Assignment 5: Assignment: Matrix Multiplication in Python

Math 264
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Objective:

To develop and implement two methods of matrix multiplication in Python: a custom method and using the NumPy library.

Prerequisites:

- Basic understanding of matrix multiplication.

- Python environment with NumPy installed.

Tasks:

1. Custom Matrix Multiplication:

1. Implement a function, named `custom_matrix_multiply`, to perform matrix multiplication without using any external libraries.

2. NumPy Matrix Multiplication:

1. Use NumPy's `dot` function to perform matrix multiplication.

3. Generate Test Matrices:

1. Write a function to generate random matrices of varying sizes for testing both multiplication methods.

Instructions:

- Implement the custom matrix multiplication method using nested loops.

- Use the `numpy.dot()` function for the NumPy method.

- Ensure that both methods can handle matrices of any size provided they are compatible for multiplication.

- Test both methods with matrices of different sizes to ensure they work correctly.

Submission:

Submit a Jupyter Notebook or a Python script file that contains the implementation of both methods and test cases demonstrating their functionality.

Evaluation Criteria:

- Correctness and efficiency of the custom matrix multiplication implementation.

- Proper use of NumPy's matrix multiplication method.

- Ability to handle different matrix sizes and properly validate matrix compatibility.

- Clarity and readability of the code, including comments.

Additional Resources:

For more information on NumPy's matrix operations, refer to the NumPy documentation: Colab.