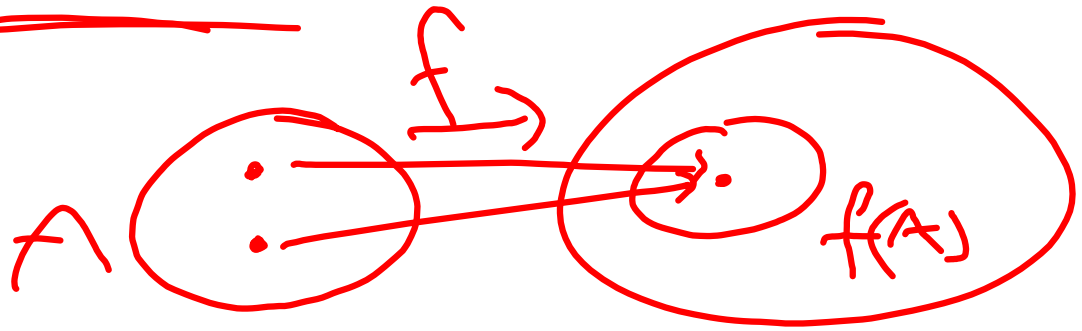
(R)

relace $\subseteq A \times B$ (binární)

(a,b) patří relaci $\quad a \sim_R b$

zhruba: $A \ni a \mapsto b \in B$

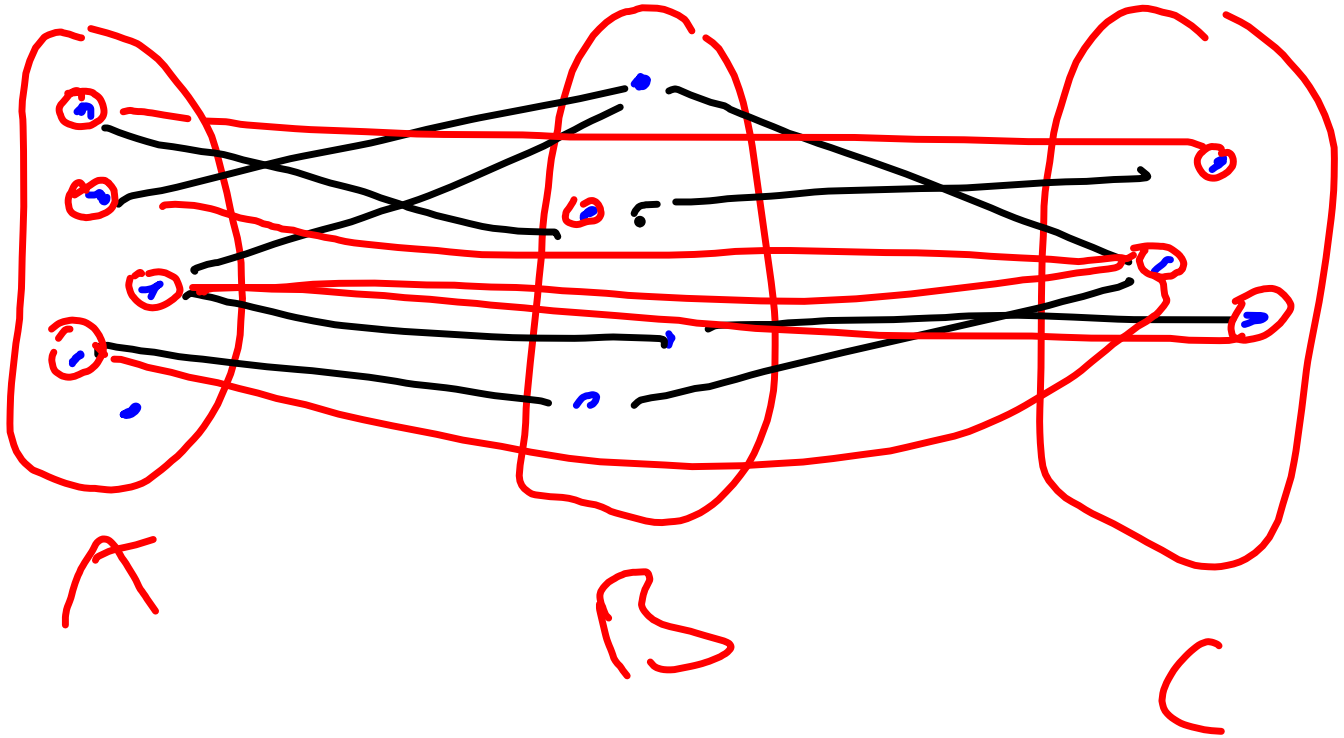
