**Matrix Interview Questions – Problem Statements and Explanations**

**1. Check if a Matrix is Square**  
**Problem:** Determine if the given matrix is square.  
**Explanation:** A matrix is square if the number of rows equals the number of columns.  
**Input:** [[1, 2], [3, 4]]  
**Output:** True

**2. Print Diagonal Elements**  
**Problem:** Print the main diagonal elements of a square matrix.  
**Explanation:** Elements where row index equals column index.  
**Input:** [[1, 2], [3, 4]]  
**Output:** [1, 4]

**3. Print Anti-Diagonal Elements**  
**Problem:** Print the anti-diagonal elements.  
**Explanation:** Elements where row + column = n - 1.  
**Input:** [[1, 2], [3, 4]]  
**Output:** [2, 3]

**4. Print Non-Diagonal Elements**  
**Problem:** Print all elements except the main diagonal.  
**Input:** [[1, 2], [3, 4]]  
**Output:** [2, 3]

**5. Print Non-Anti-Diagonal Elements**  
**Problem:** Print all elements excluding anti-diagonal.  
**Input:** [[1, 2], [3, 4]]  
**Output:** [1, 4]

**6. Lower Triangle of Matrix**  
**Problem:** Extract elements in or below the main diagonal.  
**Input:** [[1, 2], [3, 4]]  
**Output:** [[1, 0], [3, 4]]

**7. Upper Triangle of Matrix**  
**Problem:** Extract elements in or above the main diagonal.  
**Input:** [[1, 2], [3, 4]]  
**Output:** [[1, 2], [0, 4]]

**8. Transpose of Matrix**  
**Problem:** Transpose the matrix (flip over the diagonal).  
**Input:** [[1, 2], [3, 4]]  
**Output:** [[1, 3], [2, 4]]

**9. Check if Diagonal Elements are Same**  
**Problem:** Verify all diagonal elements are equal.  
**Input:** [[5, 0], [0, 5]]  
**Output:** True

**10. Check if Anti-Diagonal Elements are Same**  
**Problem:** Verify all anti-diagonal elements are equal.  
**Input:** [[0, 3], [3, 0]]  
**Output:** True

**11. Convert Diagonal Elements to Zero**  
**Problem:** Set all diagonal elements to zero.  
**Input:** [[1, 2], [3, 4]]  
**Output:** [[0, 2], [3, 0]]

**12. Convert Anti-Diagonal Elements to Zero**  
**Problem:** Set all anti-diagonal elements to zero.  
**Input:** [[1, 2], [3, 4]]  
**Output:** [[1, 0], [0, 4]]

**13. Convert Non-Diagonal Elements to Zero**  
**Problem:** Only keep diagonal elements, set rest to zero.  
**Input:** [[1, 2], [3, 4]]  
**Output:** [[1, 0], [0, 4]]

**14. Sum of All Elements in Matrix**  
**Problem:** Calculate the total sum of matrix elements.  
**Input:** [[1, 2], [3, 4]]  
**Output:** 10

**15. Matrix Multiplication**  
**Problem:** Multiply two matrices if their dimensions are compatible.  
**Input:** A = [[1, 2], [3, 4]], B = [[5, 6], [7, 8]]  
**Output:** [[19, 22], [43, 50]]

Would you like to: - 🐍 Add Python code examples for these? - 📥 Export as a PDF? - ➕ Add more matrix operations (e.g. determinant, inverse)?