Relations

Ret A and B be two non-empty sets, then relation R is a Subset of AXB i.e., RCAXB

Total no. of relations from a Set A to a Set B. $A = \{ 1, 2, 3 \}$ $B = \{ a, b \}$ R = 8 _ _ _ _ _ _

Total no of Relations = 2x2x2x2x2x2x2

$$= 2^{6}$$

$$= 2 \times 2$$

$$= 2 \times (A) \times (B) \times (A \times B)$$

$$= 2 \times (A \times B) \times (A \times B)$$

$$= 2 \times (A \times B) \times (A \times B)$$

General formula:

Suffose Set A has m elements and Set B has nelements.

then no of clemens in AXB = mxn.

no. of Relations = $\frac{m}{2}$ = $\frac{m}{2}$.

no. of Refations from a Set A to Set A itself = 2 - 2R = 1 (2, y): x (A, y (B) Domain of Relation:

R = 1 (2,y): x(A, y(B)

The Collection of all the first elements of the Coordinate pair of the relation is called the domain of the Relation.

$$R = \left\{ \begin{array}{c} C_{1} \\ C_{2} \\ C_{3} \end{array} \right\} \quad \left(\begin{array}{c} C_{1} \\ C_{3} \end{array} \right) \quad \left(\begin{array}{c} C_{1} \\ C_{2} \end{array} \right)$$

$$D_{R} = \left\{ \begin{array}{c} C_{1} \\ C_{2} \end{array} \right\}$$

Range of Relation.

The Collection of all the Second elements of the coordinate pair of the Relation is called the Range of the relation.

RR = { 1, 2, 3 }

Types of Relations:

(i) Reflexive relation: Let A be a non-empty set. Define a Refation R on A then R is called reflexive relation if.

$$(a,a)\in R \quad \forall \quad \underline{a\in A}$$

$$R = \left\{ (1,2), (1,3), (2,2), (3,3) \right\}$$

As I (A) but (1,1) &R.

Tuis relation is not reflexive relation,

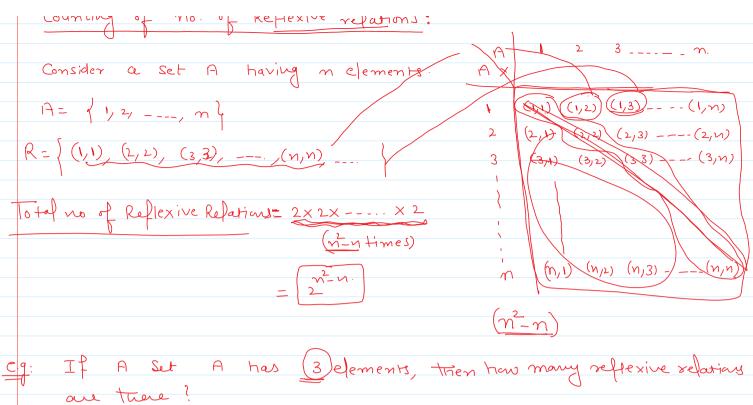
$$R = q'(1,1), (2,2), (3,3), (3,3), (4,2)$$

As $\forall a \in A$ $(a,a) \in R$

This Relation is reflexive

Counting of no. of Reflexive relations:

A 2 3 m



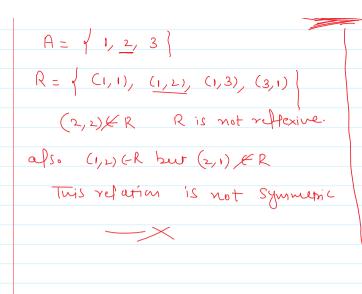
are there?

Service relations:
$$\frac{n^2-n}{10+al}$$
 no. of reflexive relations: $\frac{n^2-n}{2}$

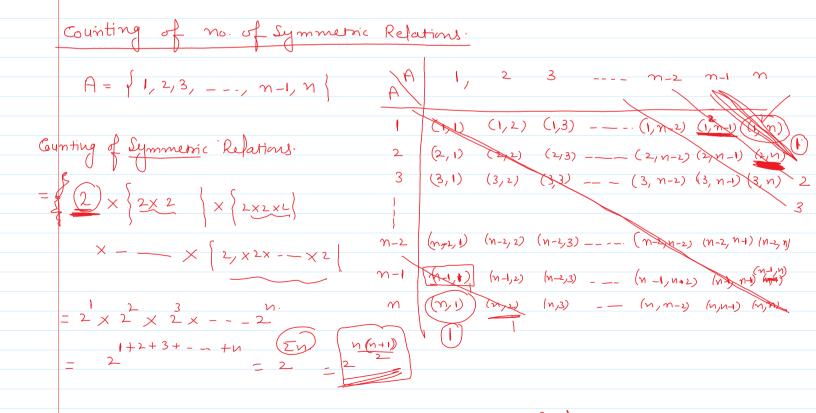
$$= \frac{3^2-3}{2}$$

$$= \frac{9-3}{2} = \frac{6}{2} = \frac{64}{2}$$

Symmetric relation: het A be a non-empty set, Define a relation R on A they this relation is called Symmetric relation if (a,b)(-R) then (b,a)(-R) $A = \left\{ 1, \frac{2}{3} \right\}$ A= 1,2,3}



A= $\{1,2,3\}$ R= $\{(1,1),(2,2),(3,3)\}$ This relation is refrexive and symmetric — \times —



If A Set A has 3 a clements, they no of symmetric relations

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Syn, no of sy				,	
		3	= 2		
		= 2		_ 64	
	\longrightarrow \times -				