lecture 17:- Ex- P481-482 Q1-30. CLOSUPE OF RELATIONS. -> PEPLEKING CLOSUPE. 2 } (a1b) i (a,a), (b, b)] Dzf(a,a)) a EAG. RUA 2 Réflexive. Ex1: R22(a16) | a clob. A2 Z. RUD 2 & (a,b) | acb & U & (a,a) | a & A & .
2 4 U & (a,a) | a & & & ? = { (a1b) | a 4b }. Symmetric Closure. R-1 27 (bia) (a,b) ER? RUR' z Symmetorz. 122 f (a,b) f.
122 f (b,a) f. RUP-1= & (a16), (4a) } Ex2: R2 & (a1b) | a7b} 127 483 R-1 29(b1a) (a1b) ER? = 9(b1a) 1 a7b} z g (a16) | b 7a } RUR-127 (a,6) | a76609 (a,6) 1 b7a6 25 (a, b) | a7 b ox b7a } = { (a, b) | a \$69. KUR' 27 (a,6) | a 7 b 6 U) (a,6) | b 7 a 6 2 S (a,6) | a 7 b ox b 7 a 6. 2 S (a,6) | a \$66.

TRANSITIVE CLOSURE.

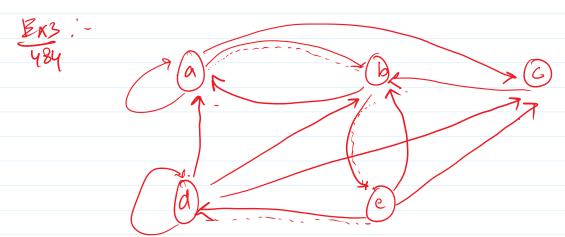
R' 2 } (2,3), (2,4), (2,2), (3,2), (2,3), (2,4), (3,4)}, b c. (3,4) Ef R'.

PATHS IN A GRAPH.

a path exist between two Vertices

i) I a Sequence of edges. Such that

(a, K,), (xg, Kz), (xg, K3), --- (xu-1, Xu), (Xu,b).



a to d.

abed (a1b) (b1e) (e1d)

by mentioning Vartices

lugth = Vertices -1.

z Number of edges.

theorem 1:- R be a felation on A.

I a path of light in (172+), from a to 6. When (a, b) E Ph. 485 the Connetivity Elation RX Contain Pairs (a,5)
Such that II a path from a tob in R Definitiond: (3) Fzd ?. P*zd &. (d. Rrd (a,a), (4,6) l. R* 29 (a,a), (4,6) l. (c,d),(1), (a,d), (c,d),(1), (c,d P* 2 0 P". EX4: Pzq(a,b) | a has met by Az Set of people.
485
What is lh=? What is f* Pla Rop. Revision. R (a,b) ER aEA bEB. P* 2 (a,b) E ft.

if 7 a Sequence.

Starty with a and endy with b. S (6,0) ES BEB CEC.
(a,0) ESOR 1) 76 (a,6) ERNCHO) ES. (a,c) Efor if to (a,b) ERA (b,) ER.

(a,b) EPZ if Jx1 (a,xi) CF N (x,b) ER.

a has met b x if a has met x, N x has met b. Ex6: - Red(a,6) (a and b has a Common boundary? What is fa 27 u 4 ft -2? As Set of States in US. (a,c) Efor if Fo (a,b) ERN (L,c) ER.

La, b) ER2 yFxy (a,K,) ERN (K, b) ER. P2 2 Rof. theorema: the transitive closure of R equals - the Rx. WARSHAL ALGO: Eauiverance Relation. and cabler. 2- Reflexive. 2- Symmetric. 3- Transitive. Ex2:- f2d(ab)| a-b EZ] AzR. Replexive: ta EA (a.a) ER.

Va ER a-a EZ. Symmetric Hais EA if (arb) ER > (bix) ER. Hais ER y a-b EZ -7 b-a EZ.

Transitive tarbic EA if (ab) ERA(LIC) ER -> (a-C) ER. taric ER if a-b EZA b-c EZ -> a-c EZ L.
House Eaxivelenc Relation.
Ex3: P2 g(a1b) azb modu p m71 (m E Zt).
Reflexive: ta EA (a.a) ER. ta EZ aza mod m.
Symmetric Hair EA if (arb) ER > (bra) ER. Hair E bazb moder > bza moder !
Transitive taibic EA if (ab) ERALLIC) ER -> (ac) ER. tapic E i) azb modur Abz c modur -> az L modur.
Your Equi veline
Ex: 6. Red(a16) (a divides 6). Kez-
Reflexive: - ta EA (a.a) ER. ta EZ a dividus a
Symmetric Hair EA if landrer - Charek. Hair EZ 1 a divides b 7 b divides a K.
Transitive tarbic EA I) (ab) ERN(LIC) ER -> (ac) ER. Hapic EZ I)
Not Equivelinee.
Ex7: P2 (x,y) [x-y] < 2} Az R
Rehlerive: ta EA (aca) ER.

New Section 2 Page 5

Replanie: ta EA (a.a) ER.

Ya E R 10-0122 V

Symmetric tais EA if (arb) ER > (bia) ER.

Hais ER 10 (arb) ERA(Lic) ER > (acd) ER.

Transitive tais EA if (arb) ERA(Lic) ER > (acd) ER.

Hais ER 17 10-10-22 A 16-c 12 12 > 10-4-181 C1.

Bz 1.3

Cz 1.8. Not Equivalue.

EN Q1-30. 500-502.