

HEINEKEN GENERAL BEER GAME MODEL

RME GRG NonLinear

RETAILER	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line								
WEEK	IO	eIO	AO	ε	O_t	$(AO - O_t)$	$(AO - O_t)^2$	EI	S_t	SL_t								
0	0	0											$\Sigma (AO - O_t)^2$	273.648				
1	4	0.00	4	-1.4648	0.723294	3.2767061	10.736903	12	12	12			θ	0.61				
2	4	2.46	4	-1.736498	2.939551	1.0604491	1.12456223	12	12	12			α	0.37				
3	4	3.41	8	0.52248	6.146099	1.8539013	3.4369499	12	12	12			β	0.00				
4	4	3.77	8	-0.143331	5.845586	2.1544139	4.6414092	12	12	16			S'	18.00				
5	8	3.91	12	-1.309822	6.268651	5.7013487	32.5053775	8	8	20								
6	8	6.42	12	1.490643	13.09009	-1.090091	1.18829883	4	4	28								
7	8	7.39	12	0.081314	12.64926	-0.649261	0.42154025	4	4	32								
8	8	7.77	12	-1.4648	11.44651	0.5534881	0.30634894	4	4	38								
9	8	7.91	12	-1.736498	10.60939	1.3906117	1.933801	6	6	38								
10	8	7.97	12	0.52248	13.29354	-1.293539	1.67324207	5	5	43								
11	8	7.99	12	-0.143331	11.90975	0.0902458	0.00814428	7	7	45								
12	8	7.99	12	-1.309822	11.12119	0.8788075	0.77230258	6	6	50								
13	8	8.00	16	-2.425023	11.11822	4.8917815	23.8317903	3	3	57								
14	8	8.00	16	1.63397	14.43007	1.5609285	2.43649793	5	5	63								
15	8	8.00	16	2.639009	13.96585	2.0341459	4.13774951	9	9	67								
16	8	8.00	8	1.986723	11.46534	-3.465338	12.0085697	14	14	70								
17	8	8.00	8	0.416886	7.307795	0.692205	0.47914771	21	21	63								
18	8	8.00	0	0.156688	2.611315	-2.611315	6.81896757	33	33	51								
19	8	8.00	0	-1.188765	0	0	0	60	60	16								
20	8	8.00	0	-2.425023	0	0	0	60	60	8								
21	8	8.00	0	1.63397	0	0	0	60	60	0								
22	8	8.00	0	2.639009	0	0	0	52	52	0								
23	8	8.00	0	1.986723	0.374981	-0.374981	0.14081093	44	44	0								
24	8	8.00	8	0.416886	1.762603	6.2373968	38.906116	36	36	0								
25	8	8.00	8	0.156688	4.469744	3.5402559	12.5334116	28	28	8								
26	8	8.00	8	-1.188765	6.07187	1.9281298	3.7176846	20	20	16								
27	8	8.00	8	-2.425023	7.793072	0.2069283	0.04281932	12	12	24								
28	8	8.00	8	1.63397	11.85206	-3.852064	14.8383952	12	12	24								
29	8	8.00	8	2.639009	12.8571	-4.857103	23.5914538	12	12	24								
30	8	8.00	8	1.986723	12.20482	-4.204817	17.6804889	12	12	24								
31	8	8.00	8	0.416886	10.63498	-2.63498	6.94312203	12	12	24								
32	8	8.00	8	0.156688	10.37466	-2.374662	5.63902025	12	12	24								
33	8	8.00	8	-1.188765	9.029329	-1.029329	1.05951856	12	12	24								
34	8	8.00	8	-2.425023	7.793072	0.2069283	0.04281932	12	12	24								
35	8	8.00	10	1.63397	11.85206	-1.852064	3.43014015	12	12	24								
36	9	8.00	10	2.639009	12.8571	-2.857103	8.16303991	12	12	28								
37	10	8.61	10	1.986723	12.81931	-2.819308	7.94848712	12	12	28								
38	11	9.47	10	0.416886	12.10085	-2.10085	4.41357224	12	12	30								
39	12	10.41	10	0.156688	12.04387	-2.043873	4.17741699	14	14	30								
40	13	11.39	10	1.355139	13.48099	-3.480991	12.1173009	16	16	30								
				mean of the disturbance	0.06043		0.2274035	mean of the standard errors										
				std dev of the disturbance	1.61238													

