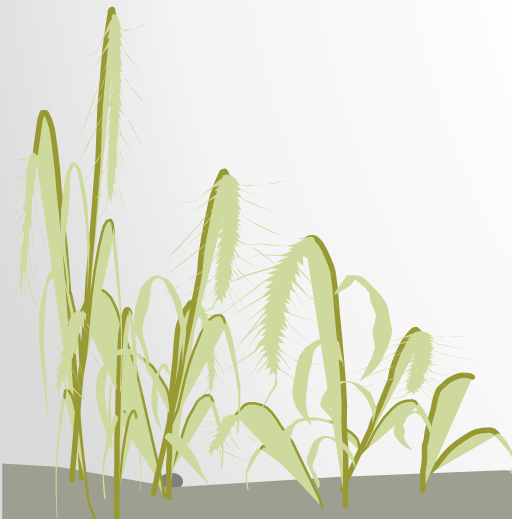# Interacting with matter and real-world using Matrices of Sets

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IEEE and IET member
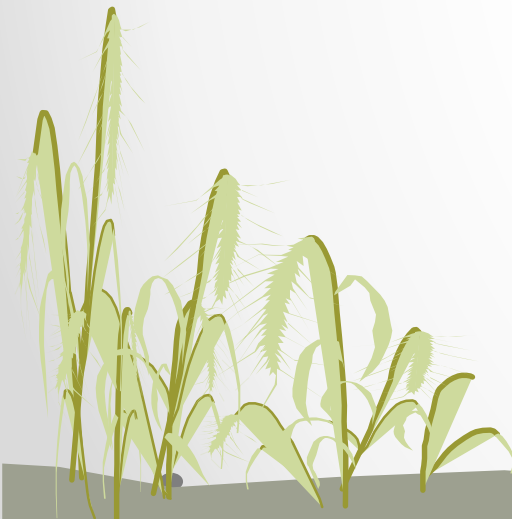
Once upon a time in India ...and elsewhere

Story of the chess player or inventor and the ruler:
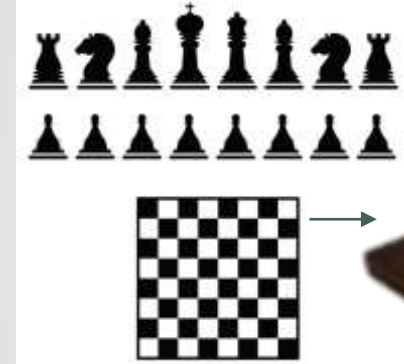
-the chess player or inventor could claim any reward,

-chose grains of rice: twice as many, moving from one box of

the chessboard to the next.

The cumulated reward is the sum $1 + 2 + \ldots + 2^{63} = 2^{64} - 1$

The chessboard parabole

Chess Game
Mental construct

Rice grains on chessboard
REAL OBJECTS

2^0	2^1	...					2^7
2^8	...						2^{15}
2^{56}	...						2^{63}

Geometric progression and Series
NUMBERS

Matrix of numbers
$m(i,j) = 2^{8(i-1)+j-1}$
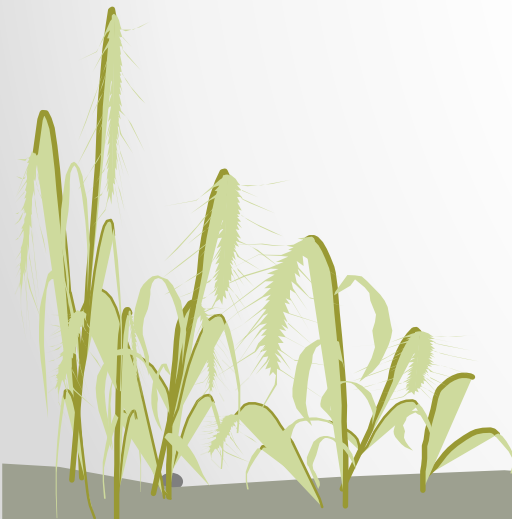
Matrices of Sets
between Objects and Quantities

