2023010747 刘一[illegible] 计32

离散数学作业

27. (1) $B_S' = \begin{bmatrix} -1 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & -1 & 0 & 0 & -1 & 0 & 0 & -1 \\ 0 & 0 & 0 & -1 & 1 & -1 & 0 & 0 \end{bmatrix} = (B_{11}\ B_{12})$

$B_{11} = \begin{bmatrix} -1 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & -1 \end{bmatrix}$ $B_{12} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ -1 & 0 & 0 & -1 \\ 1 & -1 & 0 & 0 \end{bmatrix}$ $B_{12}^{-1} = \begin{bmatrix} 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & -1 & -1 & -1 \end{bmatrix}$

$C_{f12} = -B_{11}^{T} B_{12}^{-T} = \begin{bmatrix} -1 & -1 & 1 & 1 \\ 0 & 0 & -1 & -1 \\ -1 & -1 & 0 & 1 \\ 1 & 0 & 0 & -1 \end{bmatrix}$

故 $C_f = \begin{bmatrix} 1 & 0 & 0 & 0 & -1 & -1 & 1 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 & -1 & -1 \\ 0 & 0 & 1 & 0 & -1 & -1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 & 0 & 0 & -1 \end{bmatrix}$

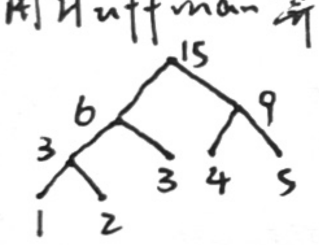
(2) $B_S' = \begin{bmatrix} -1 & 0 & 0 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & -1 & 0 & -1 & -1 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 & 0 & 0 & 0 & -1 \end{bmatrix} = (B_{11}\ B_{12})$

$B_{11} = \begin{bmatrix} -1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 \\ 0 & -1 & 0 & -1 \\ 0 & 1 & -1 & 0 \end{bmatrix}$ $B_{12} = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 \end{bmatrix}$ $B_{12}^{-1} = \begin{bmatrix} 0 & 0 & -1 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & -1 \end{bmatrix}$

$S_f = [B_{12}^{-1} B_{11}\ I) = \begin{bmatrix} 0 & 1 & 0 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ -1 & -1 & 0 & -1 & 0 & 0 & 1 & 0 \\ 0 & -1 & 1 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$

34. 出现了5种字母．a.b.c.d.e分别权值为1,2,3.4,5

① 用Huffman算法

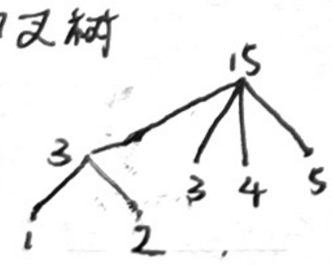


长度为33

② 三叉树．

长度为21

③ 四叉树



长度为18

不学一叉树是因为一叉树就是链表．查找效率低．

不学三叉树是因为较复杂．无类似Huffman算法的构造能达到最优三叉树

39. 我们用Prim算法求解

先选 V_1．构成集合V． V_2到V最短．添加V_2．

V_6到V最短．添加V_6．

V_5到V最短．添加V_5．

类似地．再依次添加 V_7．V_8．V_3．V_4．最短树 $T = \{(V_1,V_2),(V_2,V_6),(V_2,V_5),(V_2,V_7),(V_7,V_8),(V_2,V_3),(V_3,V_4)\}$．

边权之和为13

割集矩阵创新思路：对方向的确定．．考虑基本割基．将树的部分与非树部分相分离计算

（均与回路矩阵类似）