

Diskrētās struktūras datorzinātnēs

Praktiskā nodarbība

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

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

$$R = \{ \langle a_1, b_2 \rangle, \langle a_1, b_3 \rangle, \langle a_2, b_1 \rangle, \langle a_2, b_2 \rangle, \langle a_2, b_4 \rangle, \langle a_3, b_3 \rangle, \langle a_3, b_4 \rangle, \langle a_3, b_5 \rangle \}$$

2. $R \mid \langle a_i, b_j \rangle \begin{matrix} a_i \in A \\ b_j \in B \end{matrix} \wedge a_i > b_j$

a) $a_1 = 0, a_2 = 2, a_3 = 5, a_4 = 1$

$b_1 = 1, b_2 = 3, b_3 = 2$

$$R_{a)}^T = \begin{pmatrix} 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

b) $a_1 = 4, a_2 = 1, a_3 = 5$

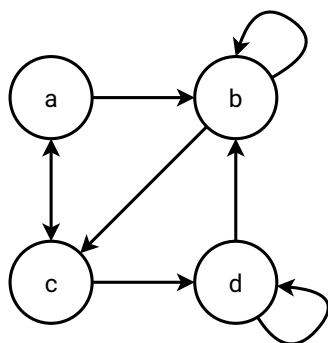
$b_1 = 5, b_2 = 4, b_3 = 2, b_4 = 0, b_5 = 3$

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

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

$$R|\langle a, b \rangle|, \text{ kur } a : b$$

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

$$5. A = \{1, 2, 3, 4\}$$

$$R_1 = \{ \langle 1, 1 \rangle, \langle 1, 2 \rangle, \langle 2, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 4 \rangle, \langle 4, 1 \rangle, \langle 4, 4 \rangle \}$$

$$R_2 = \{ \langle 1, 1 \rangle, \langle 1, 2 \rangle, \langle 2, 1 \rangle \}$$

$$R_3 = \{ \langle 3, 2 \rangle, \langle 2, 1 \rangle, \langle 3, 1 \rangle, \langle 4, 3 \rangle, \langle 4, 2 \rangle, \langle 4, 1 \rangle \}$$

R_1 nav refleksiīva, 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 refleksiīva, 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 refleksiīva, 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 refleksiīva, 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 refleksiīva.

G_2 nav simetriska, jo $\langle 2, 3 \rangle \in R \wedge \langle 3, 2 \rangle \notin R$

G_2 ir transitīva.