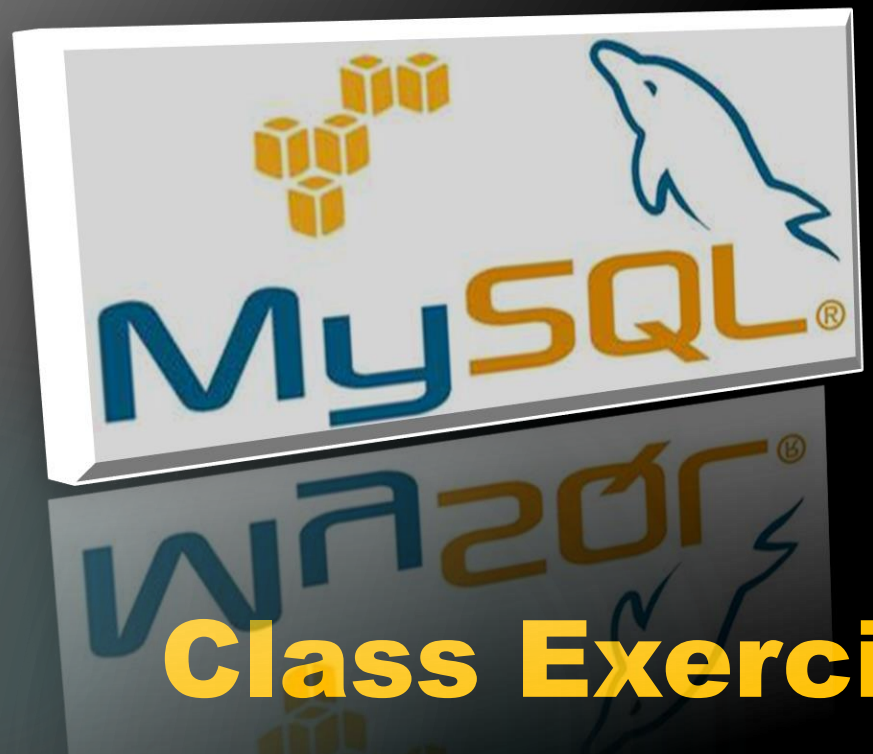
IS664 Database Programming
FALL 2022

CEX



Class Exercise 3

ADVANCED STORED PROCEDURES

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General

TASKS

Stored Procedure CypherMatrixBuilder

Creates a database Cyber_Lock containing a single table CyberMatrix of 5 x 5 and 4 x 4 integer matrices(5 of each) represented as JSON arrays. The arrays must be randomly generated not hardcoded. The primary key of the table must be auto_incremented.

Stored Procedure CypherMatrixSolver

Accepts a command and performs the specified operation (see list of operations) on the specified JSON arrays stored in the CyberMatrix table of Cyber_Lock database and displays the results as a JSON array.

Command	Operations
ADD	Slide 4
SUM_COLUMN	Slide 5
SUM_ROW	Slide 5
SUM_DIAGONAL	Slide 5
REORDER_EVEN	Slide 6
REORDER_ODD	Slide 6
FLATTEN	Slide 6

Command	Operations
REDUCE_SUM	Slide 7
REDUCE_DIFF	Slide 7
DISTANCE	Slide 8

General

Cypher Matrix				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Column

Cypher Matrix				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Left Diagonal

Cypher Matrix				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Row

Cypher Matrix				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Right Diagonal

The length of a Matrix is the number of rows in the Matrix.

The dimensions of a matrix is specified by Row x Column i.e., 5 x 5 (5 rows and 5 columns)

A Square Matrix is a matrix in which the number of rows in the same as the number of columns.

A CypherMatrix is a square matrix of any length.

Add Matrices

Cypher Matrix A				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Cypher Matrix B				
7	2	6	4	3
4	9	3	7	2
6	7	4	7	3
1	1	1	1	1
3	2	1	2	1

A + B

Cypher Matrix A + B				
8	4	9	8	8
4	18	11	14	8
12	12	8	10	5
7	8	9	10	2
8	6	4	4	1

Matrices must be Square and of the same length to be added.
Addition occurs by summing corresponding indices from both Matrices.

Sum Columns

Cypher Matrix A				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Cypher Matrix SC(A)				
18	27	26	25	15

Sum Rows

Cypher Matrix A				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Cypher Matrix SR(A)				
15	30	20	31	15

Sum Diagonals

Cypher Matrix A				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Cypher Matrix SD(A)	
24	28

Reorder Even

Cypher Matrix A				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Cyber Matrix A				
2	4	8	6	6
4	2	6	8	4
2	1	3	5	0
9	7	5	3	7
9	1	5	3	1

Flatten

Cypher Matrix A				
1	2	3	4	5
0	9	8	7	6
6	5	4	3	2
6	7	8	9	1
5	4	3	2	1

Cyber Matrix A																							
1	2	3	4	5	0	9	8	7	6	6	5	4	3	2	6	7	8	9	1	5	4	3	2	1

Row Reduction

Cypher Matrix A			
1	2	3	4
0	9	8	7
6	5	4	3
6	7	8	9

Cypher Matrix A			
1	11	11	11
12	12	12	12

Cypher Matrix A			
1	2	3	4
0	9	8	7
6	5	4	3
6	7	8	9

Cypher Matrix A			
1	7	5	3
0	2	4	6

The length of the Matrix must be even

Row Distance

Cypher Matrix A			
1	2	3	4
0	9	8	7
6	5	4	3
6	7	8	9

Distance Matrix A
9
7

The length of the Matrix must be even

$$D = \sqrt{(X1 - X2)^2 + (Y1 - Y2)^2 + (Z1 - Z2)^2 + (W1 - W2)^2}$$