Incoming Orders:
 $IO = COR$
 Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
 Actual Orders:
 $AO = ROP$
 Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1
 Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \varepsilon)$
 Error Term:
 $AO - O_t$
 Squared errors:
 $(AO - O_t)^2$
 Effective Inventory:
 $EI = REI$
 Stock:
 $S_t = \text{MAX}(0, EI)$
 Supply Line:
 $SL_t = RSL + RSD1 + RSD2 + WIO + WBL$

HEINEKEN GENERAL BEER GAME MODEL

WME - GRG NonLinear

WHOLESALE	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line								
WEEK	IO	eIO	AO	ϵ	O_t	$(AO - O_t)$	$(AO - O_t)^2$	EI	S_t	SL_t								
0	4	0											$\Sigma (AO - O_t)^2$	1897.334				
1	4	0.997237	4	-0.267638	10.79943	-6.799428	46.2322227	12	12	12			θ	0.25	>=0	<=1		
2	4	1.745853	4	1.200384	13.01607	-9.016068	81.2894494	12	12	12			α	1.00	>=0	<=1		
3	4	2.307833	6	0.844248	13.22191	-7.22191	52.1559898	12	12	12			β	0.00	>=0	<=1		
4	8	2.729708	7	0.37987	13.1794	-8.179405	38.1850435	12	12	14			S'	22.07	>=0	<=100	INT	
5	8	4.043839	10	1.484787	19.59826	-9.598255	92.1265008	8	8	17								
6	12	5.029998	12	0.348249	23.44807	-11.44807	131.058394	4	4	23								
7	12	6.767882	15	0.109446	28.94896	-13.94896	194.517631	-2	0	29								
8	12	8.072147	19	-1.4331	28.70888	-9.708878	94.2622783	-7	0	37								
9	12	9.051397	21	-0.054379	31.06685	-10.06685	101.341414	-9	0	48								
10	12	9.788511	30	-0.334728	31.52181	-1.521813	2.3153052	-14	0	60								
11	12	10.33835	45	0.19751	32.80569	12.394308	153.618823	-21	0	85								
12	12	10.75262	45	-1.157144	31.6653	13.334897	177.814146	-23	0	120								
13	12	11.0638	44	-1.31368	31.81976	12.180249	148.358471	-23	0	153								
14	16	11.29705	44	0.969569	34.33646	9.6635468	93.3941376	-22	0	184								
15	16	12.46954	48	0.994865	35.53424	10.465763	109.5322	-23	0	213								
16	16	13.34972	50	-0.630882	34.78867	15.211335	231.3847	-19	0	239								
17	8	14.01048	38	-0.317827	23.76246	12.237541	149.757399	12	12	242								
18	8	12.512	0	-0.991274	0	0	0	37	37	246								
19	0	11.38711	0	0.48898	0	0	0	79	79	195								
20	0	8.548201	0	0.00293	0	0	0	154	154	120								
21	0	6.417058	0	-0.264291	0	0	0	274	274	0								
22	0	4.817225	0	0.477858	0	0	0	274	274	0								
23	0	3.616246	0	-0.57121	0	0	0	274	274	0								
24	0	2.714683	0	-1.288942	0	0	0	274	274	0								
25	8	2.037887	0	-1.562768	0	0	0	274	274	0								
26	8	3.524297	0	0.532278	0	0	0	286	286	0								
27	8	4.640131	0	-0.219598	0	0	0	258	258	0								
28	8	5.477777	0	1.740596	0	0	0	250	250	0								
29	8	6.108591	0	-0.082124	0	0	0	242	242	0								
30	8	6.578635	0	-1.116478	0	0	0	234	234	0								
31	8	6.932994	0	0.168628	0	0	0	226	226	0								
32	8	7.199009	0	-0.463503	0	0	0	218	218	0								
33	8	7.398703	0	0.994865	0	0	0	210	210	0								
34	8	7.548612	0	-0.630882	0	0	0	202	202	0								
35	8	7.861147	0	-0.317827	0	0	0	194	194	0								
36	10	7.745826	0	-0.991274	0	0	0	186	186	0								
37	10	8.307662	0	0.48898	0	0	0	178	178	0								
38	10	8.729578	0	0.00293	0	0	0	168	168	0								
39	10	9.048308	0	-0.264291	0	0	0	156	156	0								
40	10	9.28407	0	0.477658	0	0	0	146	146	0								
		mean of the disturbance		-0.060097		-0.000571	mean of the standard errors											
		std dev of the disturbance		0.849804														

