7.1 $d(a,b)$ means the shortest route from a to b

Step1:

$d(S,T) = \min\{4 + d(A,T),\ 5 + d(B,T),\ 1 + d(C,T)\}$

Step2:

$d(A,T) = \min\{10 + d(D,T),\ 9 + d(F,T)\}$

$d(B,T) = \min\{6 + d(D,T),\ 5 + d(E,T)\}$

$d(C,T) = \min\{11 + d(E,T),\ 2 + d(G,T)\}$

Step 3.

$d(A,T) = \min\{10+4,\ 9+5\} = 14$

$d(B,T) = \min\{6+4,\ 5+3\} = 8$

$d(C,T) = \min\{11+3,\ 2+3\} = 5$

Step 4.

$d(S,T) = \min\{4+14,\ 5+8,\ 1+5\} = 6$

The solution is S - C - G - T

The minimal distance is 6

7.5

let $x_2 = y$ so

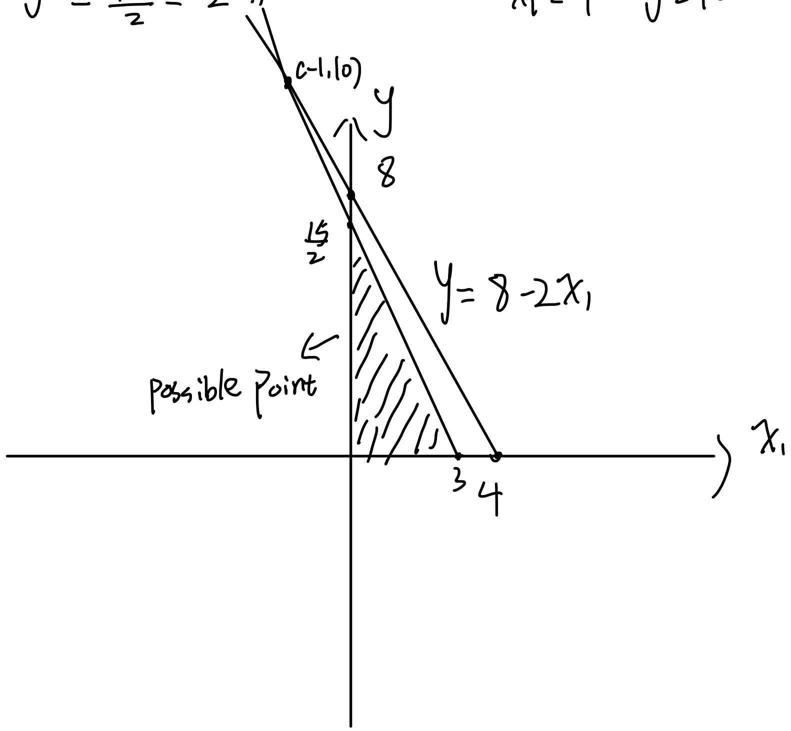
maximize $x_0 = 8x_1 + 7y \Rightarrow y = \frac{x_0}{7} - \frac{8}{7}x_1$ maximize $\frac{x_0}{7}$

Subject $y \le 8 - 2x_1$

$y \le \frac{15}{2} - \frac{5}{2}x_1$

if $8 - 2x_1 = \frac{15}{2} - \frac{5}{2}x_1$

$x_1 = -1 \quad y = 10$



Since x_1, x_2 are non-negative

So the final result is $\frac{x_0}{7} = 7 \quad x_0 = 49$

7.6 $L_{i,j}$ denote the length of the longest common sequence of $a_1, a_2, \cdots a_i$ from S_1 $b_1 b_2 \cdots b_j$ from B.

$$L_{i,j} = \begin{cases} L_{i-1,j-1}+1 & \text{if } a_i = b_j \\ \max\{L_{i-1,j}, L_{i,j-1}\} & \text{if } a_i \neq b_j \end{cases}$$

LCS means the longest Common subsequence

Step 2 the solution of this question is $L_{8,5}$

step 3.

3.1 $i=0$ Lcs of $(S_1, S_2) = 0$

$j=0$ Lcs of $(S_1, S_2) = 0$

3.2 $L_{1,1}$ = Lcs of (a_1, b_1) = Lcs of $(a, b) = 0$

$L_{1,2}$ = Lcs of $(a_1, b_1 b_2)$ = Lcs of $(a, be) = 0$

$L_{1,3}$ = Lcs of $(a_1, b_1 b_2 b_3)$ = Lcs of $(a, bea) = 1$ (a)

$L_{1,3} = 1 = L(1,4) = L(1,5) = 1$ (a)

3.3 $L_{2,1}$ = Lcs of $(a_1 a_2, b_1)$ = Lcs of $(aa, b) = 0$

$L_{3,1}$ = Lcs of $(a_1 a_2 a_3, b_1)$ = Lcs of $(aab, b) = 1$ (b)

$L_{3,1} = 1 = L_{4,1} = L_{5,1} = L_{6,1} = L_{7,1} = L_{8,1} = 1$ (b)

3.4 $L_{2,2}$ = LCS of $(a_1 a_2, b_1 b_2)$ = Lcs of $(aa, be) = 0$

$L_{2,3}$ = LCS of $(a_1 a_2, b_1 b_2 b_3)$ = Lcs of $(aa, bea) = 1$ (a)

$L_{2,4}$ = LCS of $(a_1 a_2, b_1 b_2 b_3 b_4)$ = Lcs of $(aa, bead) = 1$ (a)