DCA pro relaci R

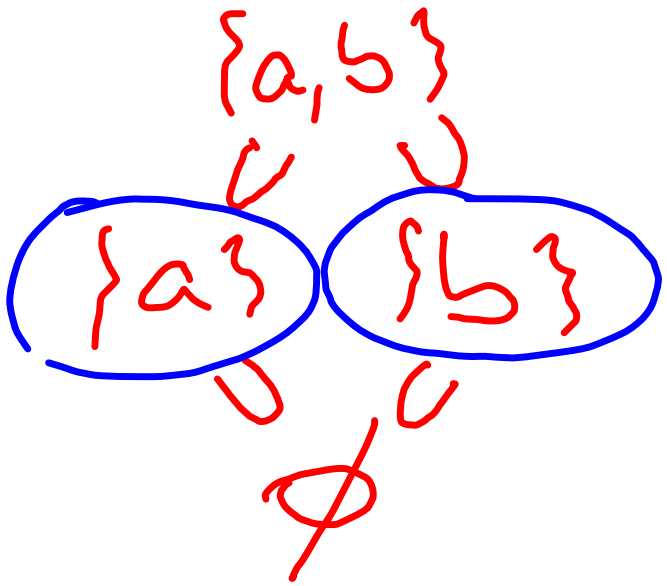


$f: A \to B$ $\quad g: B \to C$

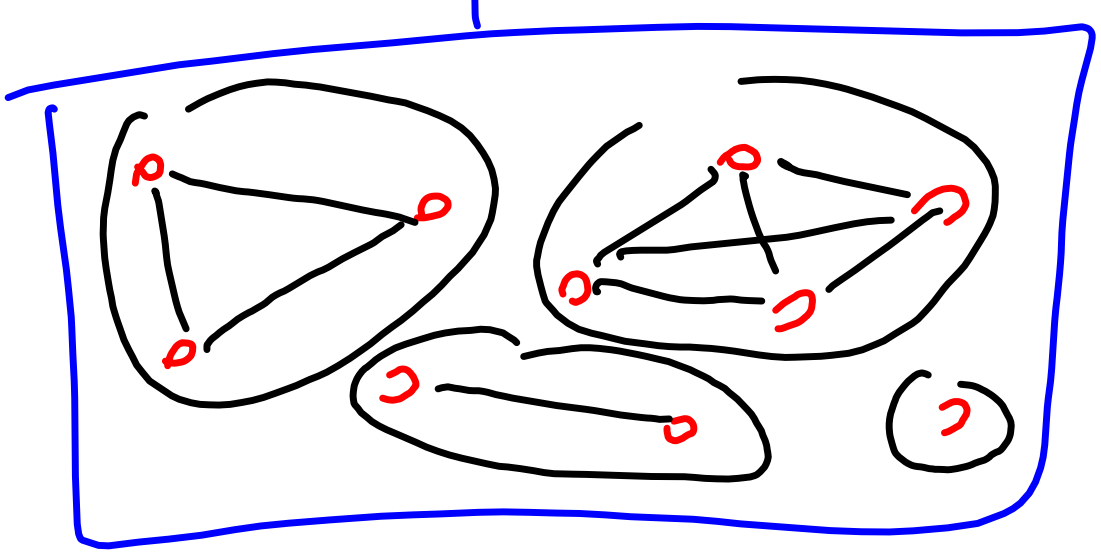
$a \mapsto f(a) = b$ $\quad b \mapsto g(b) = c$