Incoming Orders:

IO = WIO

Expected Incoming Orders:

 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:

AO = WOP

Disturbance:

normally distributed white noise

mean = 0

std dev = 1

Model Orders:

 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \epsilon$

Error Term:

AO - O_t

Squared errors:

 $(AO - O_t)^2$

Effective Inventory:

EI = MWEI

Stock:

 $S_t = \text{MAX}(0, EI)$

Supply Line:

 $SL_t = WSL = WSD1 + WSD2 + DIO + DBL$

HEINEKEN GENERAL BEER GAME MODEL

DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb- ance	model orders	error term	squared errors	effective inventory	Stock	Supply line								
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t								
0	4	0																
1	4	4	4	1.473208	14.90934	-10.90934	119.013782	12	12	12								
2	4	4	4	-0.324088	13.11204	-9.112041	83.0292982	12	12	12								
3	4	4	6	1.676443	15.11258	-9.11258	83.0391202	12	12	12								
4	6	4	4	-0.398282	12.95099	-8.950998	78.3399487	12	12	14								
5	7	6	5	-0.742593	16.50687	-11.50687	132.403567	10	10	14								
6	10	7	10	-0.713798	20.44203	-10.44203	109.036091	7	7	15								
7	12	10	12	0.008154	27.79025	-15.79025	249.331895	3	3	19								
8	15	12	15	-0.563275	31.47134	-16.47134	271.30498	-5	0	27								
9	19	15	20	-1.062354	33.03791	-13.03791	169.987054	-15	0	37								
10	21	19	30	-0.605181	36.56073	-8.560732	43.0432045	-24	0	47								
11	30	21	30	0.068991	37.54106	-7.541063	56.8676395	-33	0	65								
12	45	30	50	2.083096	46.97878	3.0212162	9.12774741	-50	0	82								
13	45	45	100	-0.498629	58.12883	43.871168	1924.67923	-80	0	117								
14	44	45	250	-1.241272	47.90939	202.09081	40840.614	-105	0	197								
15	44	44	0	2.083354	31.28671	-31.28671	977.807315	-102	0	400								
16	48	44	20	0.37212	32.63883	-12.63883	159.740112	-113	0	367								
17	50	48	0	-0.190656	38.87911	-36.87911	1360.08881	-109	0	337								
18	38	50	0	0.785999	48.86339	-48.86339	2387.63066	-84	0	262								
19	0	38	0	-1.320197	0	0	0	122	122	20								
20	0	0	0	3.321758	0	0	0	142	142	0								
21	0	0	0	0.688758	0	0	0	142	142	0								
22	0	0	0	0.665494	0	0	0	142	142	0								
23	0	0	0	-0.677712	0	0	0	142	142	0								
24	0	0	0	-0.508255	0	0	0	142	142	0								
25	0	0	0	-0.197425	0	0	0	142	142	0								
26	0	0	0	1.390968	0	0	0	142	142	0								
27	0	0	0	0.80908	0	0	0	142	142	0								
28	0	0	0	-0.197029	0	0	0	142	142	0								
29	0	0	0	0.001307	0	0	0	142	142	0								
30	0	0	0	-0.389441	0	0	0	142	142	0								
31	0	0	0	0.846151	0	0	0	142	142	0								
32	0	0	0	0.813321	0	0	0	142	142	0								
33	0	0	0	0.273298	0	0	0	142	142	0								
34	0	0	0	0.971693	0	0	0	142	142	0								
35	0	0	0	0.029101	0	0	0	142	142	0								
36	0	0	0	-1.338938	0	0	0	142	142	0								
37	0	0	0	0.785999	0	0	0	142	142	0								
38	0	0	0	-1.320197	0	0	0	142	142	0								
39	0	0	0	3.321758	0	0	0	142	142	0								
40	0	0	0	0.688758	0	0	0	142	142	0								
				mean of the disturbance	0.249276		-2.09E-08	mean of the standard errors										
				std dev of the disturbance	1.040822													

