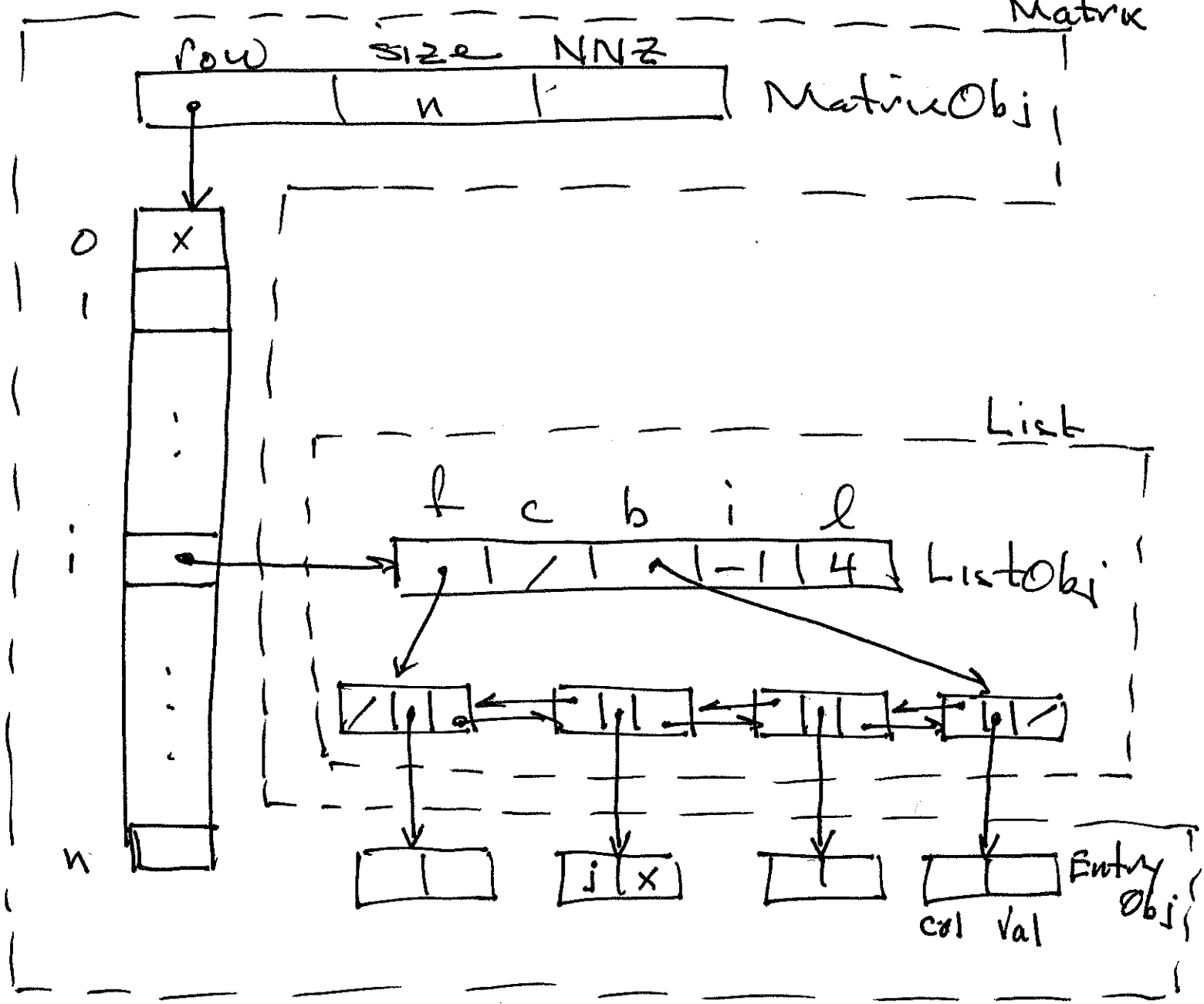
CSE 101-02 5-4-23

- Pa4 : ext. 2 more days.



Build order of Matrix ops.

- Constructor
- makeZero
- destructor
- printMatrix
- changeEntry ←

easy fcns:

- copy
- transpose
- scalarMult

helper fcns ⟶
- dot prod of 2 lists
- sum of 2 lists
- diff of 2 lists

arithmetic OPS

- Product
- sum
- diff

changeEntry(i, j, x): $M_{ij} = x$

cases:

1. $M_{ij} = 0$, $x = 0$: do nothing
2. $M_{ij} \neq 0$, $x = 0$: delete
3. $M_{ij} = 0$, $x \neq 0$: insert, append
4. $M_{ij} \neq 0$, $x \neq 0$: overwrite

dot(ListA, ListB)

=> sum = 0.0

A: (10, .) (30, x) (40, .) (60, z) ___

B: (20, .) (30, y) (50, .) (60, w) (70, .)

sum = sum + x.y

sum = sum + z.w

add(List A, List B, List S)

↑

row i of the array that sum() will return

A: (10,·) (30,·) (40,·) (60,·) —

B: (20,·) (30,·) (50,·) (60,·) (80,·)

S: (10,·) (20,·) (30,·) (40,·) (50,·) (60,·) (80,·)

copy copy add copy copy add copy

Runtime of BFS

let $n = |V(G)|$, $m = |E(G)|$

- initialize : $\Theta(n)$
- Queue ops : $\Theta(n)$
- adj list ops : undir : $2m$, dir : m $\Big\} = \Theta(m)$

runtime $= \Theta(n) + \Theta(m) = \Theta(n+m)$

↑ # bytes needed to store adj list representation (up to constant multiple)

Runtime of DFS

again $n = |V|$, $m = |E|$

initialize : $\Theta(n)$

main loop (apart from visit()) : $\Theta(n)$

adj list ops : undir : $2m$, dir : m $\Big\} = \Theta(m)$

runtime $= \Theta(n+m)$