$(g \circ f)(a) = g(f(a))$





$$R_a = \{b \in A ; (a,b) \in R\}$$



A

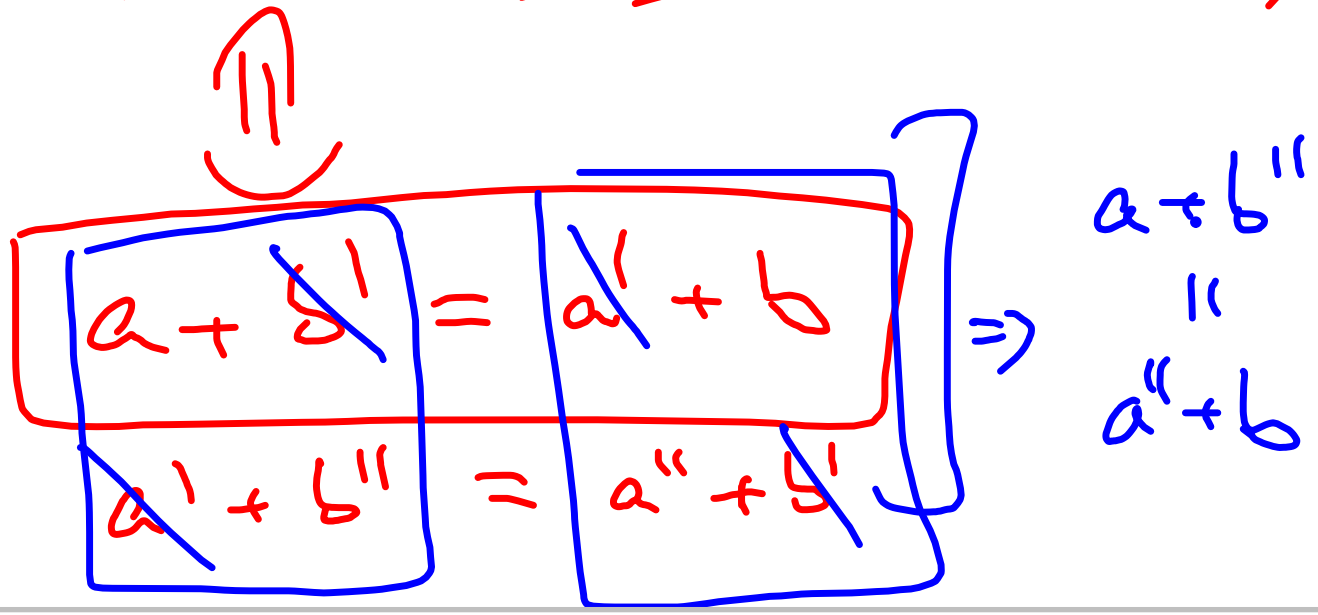
$=$

$R_1 \cup R_2 \cup R_3 \cup R_4$

$$(a-b)+(c-d)=$$

$$=(a+c)-(b+d)$$

$$(a,b)\sim(a',b')\sim(a'',b'')$$



$(a,b)\cdot(c,d) = (ac+bd,\ ad+bc)$

$(0,1)\cdot(c,0) = (0,c)$

$(a-b)\cdot(c-d) = (ac+bd)-(ad+bc)$

$(a,b)\cdot((c,d)+(c',d')) =$

$(a,b)\cdot(c+c',d+d') = \dots$

$\Downarrow$

$(\mathbb{Z},+,\cdot)$

$p \cdot q = p \cdot q \Rightarrow$ reflexivita

$(p,q) \sim (p',q')$ — symetrie zejm.

$$\left.\begin{array}{l} p \cdot q' = p' \cdot q \\ p' \cdot q'' = p'' \cdot q' \end{array}\right\} \overset{?}{\Rightarrow} p \cdot q'' = p'' \cdot q$$

$$[(p,q)] \cdot [(p',q')] = [(pp', qq')]$$

$$p/q + p'/q' = \frac{pq' + p'q}{q'q}$$

$\mathbb{Z}$ a relace $\sim_k$

$a, b \in \mathbb{Z}$, $a \sim_k b \Leftrightarrow$ a i b mají stejný zbytek po dělení k

je ekvivalence

$[a]_k + [b]_k = [a+b]_k$

$[a]_k \cdot [b]_k = [a \cdot b]_k$

$[a+nk] + [b+mk] = [a+b+(n+m)\cdot k]$

$(a+nk) \cdot [b+mk] = [a \cdot b + nb \cdot k + ma \cdot k + nm \cdot k \cdot k]$

$\mathbb{Z}_k = \mathbb{Z}/\sim_k$

$\mathbb{Z}_2 = \{0, 1\}$

$\mathbb{Z}_7 = \{0, 1, 2, 3, 4, 5, 6\}$

$2^{-1} = 4$

$3^{-1} = 5$

$4^{-1} = 2$

$5^{-1} = 3$

$6^{-1} = 6$

$\mathbb{Z}_6 : \quad 3 \cdot 2 = 0$