	Seongmin Lee (CID:0/247436)
	(3-a)
	i) Decision Variables.
	Xi: 1 product manufactured at the plant 1, X, GZ
	X: 2 product nonufactured at the plant 2, X, E.Z.
	X: 3 product manufactural out the plant 3, XI CZ
	Xx3 4 product manufactural at the plant 4., x462
	M8 Big M, 20000
	Disturning the plant 1 line or not, y, 830,19
0	y: running the plant 2 line or not , 3, 630,15
	y: Hulming the plant 3 Line or not, 22636,15
	Las rummy the plant & Line or not, 14 630,19
	V's Auxilian variable, UE30,19
	ii) Objective tunction
	Marximise profets 10 x, +60x2 + 90X3 + 80X4
	-500004, -400004, -100004, -6000094
220 5	ii) Constraits.
	- Remore limit for each product
0	· X, £ 10000, X, £ 1000, X, £ 12500 x4£ 9000
	- X, £ 10000, X, £ 1000 , X, £ 12500 , X, £ 9000 - At most two lines should be modured
	· 4.ty.ty.ty+4+ = 2
	- If either line 1 or line 2 is proming, the line 3 can only run · y, + y = Z, y, -Dy, +y, -y, 20
	· 4,74, 7.4, -D4, +y, -4, 20
	- Either Line + line 2 are below 20,000 or lines + line 4 are below 20,000
	· YI+ X = 6 20000 + M.V, where M=80000 (Big M), WE 30,19
	· Xz+X4 = 20000 +M. (1-v), where M=80000 (Bigm), VE30.19
	- Line & product binding
	· X, 5MY, X, 5MY, X, 5MY, X4 EMY,
	- Non-negotiveness.
	· X1, 12, 14, 14, 20

	$(4-\alpha)$
	i) Decision variables
	- C: the minute of the transmit from Covaline
	-n°s 1: from Norshawtuc
	- 01: 1 from Adirondack
	- l'3 " from Lancaster.
	· c, n,a, lez
	-cd: the delivery charge if accepting the hil from Carolino
0	- nd: from Noshawtuc - adis from Adirondack
	- ld? From Lan castoz.
	· cd, nd, ad, ld 630,19
	ii) Objetile Tunetion.
	-Minimist cost: 2000+24ton+ 2510a+2410l
	+ 10000cd+ 20000 nd+ 0 xad+ 13000ld
	iii) Constraints.
	- Remond's C+n+a+l' \(\frac{1}{2}\) 2000
-0	- Linking capacity: C & M. Col, n&M. nd, a & Mad, l&M.ll.
	- Supply Capacity Big M- 40000
	· C < 1000
	· N = 1260
	· 01 4 800
	· 1 & 1100
	- Nonnegativity
	. C, N, a, 120
	(4-b) The AMPL file is attached.
	The optimal solution is Norsha whic= 1200 & Languiter = 800 with
	the optimal value of 2494anoo.

	1) New Decision Variables added to the original one. - L: the Mamples of Furnithus from Delaware - dr: trom Delaware at reduce cost.
	- 2: the MMARKER of Furnithue from Delaware
	- 2: the Minter of furnithus from Delaverse
	- die de la
	d, dr 6.7
	-dd: the deliver charge if accepting the bild from
-	-drd's '' of radiue rost.
	M, drd = 30,15
0	i) New Objective funcion.
	- Minimise Cost: 2000+2450n+2570a+24001+2530d+2430d)
+	10000cd +20000nd+ Oad+ 13000ld+ 9000dd+ 1000drd.
	iii) Constraints
	- Demand: Ctrtatlt dtdrz 2000
	- Linking corpecity: CEM·cd, nEM·nd, onEM·nd, lEM·ld, LEM·ddydrem
	- Supply Catality T · C 6 1000 M= by M=100000.
0	· N6/200
	· 015900
-	- 16/100
-	-d < 1000
	dr = 500
	- dd 2 drd.
1	- d = 1000 drd. (reduced price is a vailable after 1000 ort an original price)
	AMPLES AND TO SERVE A SERVE AS A
	= 7 AMPL File is oddardard. The optimal solution and while one some as
	$(4-\alpha)$