Incoming Orders:
IO = DIO

Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
AO = DOP

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t)) + \epsilon$

Error Term:
 $AO - O_t$

Squared errors:
 $(AO - O_t)^2$

Effective Inventory:
EI = MDEI

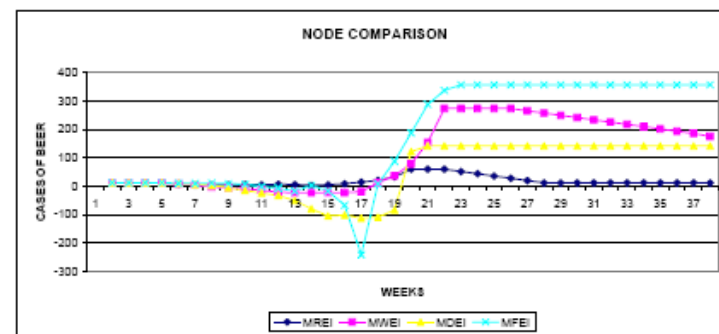
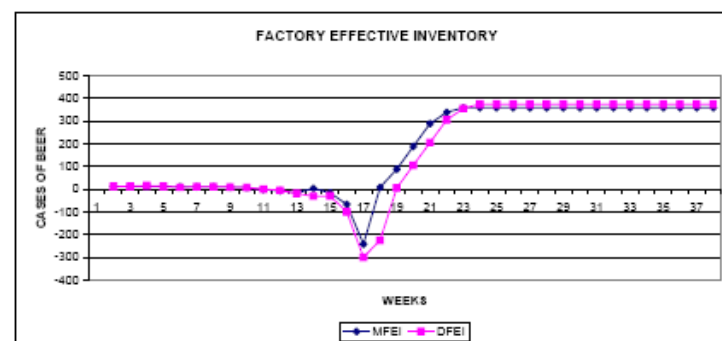
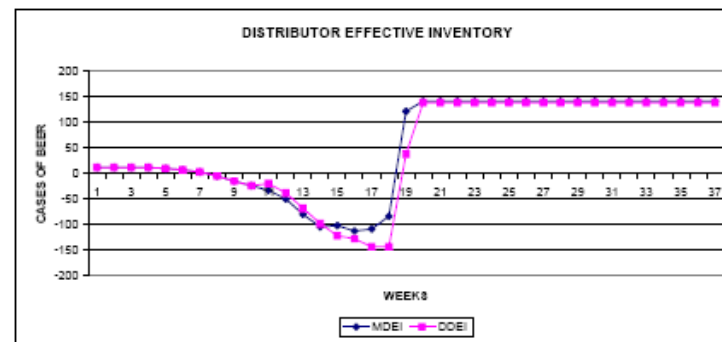
Stock:
 $S_t = \text{MAX}(0, EI)$

