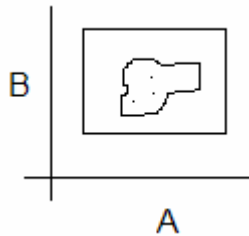


RELACIJE

$$(R^{-1})^{-1} = R$$

$$x(R^{-1})^{-1}y \sim yR^{-1}x \sim xRy$$

$$R \subseteq A \times B$$



$$(x,y) \in R \subseteq A \times B \Leftrightarrow xRy, =, \leq, <, ||$$

1. $A = \{ 1, 2, 3, 4 \}$
 $B = \{ 1, 2, 3, 4 \}$
 $S, R \subseteq A \times B$
 $R = \{ (1,2), (1,4), (2,3) \}$
 $S = \{ (1,1), (2,2), (3,3), (4,1) \}$

$$D_R = \text{vsi možni } x\text{-i } \{ x: \exists y; (x,y) \in R \}$$

$$Z_R = \text{vsi možni } y\text{-i } \{ y: \exists x; (x,y) \in R \}$$

$$Z_R = \{ 2, 3, 4 \}$$

$$D_R = \{ 1, 2 \}$$

$$Z_S = \{ 1, 2, 3 \}$$

$$D_S = \{ 1, 2, 3, 4 \}$$

$$R^{-1} = \text{inverz}$$

$$xR^{-1}y \Leftrightarrow yRx$$

$$R^{-1} = \{ (2,1), (4,1), (3,2) \}$$

$$S^{-1} = \{ (1,1), (2,2), (3,3), (1,4) \}$$

$$S^*R = \text{produkt, kompozitum}$$

$$xR^*Sy \Leftrightarrow \exists z: (xRz \wedge zSy)$$

$$S^*R = \{ (1,2), (1,4), (2,3), (4,2), (4,4) \} \text{ (gledas } S, \text{ potem } R)$$

$$R^*S = \{ (1,1), (1,2), (2,3) \}$$

2. $A = \{ 1, 2, 3, 4, 5, 6 \}$
 $R, S, T \subseteq A \times A$
 $R = \{ (1,3), (1,2), (2,6), (3,1) \}$
 $S = \{ (3,1), (2,1), (3,2), (6,2), (1,1) \}$
 $T = \{ (3,4), (4,5) \}$

$$D_R = \{ 1, 2, 3 \}$$

$$D_S = \{ 3, 2, 6, 1 \}$$

$$D_T = \{ 3, 4 \}$$

$$Z_R = \{ 3, 2, 6, 1 \}$$

$$Z_S = \{ 1, 2 \}$$

$$Z_T = \{ 4, 5 \}$$

$$R^*S = \{ (1,1), (1,2), (2,1), (2,2), (3,1) \}$$

$$S^*T = \{ \}$$

$$T^*S = \{ \}$$

$$T^*R = \{ \}$$

$$S^*R = \{ (3,3), (3,2), (2,3), (2,2), (3,6), (6,6), (1,3), (1,2) \}$$

$$R^*T = \{ (1,4) \}$$

3. $R, S, T, U \subseteq Z \times Z$
 $xRy \Leftrightarrow x+y=1$
 $xSy \Leftrightarrow x-y^2=0$ (parabola)
 $xTy \Leftrightarrow x < y+1$
 $xUy \Leftrightarrow x^2 > y^2$

