Diskrētās struktūras datorzinātnēs

Praktiskā nodarbība

1. $A = \{ a_1, a_2, a_3 \},\ \{ b_1, b_2, b_3, b_4, b_5 \}$

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

$R = \{ \langle a_1, b_2 \rangle, \langle a_1, b_3 \rangle,$
$\langle a_2, b_1 \rangle, \langle a_2, b_2 \rangle, \langle a_2, b_4 \rangle,$
$\langle a_3, b_3 \rangle, \langle a_3, b_4 \rangle, \langle a_3, a_5 \rangle \}$

2. $R \mid \langle a_i, b_j \rangle_{\substack{a_i \in A \\ b_j \in B}} \wedge a_i > b_j$

$a)\ a_1 = 0,\ a_2 = 2,\ a_3 = 5,\ a_4 = 1$
$\quad b_1 = 1,\ b_2 = 3,\ b_3 = 2$

$$R^T_{a)} = \begin{pmatrix} 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

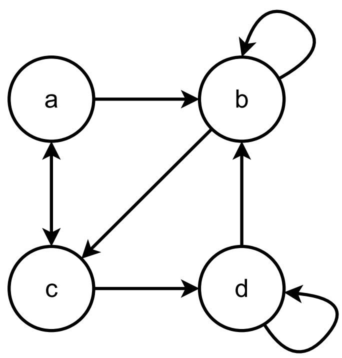
$b)\ a_1 = 4,\ a_2 = 1,\ a_3 = 5$
$\quad b_1 = 5,\ b_2 = 4,\ b_3 = 2,\ b_4 = 0, b_5 = 3$

$$R_{b)} = \begin{pmatrix} 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 1 \end{pmatrix}$$

3. $A = \{ a, b, c, d \}$

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

$R = \{ \langle a, b \rangle, \langle a, c \rangle, \langle b, b \rangle, \langle b, c \rangle, \langle c, a \rangle, \langle c, d \rangle, \langle d, b \rangle, \langle d, d \rangle \}$



4. $A = 1, 2, 3, 4$

$R | \langle a, b \rangle |$, kur $a \vdots b$

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

5. $A = \{1, 2, 3, 4\}$
$R_1 = \{\langle 1,1\rangle, \langle 1,2\rangle, \langle 2,1\rangle, \langle 2,2\rangle, \langle 3,4\rangle, \langle 4,1\rangle, \langle 4,4\rangle\}$
$R_2 = \{\langle 1,1\rangle, \langle 1,2\rangle, \langle 2,1\rangle\}$
$R_3 = \{\langle 3,2\rangle, \langle 2,1\rangle, \langle 3,1\rangle, \langle 4,3\rangle, \langle 4,2\rangle, \langle 4,1\rangle\}$
R_1 nav refleksīva, jo $\langle 3,3\rangle \notin R$
R_1 nav simetriska, jo $\langle 3,4\rangle \in R_1 \wedge \langle 4,3\rangle \notin R_1$
R_1 nav transitīva, jo $\langle 3,4\rangle \in R \wedge \langle 4,1\rangle \in R \wedge \langle 3,1\rangle \notin R$

R_2 nav refleksīva, jo $\langle 2,2\rangle \notin R$
R_2 ir simetriska.
R_2 nav transitīva, jo $\langle 2,1\rangle \in R \wedge \langle 1,2\rangle \in R \wedge \langle 2,2\rangle \notin R$

R_3 nav refleksīva, jo $\langle 1,1\rangle \notin R$
R_3 nav simetriska, jo $\langle 3,2\rangle \in R \wedge \langle 2,3\rangle \notin R$
R_3 ir transitīva.

6. $B = \{0, 1, 2, 3, 4\}$
$G_1 = \{\langle 2,2\rangle, \langle 1,4\rangle, \langle 2,1\rangle, \langle 1,2\rangle, \langle 1,1\rangle, \langle 4,4\rangle, \langle 3,3\rangle, \langle 4,1\rangle\}$
$G_2 = \{\langle 2,2\rangle, \langle 2,3\rangle, \langle 1,3\rangle, \langle 1,4\rangle, \langle 3,4\rangle, \langle 3,3\rangle, \langle 0,0\rangle, \langle 1,2\rangle, \langle 1,1\rangle, \langle 2,4\rangle, \langle 4,4\rangle\}$
G_1 nav refleksīva, jo $\langle 0,0\rangle \notin R$
G_1 ir simetriska.
G_1 nav transitīva, jo $\langle 4,1\rangle \in R \wedge \langle 1,2\rangle \in R \wedge \langle 4,2\rangle \notin R$

G_2 ir refleksīva.
G_2 nav simetriska, jo $\langle 2,3\rangle \in R \wedge \langle 3,2\rangle \notin R$
G_2 ir transitīva.