| **National University of Computer and Emerging Sciences, Lahore Campus** | | | | |
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| C:\Users\saif\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\final design.jpg | **Course:** | **Computer Networks** | **Course Code:** | **CL-3001** |
| **Program:** | **BS (Computer Science)** | **Semester:** | **Fall 2024** |
| **Duration:** | **60 Minutes** | **Total Marks:** | **10** |
| **Paper Date:** | **29-Nov-24** |  |  |
| **Section:** | **5G** |  |  |
| **Exam:** | **Quiz-II** |  |  |
| **Instruction/Notes:** | Do not bring any unauthorized material (e.g. written notes, notes in dictionaries, paper, sticky tape eraser etc.)  Good luck! | | | |

**Question:**

You are tasked with creating a client-server application in Python that performs matrix multiplication. The application should follow these requirements:

1. The client:

* Sends two matrices (Matrix A and Matrix B) to the server.
* Receives either the result of the matrix multiplication or an error message from the server.
* Displays the result or error message to the user.

2. The server:

* Receives the two matrices from the client.
* Checks if the matrices are compatible for multiplication (i.e., the number of columns in Matrix A must equal the number of rows in Matrix B).
* If compatible, performs the matrix multiplication using the following formula:
* Sends the output back to client

**Formula for Matrix Multiplication:**

cij​=ai1​⋅b1j​+ai2​⋅b2j​+⋯+ain​⋅bnj​

**Example:**

1. Client Input:

Matrix A:

[[1, 2],

[3, 4]]

Matrix B:

[[5, 6],

[7, 8]]

Server Output (Sent to Client):

Resultant Matrix:

[[19, 22],

[43, 50]]

2. Client Input (Invalid Case):

Matrix A:

[[1, 2, 3],

[4, 5, 6]]

Matrix B:

[[1, 2]]

Server Output (Sent to Client):

"Error: Incompatible matrices for multiplication."

**Instructions:**

Implement the client-server communication using TCP/UDP sockets.

Ensure proper error handling for invalid inputs or server errors.

Follow the matrix multiplication formula to compute the resultant matrix.

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