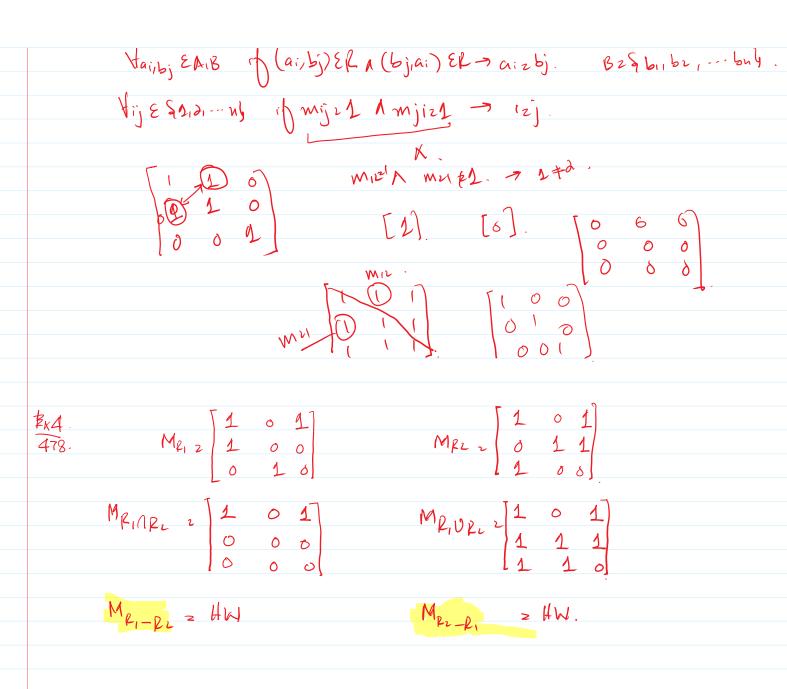
lecture 15: Ex2. b, b2 b3 b4 b5 47. ai 0 1 0 0 0 Mezar 1 0 1 1 0 1 1 0 1 Ar fan ar, as} Brfbn br, bs, bu, 65%. R= (a2, b2), (a2, b2), (a2, b3), (a2, b4), (a3, b2), (a3, b3), (a3, b5)) PROPERTIES OF RELATIONS. (How to determine the Properties in terms of MATRICES) 1- REPLEXIVE: Ya EA (a, a) ER Az 9 a 1, a 2, a 3, ... au }. Hai EA (ai,ai)ER. Vi Ed 1, 2, 3 --- no mij 2 1  $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} \qquad \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ Symmetric HabEA if CarbER -> (bia)ER. Az {az, az, --- an } Vailbj EAB if (ai, bj) ER → (bj.ai) ER. Bzfbabz....by? Hij ε {1,2,...n} if mij=1. → mji=1.

miz=1 → mzi=1. [0] [1]  $m_{12} = 1$   $M^{T}zM$ . 3- Auti Symmetric: - tab EA if (ab) ER N(bia) ER -> azb A far an -- only Hairbi EAIB of (airbi) ERA (bjiai) ER > aizbj. B29 b11 b2, -- buy.

New Section 2 Page 1



Composite OP & RELATION.

R (a16) AKB AEA BEB.

S (b1c) BKC. BEB CEC.

Sir (aic).
(aic) ESir J Jb (aib) ER 1 (Lic) ES.

Mr = [Yij] MKn.
Ms z [Sij]. NKp.
Msor z [ tij]. MKp.

R (ai,bk).

$$S$$
  $(b_{\kappa}, c_{j})$ 

$$\frac{\mathbb{E}_{KS}}{478}. \qquad M_{R2} \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 0 & 0 & 9 \end{bmatrix} \qquad M_{S} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix}$$

$$M_{S \circ R} = \begin{bmatrix} t_{11} & t_{12} & t_{13} \\ t_{21} & t_{22} & t_{23} \\ t_{31} & t_{32} & t_{33} \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 \\ t_{11} & t_{12} & t_{13} \\ t_{11} & t_{12} & t_{13} \\ t_{11} & t_{12} & t_{13} \end{bmatrix}$$

Ex 1-26. 9481-482.

How many Non Zero cuties untile Matrix MR.

Total 2 20,000. - 200 2 9900. 4950. 9900 2 4950 (ms)

NA -

COMPLEMENT. M.R. = By Subtracting [10]

Rod dement 0000

MP-1 By taking transpose of MR.

[40]

[40]

[00]

[10]

Hauspose.