$L_{2,5}$ = LCS of $(a_1 a_2, b_1 b_2 b_3 b_4 b_5)$ = LCS of $(aa, beadf) = 1$ (a)

3.5 $L_{3,2}$ = LCS of $(a_1a_2a_3, b_1b_2)$ = LCS of (aab, be) = 1 (b)

$L_{4,2}$ = LCS of $(a_1a_2a_3a_4, b_1b_2)$ = LCS of (aabc, be) = 1 (b)

$L_{5,2}$ = LCS of $(a_1a_2a_3a_4a_5, b_1b_2)$ = LCS of (aabcd, be) = 1 (b)

$L_{6,2}$ = LCS of $(a_1a_2a_3a_4a_5a_6, b_1b_2)$ = LCS of (aabcda, be) = 1 (b)

$L_{7,2}$ = LCS of $(a_1a_2a_3a_4a_5a_6a_7, b_1b_2)$ = LCS of (aabcdae, be) = 2 (be)

$L_{7,2} = 2 = L_{8,2} = 2$ (be)

哪个?

3.6 $L_{3,3}$ = LCS of $(a_1a_2a_3, b_1b_2b_3)$ = LCS of (aab, bea) = 1 (b or a)

$L_{3,4}$ = LCS of $(a_1a_2a_3, b_1b_2b_3b_4)$ = LCS of (aab, bead) = 1 (b or a)

$L_{3,5}$ = LCS of $(a_1a_2a_3, b_1b_2b_3b_4b_5)$ = LCS of (aab, beadf) = 1 (b or a)

3.7 $L_{4,3}$ = LCS of $(a_1a_2a_3a_4, b_1b_2b_3)$ = LCS of (aabc, bea) = 1 (b or a)

$L_{5,3}$ = LCS of $(a_1a_2a_3a_4a_5, b_1b_2b_3)$ = LCS of (aabcd, bea) = 1 (b or a)

$L_{6,3}$ = LCS of $(a_1a_2a_3a_4a_5a_6, b_1b_2b_3)$ = LCS of (aabcda, bea) = 2 (ba)

$L_{7,3}$ = LCS of $(a_1a_2a_3a_4a_5a_6a_7, b_1b_2b_3)$ = LCS of (aabcdae, bea) = 2 (ba or be)

$L_{8,3}$ = LCS of $(a_1a_2a_3a_4a_5a_6a_7a_8, b_1b_2b_3)$ = LCS of (aabcdaef, bea) = 2 (ba or be)

3.8

$L_{4,4}$ = LCS of $(a_1 a_2 a_3 a_4,\ b_1 b_2 b_3 b_4)$ = LCS of (aabc, bead) = 1 (b or a

$L_{4,5}$ = LCS of $(a_1 a_2 a_3 a_4,\ b_1 b_2 b_3 b_4 b_5)$ = LCS of (aabc, beadf) = 1 (b or a

3.9

$L_{5,4}$ = Lcs of $(a_1 a_2 a_3 a_4 a_5,\ b_1 b_2 b_3 b_4)$ = Lcs of (aabcd, bead) = 2 (ad or bd)

$L_{6,4}$ = Lcs of $(a_1 a_2 a_3 a_4 a_5 a_6,\ b_1 b_2 b_3 b_4)$ = Lcs of (aabcda, bead) = 2 (ad or bd)

$L_{7,4}$ = Lcs of $(a_1 a_2 a_3 a_4 a_5 a_6 a_7,\ b_1 b_2 b_3 b_4)$ = Lcs of (aabcdae, bead) = 2 (ad or bd or be)

$L_{8,4}$ = Lcs of $(a_1 a_2 a_3 a_4 a_5 a_6 a_7 a_8,\ b_1 b_2 b_3 b_4)$ = Lcs of (aabcdaef, bead) = 2 (ad or bd or be)

3.10

$L_{5,5}$ = Lcs of $(a_1 a_2 a_3 a_4 a_5,\ b_1 b_2 b_3 b_4 b_5)$

= Lcs of (aabcd, beadf) = 2 (ad or bd)

3.11

$L_{6,5}$ = Lcs of $(a_1 a_2 a_3 a_4 a_5 a_6,\ b_1 b_2 b_3 b_4 b_5)$

= Lcs of (aabcda, beadf) = 2 (ad or bd)

$L_{7,5}$ = Lcs of $(a_1 a_2 a_3 a_4 a_5 a_6 a_7,\ b_1 b_2 b_3 b_4 b_5)$

= Lcs of (aabcdae, beadf) = 2 (ad or bd or be)

$L_{8,5}$ = LCS of $(a_1a_2a_3a_4a_5a_6a_7a_8, b_1b_2b_3b_4b_5)$

= LCS of (aabcdaef, beadf) = 3 (adf, bdf, bef)

S_2

S_1		b	e	a	d	f	LCS	of
	0	0	0	0	0	0	None	a_0 and B
a	0	0	0	1	1	1	a	a_1 and B
a	0	0	0	1	1	1	a	a_2 and B
b	0	1	1	1	1	1	a, b	a_3 and B
c	0	1	1	1	1	1	a, b	a_4 and B
d	0	1	1	1	2	2	bd, ad	a_5 and B
a	0	1	1	2	2	2	bd, ad, ba	a_6 and B
e	0	1	2	2	2	2	bd, ad, be, ba	a_7 and B
f	0	1	2	2	2	3	adf, bdf, bef	a_8 and B
		b	be	be ba	be ba bd ad	adf bdf bef		