euclidean distance.

9. Compute Vector Similarity in ML

Given two text embeddings (high-dimensional vectors), compute their cosine similarity.