Diskrētās struktūras datorzinātnēs

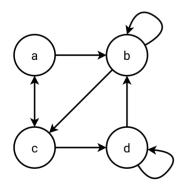
Praktiskā nodarbība

$$\begin{aligned} &1.\ A = \{\ a_1, a_2, a_3\ \},\ \{\ b_1, b_2, b_3, b_4, b_5\ \} \\ &R = \begin{pmatrix} 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 & 1 \end{pmatrix} \\ &R = \{\ \langle a_1, b_2 \rangle, \langle a_1, b_3 \rangle, \\ &\langle a_2, b_1 \rangle, \langle a_2, b_2 \rangle, \langle a_2, b_4 \rangle, \\ &\langle a_3, b_3 \rangle, \langle a_3, b_4 \rangle, \langle a_3, a_5 \rangle\ \} \end{aligned}$$

$$egin{aligned} 2. \ R \mid \langle a_i, b_j
angle egin{aligned} a_i \in A \ a_j > b_j \ a_1 = 0, \ a_2 = 2, \ a_3 = 5, \ a_4 = 1 \ b_1 = 1, \ b_2 = 3, \ b_3 = 2 \ R_{a)}^T = egin{pmatrix} 0 & 1 & 1 & 0 \ 0 & 0 & 1 & 0 \ 0 & 0 & 1 & 0 \end{pmatrix} \ b) \ a_1 = 4, \ a_2 = 1, \ a_3 = 5 \ b_1 = 5, \ b_2 = 4, \ b_3 = 2, \ b_4 = 0, b_5 = 3 \ R_{b)} = egin{pmatrix} 0 & 0 & 1 & 1 & 1 \ 0 & 0 & 0 & 1 & 0 \ 0 & 1 & 1 & 1 \end{pmatrix} \end{aligned}$$

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

$$egin{aligned} 3. \ A &= \set{a,b,c,d} \ R &= egin{pmatrix} 0 & 1 & 1 & 0 \ 0 & 1 & 1 & 0 \ 1 & 0 & 0 & 1 \ 0 & 1 & 0 & 1 \end{pmatrix} \ R &= \set{\langle a,b
angle, \langle a,c
angle, \langle b,b
angle, \langle b,c
angle, \langle c,a
angle, \langle c,d
angle, \langle d,b
angle, \langle d,d
angle} \end{aligned}$$



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

1 of 2

$$R|\langle a,b
angle|,\, \mathrm{kur}\; a:b$$
 $R=egin{pmatrix} 1&1&1&1\ 0&1&0&1\ 0&0&1&0\ 0&0&0&1 \end{pmatrix}$

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

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

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

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

 R_1 nav refleksīva, jo $\langle 3, 3 \rangle \notin R$

 R_1 nav simetriska, jo $\langle 3,4
angle \in R_1 \wedge \langle 4,3
angle \notin R_1$

 R_1 nav transitīva, jo $\langle 3,4 \rangle \in R \land \langle 4,1 \rangle \in R \land \langle 3,1 \rangle \notin R$

 R_2 nav refleksīva, jo $\langle 2,2 \rangle \notin R$

 R_2 ir simetriska.

 R_2 nav transitīva, jo $\langle 2,1
angle \in R \wedge \langle 1,2
angle \in R \wedge \langle 2,2
angle
otin R$

 R_3 nav refleksīva, jo $\langle 1, 1 \rangle \notin R$

 R_3 nav simetriska, jo $\langle 3,2
angle \in R \land \langle 2,3
angle
otin R$

 R_3 ir transitīva.

$$6. B = \{0, 1, 2, 3, 4\}$$

$$G_1 = \{\, \langle 2,2
angle, \langle 1,4
angle, \langle 2,1
angle, \langle 1,2
angle, \langle 1,1
angle, \langle 4,4
angle, \langle 3,3
angle, \langle 4,1
angle \, \}$$

$$G_2 = \{\, \langle 2,2
angle, \langle 2,3
angle, \langle 1,3
angle, \langle 1,4
angle, \langle 3,4
angle, \langle 3,3
angle, \langle 0,0
angle, \langle 1,2
angle, \langle 1,1
angle, \langle 2,4
angle, \langle 4,4
angle \, \}$$

 G_1 nav refleksīva, jo $\langle 0, 0 \rangle \notin R$

 G_1 ir simetriska.

 G_1 nav transitīva, jo $\langle 4,1
angle \in R \wedge \langle 1,2
angle \in R \wedge \langle 4,2
angle
otin R$

 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.