Supply Line:
 $SL_t = DSL = DSD1 + DSD2 + FIO + FBL$

FACTORY	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line											
WEEK	IO	eIO	AO	ε	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t											
0	4	0												$\Sigma (AO-O_t)^2$	41823.26		constraints				
1	4	1.133662	4	-0.548984	25.39672	-21.39872	457.819701	12	12	8				θ	0.28		≥ 0	≤ 1			
2	4	1.948028	4	0.161707	26.91978	-22.91978	525.316199	12	12	8				α	0.79		≥ 0	≤ 1			
3	4	2.528154	4	-0.100219	27.23998	-23.23998	540.096617	12	12	8				β	0.00		≥ 0	≤ 1			
4	6	2.945298	6	-0.771578	28.98576	-20.98576	440.402279	12	12	8				S'	43.37		≥ 0	≤ 100	INT		
5	4	3.811048	8	-0.061332	30.14341	-22.14341	490.330401	10	10	10											
6	5	3.8646	10	-1.326493	28.9318	-18.9318	358.412936	10	10	14											
7	10	4.19839	8	0.762634	30.55189	-24.55189	602.795342	11	11	18				GRG NonLinear							
8	12	5.834067	15	0.258867	33.27744	-18.27744	334.064701	9	9	16											
9	15	7.58158	20	0.370538	36.71828	-16.71828	279.500801	7	7	21											
10	20	9.884075	50	-0.320779	43.66522	6.3347834	40.1294812	-2	0	35											
11	30	12.60777	30	1.379051	48.28874	-18.28874	334.477969	-7	0	70											
12	30	17.53999	50	0.100175	51.93909	-1.939091	3.76007273	-17	0	80											
13	50	21.0692	75	-0.89927	62.12938	22.870816	523.065054	3	3	80											
14	100	29.26864	250	1.716236	65.28679	184.71321	34118.9684	-17	0	125				Incoming Orders:							
15	250	49.315	100	-0.401671	83.21525	18.784753	281.727937	-87	0	325				IO = FIO							
16	0	106.1922	100	-0.978647	139.5175	-39.5175	1561.8326	-242	0	350				Expected Incoming Orders:							
17	20	76.09571	100	0.392295	104.4633	-4.46334	19.9214082	8	8	200				eIO = $\theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$							
18	0	60.19732	50	2.491437	27.39825	22.601753	510.839256	88	88	200				Actual Orders:							
19	0	43.13647	20	-0.741984	0	20	400	188	188	150				AO = FPR							
20	0	30.91093	0	0.427086	0	0	0	288	288	70				Disturbance:							
21	0	22.15029	0	-1.218837	0	0	0	338	338	20				normally distributed white noise							
22	0	15.87268	0	0.072471	0	0	0	358	358	0				mean = 0							
23	0	11.37403	0	-0.548124	0	0	0	358	358	0				std dev = 1							
24	0	8.150455	0	0.617691	0	0	0	358	358	0				Model Orders:							
25	0	5.84049	0	0.136664	0	0	0	358	358	0				$O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \varepsilon$							
26	0	4.185205	0	-1.714183	0	0	0	358	358	0				Error Term:							
27	0	2.999053	0	-0.729895	0	0	0	358	358	0				AO - O_t							
28	0	2.149075	0	1.387173	0	0	0	358	358	0				Squared errors:							
29	0	1.539994	0	-0.575873	0	0	0	358	358	0				$(AO - O_t)^2$							
30	0	1.103536	0	-1.016041	0	0	0	358	358	0				Effective Inventory:							
31	0	0.790777	0	-1.071916	0	0	0	358	358	0				EI = MFEI							
32	0	0.568659	0	-0.752653	0	0	0	358	358	0				Stock:							
33	0	0.408059	0	-0.161031	0	0	0	358	358	0				$S_t = \text{MAX}(0, EI)$							
34	0	0.290975	0	-1.096819	0	0	0	358	358	0				Supply Line:							
35	0	0.208509	0	1.835789	0	0	0	358	358	0				SLT = FSL = FPD1+FPD2							
36	0	0.149414	0	0.31165	0	0	0	358	358	0											
37	0	0.107068	0	-0.449875	0	0	0	358	358	0											
38	0	0.078723	0	0.823503	0	0	0	358	358	0											
39	0	0.054979	0	-0.974692	0	0	0	358	358	0											
40	0	0.039397	0	-0.932591	0	0	0	358	358	0											
mean of the disturbance				-0.082703		0.5694684	mean of the standard errors														
std dev of the disturbance				0.978688																	

