

The background of the slide features a close-up, slightly blurred image of a wooden pencil with a pink eraser, resting on a sheet of graph paper. A metal ruler is also visible, partially overlapping the pencil and the graph paper. The overall tone is warm and educational.

APPLICATION OF ARRAYS SPARSE MATRICES & REPRESENTATION

Sparse Matrix



- a **sparse matrix** is a matrix in which most of the elements are zero
- sparse ... many elements are zero
- dense ... few elements are zero
- Eg: diagonal
- tridiagonal

Sparse Matrix



	col1	col2	col3	col4	col5	col6
row0	15	0	0	22	0	-15
row1	0	11	3	0	0	0
row2	0	0	0	-6	0	0
row3	0	0	0	0	0	0
Row	91	0	0	0	0	0
4	0	0	28	0	0	0
row5						

Representation



- Represented by a two-dimensional array. Sparse matrix wastes space.
- (2) Each element is characterized by **<row, col, value>**.

Sparse Matrix Operations



- Transpose of a sparse matrix.
- What is the transpose of a matrix?

□ *row col value*

<i>a[0]</i>	6	6	8
<i>[1]</i>	0	0	15
<i>[2]</i>	0	3	22
<i>[3]</i>	0	5	-15
<i>[4]</i>	1	1	11
<i>[5]</i>	1	2	3
<i>[6]</i>	2	3	-6
<i>[7]</i>	4	0	91
<i>[8]</i>	5	2	28

row col value

<i>b[0]</i>	6	6	8
<i>[1]</i>	0	0	15
<i>[2]</i>	0	4	91
<i>[3]</i>	1	1	11
<i>[4]</i>	2	1	3
<i>[5]</i>	2	5	28
<i>[6]</i>	3	0	22
<i>[7]</i>	3	2	-6
<i>[8]</i>	5	0	-15