c) $M_{Re} = \sum_{n=0}^{\infty} M_S^n$

$n=2)$ $\begin{vmatrix} 1 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 1 \end{vmatrix} \cdot \begin{vmatrix} 1 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 1 \end{vmatrix} = \begin{vmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{vmatrix}$

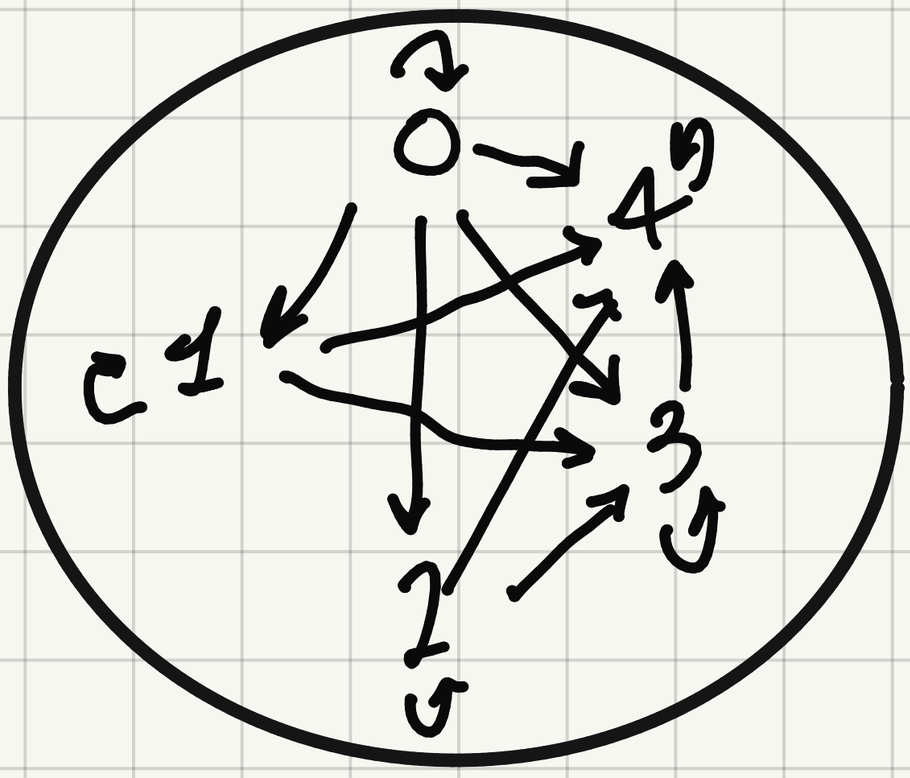
$\Rightarrow M_{Re} = T$

EXTRA: FIND HASSE DIAGRAM FOR THE ORDER RELATION

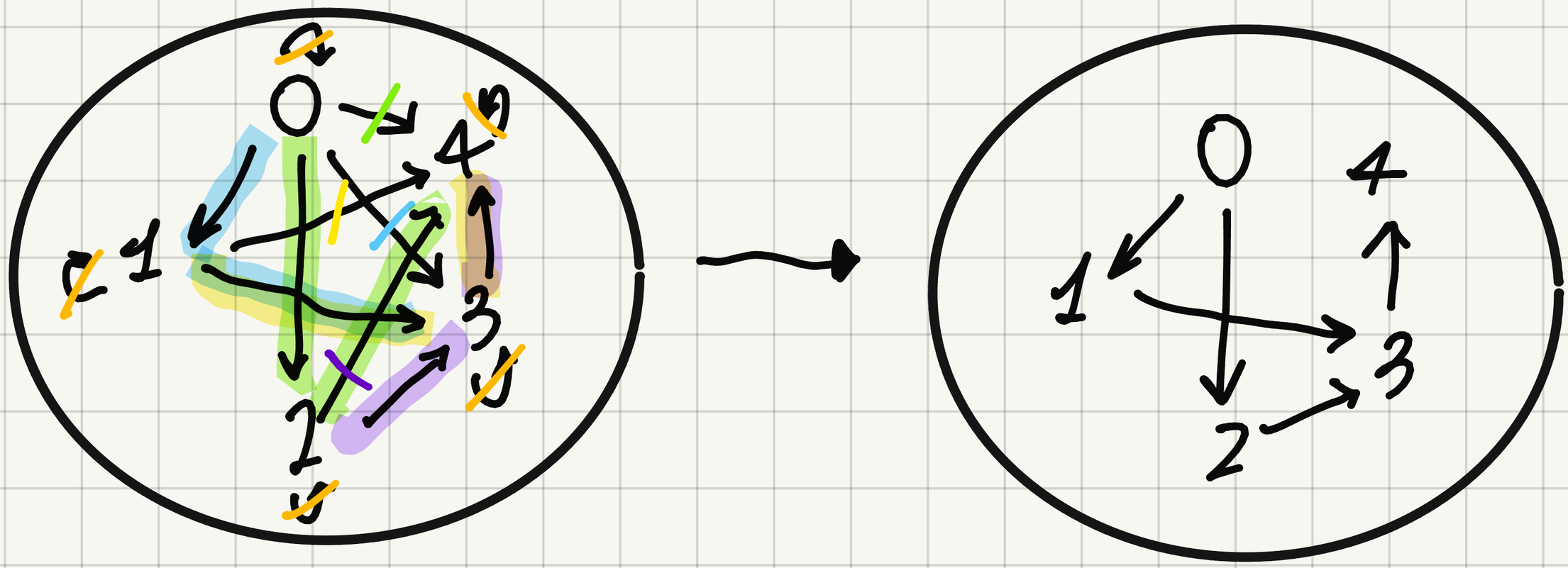
$$R = \begin{vmatrix} 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 1 \end{vmatrix}$$