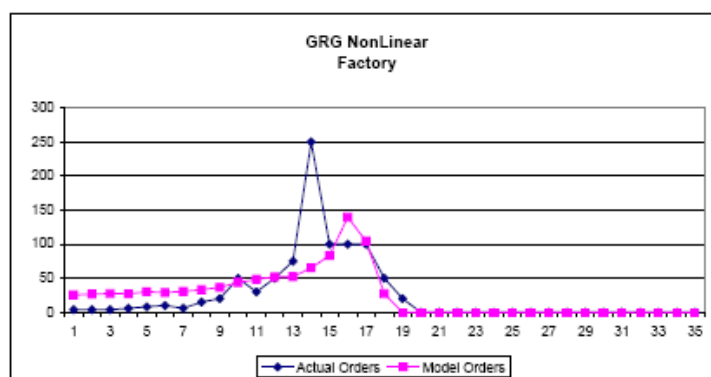
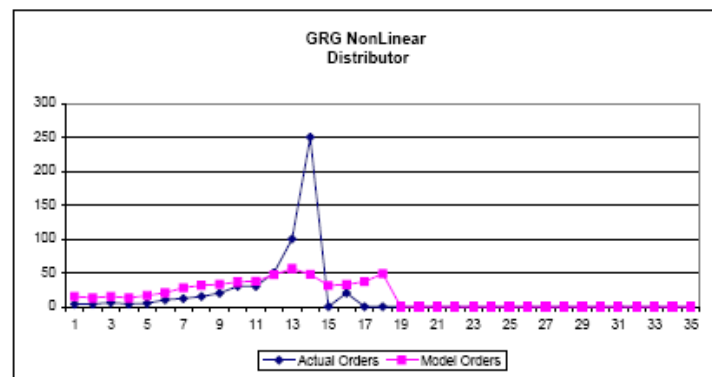
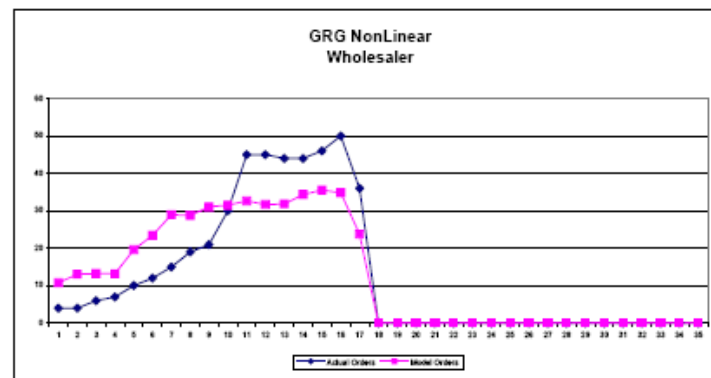
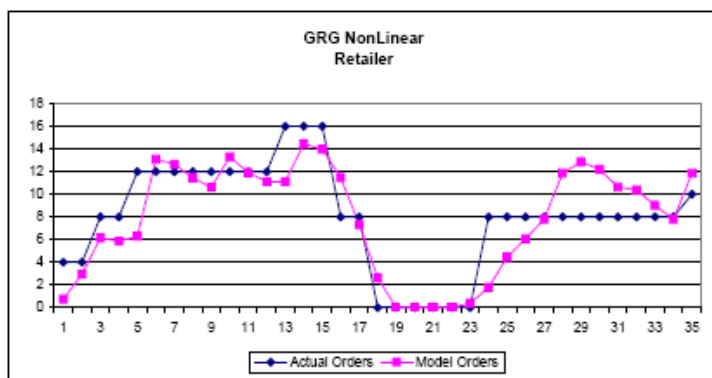
HEINEKEN GENERAL BEER GAME MODEL

MODEL CHARTS



HEINEKEN GENERAL BEER GAME MODEL

ORDER CHARTS



HEINEKEN GENERAL BEER GAME MODEL

MODEL WORKSHEET

	STEP 1 Receive The Inventory and Advance the shipping Delays								STEP 2 Look at the incoming orders and fill orders all incoming orders + backlog											
	HEINEKEN	IT								HEINEKEN	Retailer	IT								
	Team Costs	\$	9,502.50							Costs	\$	355.50								
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	DREI	RCOSTS	ROP	WIO	RSL		WINV1	WSD1				
0	0																			
1	4																			
2	4																			
3	4																			
4	4																			
5	8																			
6	8																			
7	8																			
8	8																			
9	8																			
10	8																			
11	8																			
12	8																			
13	8																			
14	8																			
15	8																			
16	8																			
17	8																			
18	8																			
19	8																			
20	8																			
21	8																			
22	8																			
23	8																			
24	8																			
25	8																			
26	8																			
27	8																			
28	8																			
29	8																			
30	8																			
31	8																			
32	8																			
33	8																			
34	8																			
35	8																			
36	8																			
37	8																			
38	8																			
39	8																			
40	8																			

