Problems Mathematical Programming

PROBLEM #1
Consider the following data for a crude unit:

Hot Streams

	TCR	MCR	LCR	KER	LGO	HGO	LR1	LR2	LR3	LR4	NAP
Fcp [kW/C]	1007.80	356.19	403.31	120.03	44.43	70.57	139.55	70.65	236.3	77.23	1460.04
Tin [C]	134.0	227.7	268.1	232.7	238.2	279.3	335.9	335.9	239.4	186.2	115.2
Tout [C]	108.2	190.8	198.8	40	45	68	262.7	186.1	186.2	90.00	56.00

Cold Streams

	C1	C2	C3	C4
Fcp [kW/C]	523.35	619.8	585.68	175.8
Tin [C]	39.00	153	155.3	150
Tout [C]	153	165.2	348	270

COST OF HOT UTILITY =2996 \$/Kw

Hot utility temperature change $600\,^{\circ}C \rightarrow 580\,^{\circ}C$

COST OF COLD UTILITY =1198 \$/Kw

Cold utility temperature change $20\,^{\circ}C \rightarrow 40\,^{\circ}C$

FIXED COST PER UNIT: 18,572 \$

COST OF AREA= 224.63 \$/m^2

U=0.31 kW/($^{\circ}$C m^2)

1) Use the Transhipment model to obtain networks. (HRAT=10 $^{\circ}$C)

2) Use the Stages model to obtain a heat exchanger network.
- Vary the ratio of the cost of energy to the cost of exchangers to obtain different networks.
- Vary the value of EMAT and see what the effect is.
- Add the area equations and run the model without any initial values.
- Try using the results of the model without areas as initial point to see if different results are obtained.