Chess Game
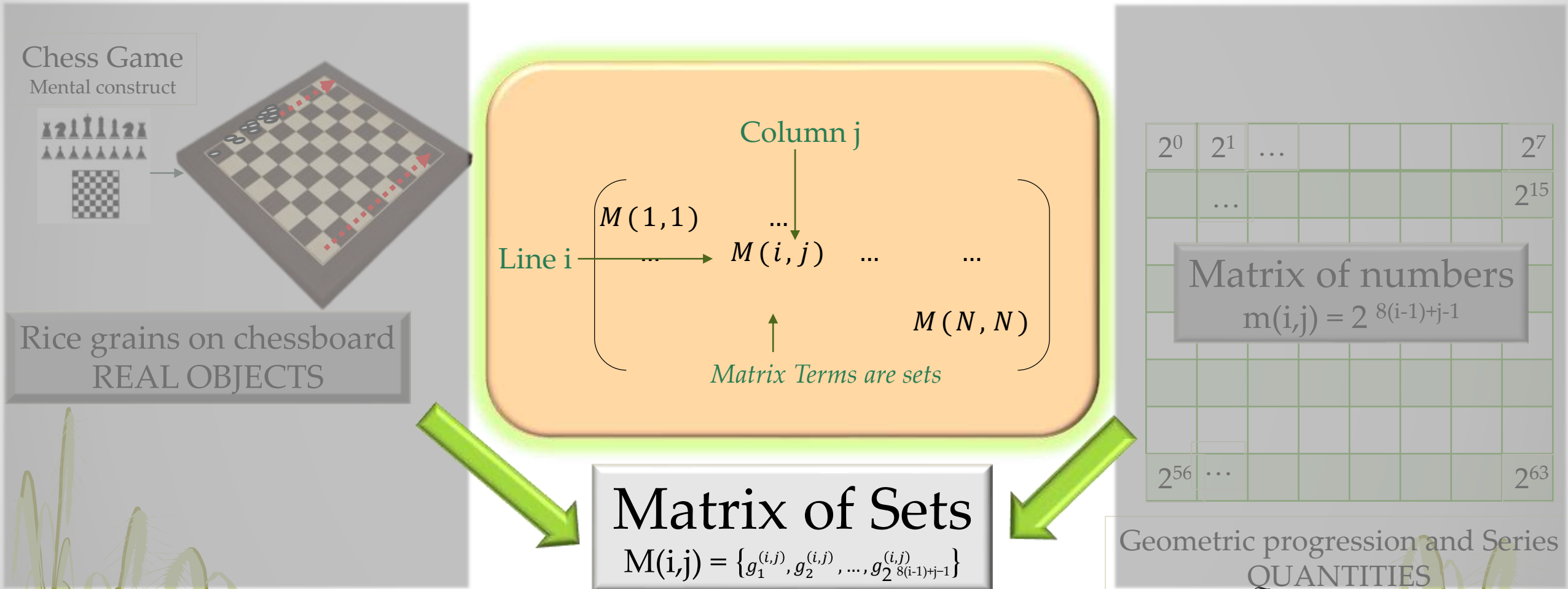Mental construct

Rice grains on chessboard
REAL OBJECTS

Column j

$$M(1,1) \quad \dots$$

Line i $\quad \dots \quad M(i,j) \quad \dots \quad \dots$

$$M(N,N)$$

Matrix Terms are sets

2^0 $\quad 2^1$ $\quad \dots$ $\qquad\qquad 2^7$

$\dots \qquad\qquad\qquad 2^{15}$

Matrix of numbers
$m(i,j) = 2^{\,8(i-1)+j-1}$

2^{56} $\dots$ $\qquad\qquad\qquad 2^{63}$

Geometric progression and Series
QUANTITIES

Matrix of Sets

$$M(i,j) = \left\{ g_1^{(i,j)}, g_2^{(i,j)}, \dots, g_{2^{8(i-1)+j-1}}^{(i,j)} \right\}$$

Such set contains all grains $g_k^{(i,j)}$ with k ranging from 1 to $2^{\,8(i-1)+j-1}$