, WHERE $R: A \to A$ AND $A = \{0, 1, 2, 3, 4\}$

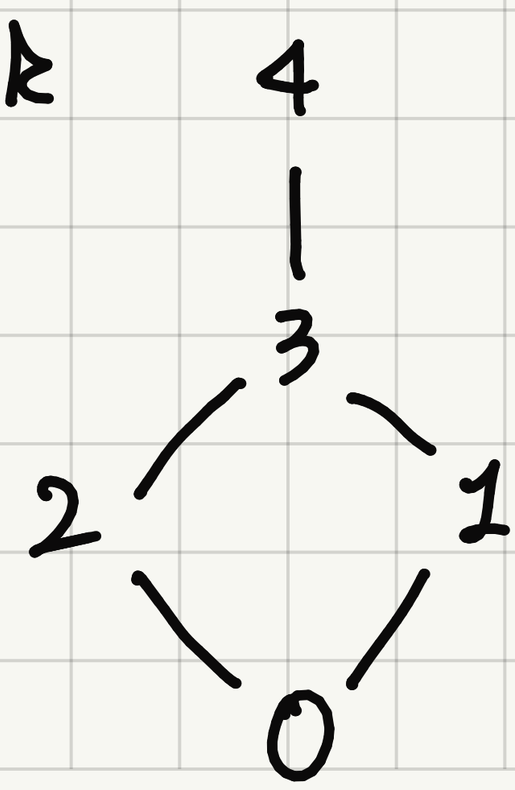
- GRAPH



- REDUCTIONS
- REFLEXIVE PROPERTY
- TRANSITIVE PROPERTY



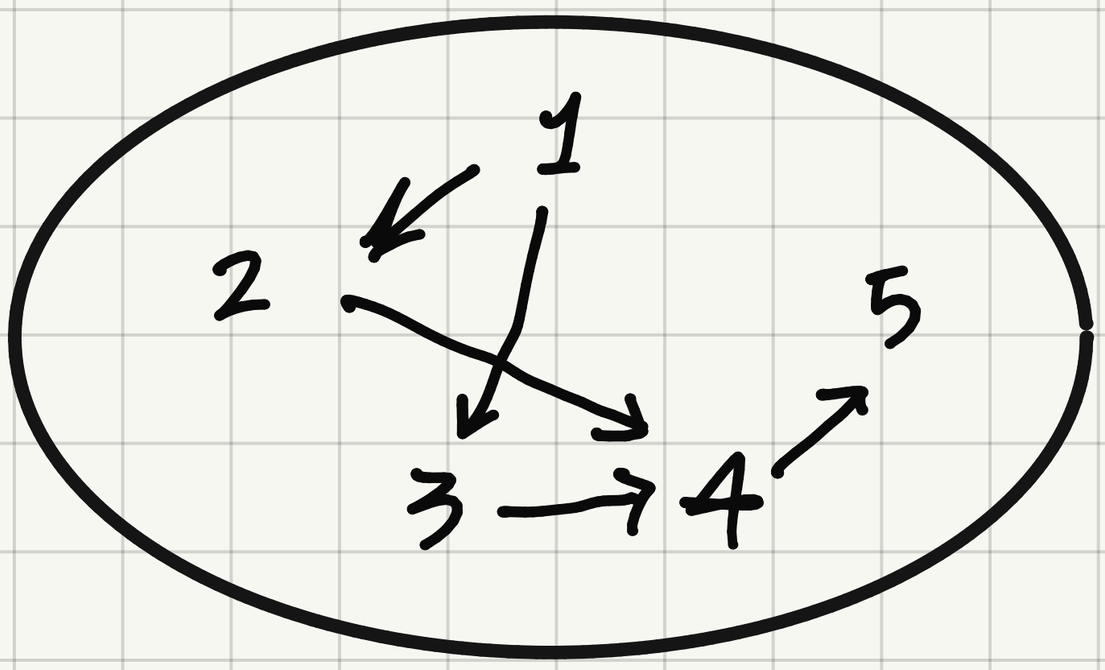
- BOTTOM-TOP ORDER



FIND ORDER RELATIONS, IF THERE ARE, THAT CONTAINS a AND b

a)
$$\begin{vmatrix} 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$$

① GRAPH



② COMPUTE R^{rc} BY FOLLOWING ALL COMPOSABLE PATHS

$$M(R^{rt}) = \begin{vmatrix} 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 1 \end{vmatrix}$$

REFLEXIVITY

TRANSITIVITY

IT IS EASY TO NOTICE ANTISYMMETRISM $\Rightarrow$ R^{rt} IS THE SMALLEST ORDER CONTAINING R