Homework 04 22CS 蒋云翔

Section 9.4

Ex26.(a) $\{(a,c),(b,d),(c,a),(d,b),(e,d)\}$

Sol: By Algorithm 1: we can get that matrix: $A = \begin{bmatrix} 0&0&1&0&0\\ 0&0&0&1&0\\ 1&0&0&0&0\\ 0&1&0&0&0\\ 0&0&0&1&0 \end{bmatrix}$

$A^2 = \begin{bmatrix} 1&0&0&0&0\\ 0&1&0&0&0\\ 0&0&1&0&0\\ 0&0&0&1&0\\ 0&1&0&0&0 \end{bmatrix}$ $A^3 = \begin{bmatrix} 0&0&1&0&0\\ 0&0&0&1&0\\ 1&0&0&0&0\\ 0&1&0&0&0\\ 0&0&0&1&0 \end{bmatrix} = A$

$A^4 = A^2$, $A^5 = A^3$

so: the transitive closures of the relation is $A \vee A^2 = \begin{bmatrix} 1&0&1&0&0\\ 0&1&0&1&0\\ 1&0&1&0&0\\ 0&1&0&1&0\\ 0&1&0&1&0 \end{bmatrix}$

Ex28.(a) $\{(a,c),(b,d),(c,a),(d,b),(e,d)\}$

Sol: $W_0 = \begin{bmatrix} 0&0&1&0&0\\ 0&0&0&1&0\\ 1&0&0&0&0\\ 0&1&0&0&0\\ 0&0&0&1&0 \end{bmatrix}$ $W_1 = \begin{bmatrix} 0&0&1&0&0\\ 0&0&0&1&0\\ 1&0&1&0&0\\ 0&1&0&0&0\\ 0&0&0&1&0 \end{bmatrix}$ $W_2 = \begin{bmatrix} 0&0&1&0&0\\ 0&0&0&1&0\\ 1&0&1&0&0\\ 0&1&0&1&0\\ 0&0&0&1&0 \end{bmatrix}$

$W_3 = \begin{bmatrix} 1&0&1&0&0\\ 0&0&0&1&0\\ 1&0&1&0&0\\ 0&1&0&1&0\\ 0&0&0&1&0 \end{bmatrix}$ $W_4 = \begin{bmatrix} 1&0&1&0&0\\ 0&1&0&1&0\\ 1&0&1&0&0\\ 0&1&0&1&0\\ 0&1&0&1&0 \end{bmatrix}$ $W_5 = W_4$

Section 9.5

Ex24.

(a) $\begin{bmatrix} 1&1&1\\ 0&1&1\\ 1&1&1 \end{bmatrix}$ It is not an equivalence relations, because it is not symmetric

(b) $\begin{bmatrix} 1&0&1&0\\ 0&1&0&1\\ 1&0&1&0\\ 0&1&0&1 \end{bmatrix}$ It is an ~~a~~ equivalence relations.

(c) $\begin{bmatrix} 1&1&1&0\\ 1&1&1&0\\ 1&1&1&0\\ 0&0&0&1 \end{bmatrix}$ It is an equivalence relations.

Ex 36.

(a) $[4]_2 = [\ldots, -4, -2, 0, 2, 4, \ldots]$

(b) $[4]_3 = [\ldots, -2, 1, 4, 7, \ldots]$

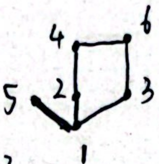
(c) $[4]_6 = [\ldots, -8, -2, 4, 10, \ldots]$

(d) $[4]_8 = [\ldots, -12, -4, 4, 12 \ldots]$

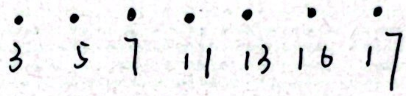
Section 9.6:

Ex 22.

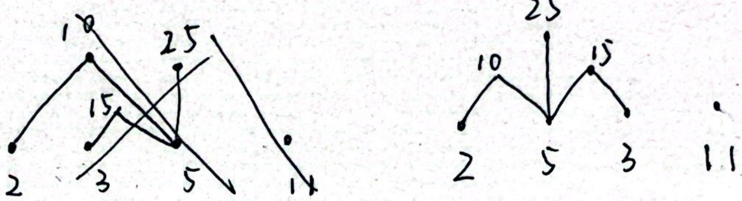
(a) $\{1,2,3,4,5,6\}$:



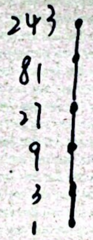
(b) $\{3,5,7,11,13,16,17\}$:



(c) $\{2,3,5,10,11,15,25\}$:



(d) $\{1,3,9,27,81,243\}$:



Ex 32.

(a) Maximal elements: "l", "m"

(b) minimal elements: "a" "b" "c"

(c) No.

(d) No

(e) "k" "l" "m"

(f) "k".

(g) No elements.

(h) ~~No~~ greatest lower bound does not exist.