3d) <u>for U</u>

$E_{41}E_{31}E_{21}A = U_1$

$(E_{42}E_{32})U_1 = U_2$

$E_{43}U_2 = U$

therefore

$$\underline{U = E_{43}E_{42}E_{32}E_{41}E_{31}E_{21}A}$$

Hence U is obtained by computing the product $U = E_{43}U_2 = E_{43}E_{42}E_{32}U_1$ and $U_1 = E_{41}E_{31}E_{21}A$

<u>For L</u>

$(E_{41}E_{31}E_{21})^{-1} = L_1$

$(E_{42}E_{32})^{-1}L_1 = L_2$

$(E_{43})^{-1}L_2 = L$

So

$$L = (E_{43}E_{42}E_{32}E_{41}E_{31}E_{21})^{-1}$$

To compute this inverse, we can assume

$$(AB)^{-1} = A^{-1}B^{-1}$$

therefore

$$L = (E_{43}E_{42}E_{32}E_{41}E_{31}E_{21})^{-1} = (E_{43}E_{42}E_{32})^{-1}(E_{41}E_{31}E_{21})^{-1}$$

but

$$(E_{41}E_{31}E_{21})^{-1} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ l_{21} & 1 & 0 & 0 \\ l_{31} & 0 & 1 & 0 \\ l_{41} & 0 & 0 & 1 \end{bmatrix}$$