HEINEKEN GENERAL BEER GAME MODEL

MODEL WORKSHEET

	STEP 3 Record your inventory or backlog								STEP 4 Advance the order slips and the brewery Brews								
					HEINEKEN Costs	Wholesaler \$ 2,584.00		IT									HEINEKEN Costs
WEEK	WSD2	WBL	WINV2	MWEI	DWEI	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	DDEI
0	4	0	12			0	4	4			12	4	4	0	12		
1	4	0	12	12	12	6	4	4	12		16	4	4	0	12	12	12
2	4	0	12	12	12	12	4	4	12		16	4	4	0	12	12	12
3	4	0	12	12	12	18	6	4	12		16	4	4	0	12	12	12
4	4	0	12	12	12	24	7	6	14		16	4	4	0	12	12	12
5	6	0	8	8	8	28	10	7	17		16	4	6	0	10	10	10
6	7	0	4	4	4	30	12	10	23		14	6	4	0	7	7	7
7	10	2	0	-2	-2	32	15	12	29		13	4	5	0	3	3	3
8	7	7	0	-7	-7	39	19	15	37		7	5	10	5	0	-5	-5
9	5	9	0	-9	-9	48	21	19	46		5	10	12	15	0	-15	-15
10	10	14	0	-14	-14	62	30	21	60		10	12	13	24	0	-24	-24
11	12	21	0	-21	-21	83	45	30	85		12	13	15	33	0	-33	-20
12	13	23	0	-23	-23	106	45	45	120		13	15	20	50	0	-50	-38
13	15	23	0	-23	-22	129	44	45	153		15	20	47	80	0	-80	-68
14	20	22	0	-22	-22	151	44	44	184		20	47	33	105	0	-105	-98
15	47	23	0	-23	-23	174	46	44	213		47	33	50	102	0	-102	-122
16	33	19	0	-19	-24	193	50	46	239		33	50	75	113	0	-113	-128
17	50	0	12	12	-20	199	36	50	242		50	75	242	109	0	-109	-144
18	75	0	37	37	22	217.5	0	36	245		75	242	20	84	0	-84	-144
19	120	0	79	79	44	257	0	0	195		242	20	0	0	122	122	38
20	0	0	154	154	94	334	0	0	120		142	0	0	0	142	142	139
21	0	0	274	274	130	471	0	0	0		142	0	0	0	142	142	139
22	0	0	274	274	274	608	0	0	0		142	0	0	0	142	142	139
23	0	0	274	274	274	745	0	0	0		142	0	0	0	142	142	139
24	0	0	274	274	274	882	0	0	0		142	0	0	0	142	142	139
25	0	0	274	274	274	1019	0	0	0		142	0	0	0	142	142	139
26	0	0	268	268	266	1152	0	0	0		142	0	0	0	142	142	139
27	0	0	258	258	258	1281	0	0	0		142	0	0	0	142	142	139
28	0	0	250	250	250	1406	0	0	0		142	0	0	0	142	142	139
29	0	0	242	242	242	1527	0	0	0		142	0	0	0	142	142	139
30	0	0	234	234	234	1644	0	0	0		142	0	0	0	142	142	139
31	0	0	226	226	226	1757	0	0	0		142	0	0	0	142	142	139
32	0	0	218	218	218	1866	0	0	0		142	0	0	0	142	142	139
33	0	0	210	210	200	1971	0	0	0		142	0	0	0	142	142	139
34	0	0	202	202	192	2072	0	0	0		142	0	0	0	142	142	139
35	0	0	194	194	184	2169	0	0	0		142	0	0	0	142	142	139
36	0	0	186	186	176	2262	0	0	0		142	0	0	0	142	142	139
37	0	0	178	178	166	2350	0	0	0		142	0	0	0	142	142	139
38	0	0	168	168	156	2433	0	0	0		142	0	0	0	142	142	139
39	0	0	158	158	146	2511	0	0	0		142	0	0	0	142	142	139
40	0	0	148	148	136	2584	0	0	0		142	0	0	0	142	142	139