Doloci:

$$D_R = \{ \dots, -2, -1, 0, 1, 2, \dots \} = Z$$

$$D_S = \{ 0, 1, 4, 9, 16, 25, \dots \} = \{ n^2: n \in Z \}$$

$$D_T = Z$$

$$D_U = Z \setminus \{ 0 \}$$

$$Z_R = Z$$

$$Z_S = \{ \dots, -2, -1, 0, 1, 2, 3, \dots \} = Z$$

$$Z_T = Z$$

$$Z_U = Z$$

$$xR^*Sy \Leftrightarrow \exists z: (xRz \wedge zSy)$$

$$\Leftrightarrow x+z=1 \wedge z-y^2=0$$

$$z=1-x \wedge z-y^2=0$$

$$(1-x)-y^2=0$$

$$xR^*Sy \sim x+y^2=1$$

SE 2 POJMA

$$R, S \subseteq A \times B$$

$R \cup S$ – unija relacij

$R \cap S$ – presek

$R \setminus S$ – razlika

$$xR \cup Sy \Leftrightarrow xRy \vee xSy$$

$$xR \cap Sy \Leftrightarrow xRy \wedge xSy$$

$$xR \setminus Sy \Leftrightarrow xRy \wedge \neg(xSy)$$

$$(x,y) \in R \cup S \Leftrightarrow (x,y) \in R \vee (x,y) \in S$$

1. $R \circ (S \cup T) = R \circ S \cup R \circ T$
 $xR \circ (S \cup T)y \Leftrightarrow \exists z: xRz \wedge zS \cup Ty$
 $\exists z: xRz \wedge (zSy \vee zTy) \sim \exists z: (xRz \wedge zSy) \vee (xRz \wedge zTy)$
 $xR \circ Sy \vee xR \circ Ty \sim xR \circ S \cup R \circ Ty$

2. $(R \cup S)^{-1} = R^{-1} \cup S^{-1}$
 $x(R \cup S)^{-1}y \sim y(R \cup S)x \sim yRx \vee ySx \sim xR^{-1}y \vee xS^{-1}y \sim xR^{-1} \cup S^{-1}y$
3. $(R \setminus S)^{-1} = R^{-1} \setminus S^{-1}$
 $x(R \setminus S)^{-1}y = y(R \setminus S)x \sim yRx \wedge \neg(ySx) \sim xR^{-1}y \wedge \neg(xS^{-1}y) \sim xR^{-1} \setminus S^{-1}y$
4. $(R \circ S)^{-1} = S^{-1} \circ R^{-1}$
 $x(R \circ S)^{-1}y \sim yR \circ Sx \sim \exists z: yRz \wedge zSx \sim \exists z: zR^{-1}y \wedge xS^{-1}z \sim \exists z: xS^{-1}z \wedge zR^{-1}y \sim xS^{-1} \circ R^{-1}y$

LASTNOSTI RELACIJ

1. Simetričnost
 $xRy \sim yRx$ npr. =, || sta simetrični, <, ≤ nista simetrični
 2. Refleksivnost
 xRx npr. =, ≤, ≥ so refleksivne, < ni refleksivna
 3. Antisimetričnost
 $xRy \wedge yRx \Rightarrow x=y$ npr. =, ≤ so antisimetrične, || ni antisimetrična
 4. Tranzitivnost
 $xRy \wedge yRz \Rightarrow xRz$ npr. ≤, <, =, ⊆ so tranzitivne
 $x \leq y \wedge y \leq z \Rightarrow x \leq z$
 $A \subseteq B \wedge B \subseteq C \Rightarrow A \subseteq C$
 5. Asimetričnost
 $xRy \Rightarrow \neg(yRx)$ npr. < je asimetrična, ≤ ni asimetrična
 $x < y \Rightarrow \neg(y < x)$
- 1.) $R, S, T, U, V = \{ \text{ljudje} \}$
 $xRy \Leftrightarrow x$ živi v istem kraju kot y
 $xSy \Leftrightarrow x$ sestra y
 $xTy \Leftrightarrow x$ starejši od y
 $xUy \Leftrightarrow x$ sin od y
 $xV_1y \Leftrightarrow x$ in y se poznata
 $xV_2y \Leftrightarrow x$ pozna y

R: simetrična, refleksivna, tranzitivna
S: tranzitivna
T: (antisimetrična), tranzitivna, asimetrična
U: (antisimetrična), asimetrična
V₁: simetrična, refleksivna
V₂: refleksivna