Assignment 1

August 13, 2023

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Q. 1 Write a function `Multiply` that may be used to multiply two matrices given the matrices and the size of both matrices. Use assertion to verify that the matrices are of suitable sizes to be multiplied.

Q. 2 Overload the function `Multiply` written in the previous exercise so that it may be used to multiply:

(a) a vector and a matrix of given sizes;

(b) a matrix and a vector of given sizes;

(c) a scalar and a matrix of a given size; and

(d) a matrix of a given size and a scalar.

Q. 3 The $p-$norm of a vector v of length n is given by

$$||v||_p = \left(\sum_{i=1}^{n} |v_i|^p \right)^{1/p}$$

where p is a positive integer. As a function norm to the above code to calculate the $p-$norm of a given vector, where p takes the default value 2.

Write an appropriate `main` function to show case the usages of the above written functions.