HEINEKEN GENERAL BEER GAME MODEL

MODEL WORKSHEET

STEP 5 Place and record your orders																	
	Distributor		IT										HEINEKEN	Factory		IT	
	\$ 2,306.00												Costs	\$ 4,257.00			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	DFEI	FCOSTS		FPR	FSL	
0	0	4	4	12		12	4	4	0	12	12	12	0		4	8	
1	6	4	4	12		16	4	4	0	12	12	12	6		4	8	
2	12	4	4	12		16	4	4	0	12	12	12	12		4	8	
3	18	6	4	12		16	4	4	0	12	12	16	18		4	8	
4	24	4	6	14		16	4	4	0	12	12	12	24		6	8	
5	29	5	4	14		16	4	6	0	10	10	8	29		8	10	
6	32.5	10	5	15		14	6	8	0	10	10	10	34		10	14	
7	34	12	10	19		16	8	10	0	11	11	11	39.5		6	18	
8	39	15	12	27		19	10	6	0	9	9	9	44		15	18	
9	54	20	15	37		19	6	15	0	7	7	7	47.5		20	21	
10	78	30	20	47		13	15	20	2	0	-2	0	49.5		50	35	
11	111	30	30	65		15	20	50	7	0	-7	-5	56.5		30	70	
12	161	50	30	82		20	50	30	17	0	-17	-20	73.5		50	80	
13	241	100	50	117		50	30	50	0	3	3	-30	75		75	80	
14	346	250	100	197		33	50	75	17	0	-17	-30	92		250	125	
15	448	0	250	400		50	75	250	67	0	-67	-100	159		100	325	
16	561	20	0	367		75	250	100	242	0	-242	-300	401		100	350	
17	670	0	20	337		250	100	100	0	8	8	-225	405		100	200	
18	754	0	0	262		108	100	100	0	88	88	5	449		50	200	
19	815	0	0	20		188	100	50	0	188	188	105	543		20	150	
20	886	0	0	0		288	50	20	0	288	288	205	687		0	70	
21	957	0	0	0		338	20	0	0	338	338	305	858		0	20	
22	1028	0	0	0		358	0	0	0	358	358	355	1035		0	0	
23	1099	0	0	0		358	0	0	0	358	358	375	1214		0	0	
24	1170	0	0	0		358	0	0	0	358	358	375	1393		0	0	
25	1241	0	0	0		358	0	0	0	358	358	375	1572		0	0	
26	1312	0	0	0		358	0	0	0	358	358	375	1751		0	0	
27	1383	0	0	0		358	0	0	0	358	358	375	1930		0	0	
28	1454	0	0	0		358	0	0	0	358	358	375	2109		0	0	
29	1525	0	0	0		358	0	0	0	358	358	375	2288		0	0	
30	1596	0	0	0		358	0	0	0	358	358	375	2467		0	0	
31	1667	0	0	0		358	0	0	0	358	358	375	2646		0	0	
32	1738	0	0	0		358	0	0	0	358	358	375	2825		0	0	
33	1809	0	0	0		358	0	0	0	358	358	375	3004		0	0	
34	1880	0	0	0		358	0	0	0	358	358	375	3183		0	0	
35	1951	0	0	0		358	0	0	0	358	358	375	3362		0	0	
36	2022	0	0	0		358	0	0	0	358	358	375	3541		0	0	
37	2093	0	0	0		358	0	0	0	358	358	375	3720		0	0	
38	2164	0	0	0		358	0	0	0	358	358	375	3899		0	0	
39	2235	0	0	0		358	0	0	0	358	358	375	4078		0	0	
40	2306	0	0	0		358	0	0	0	358	358	375	4257		0	0	

HEINEKEN GENERAL BEER GAME MODEL

MODEL DATA

HEINEKEN								
IT								
Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	8	12	6	12	6	12	4	16
4	8	12	7	12	4	12	6	12
5	12	8	10	8	5	10	8	8
6	12	4	12	4	10	7	10	10
7	12	4	15	-2	12	3	6	11
8	12	6	19	-7	15	-5	15	9
9	12	5	21	-9	20	-15	20	7
10	12	7	30	-14	30	-24	50	0
11	12	6	45	-21	30	-20	30	-5
12	12	6	45	-23	50	-38	50	-20
13	16	7	44	-22	100	-68	75	-30
14	16	6	44	-22	250	-98	250	-30
15	16	3	46	-23	0	-122	100	-100
16	8	5	50	-24	20	-128	100	-300
17	8	10	36	-20	0	-144	100	-225
18	0	14	0	22	0	-144	50	5
19	0	21	0	44	0	38	20	105
20	0	28	0	94	0	139	0	205
21	0	31	0	130	0	139	0	305
22	0	60	0	274	0	139	0	355
23	0	60	0	274	0	139	0	375
24	8	52	0	274	0	139	0	375
25	8	44	0	274	0	139	0	375
26	8	36	0	266	0	139	0	375
27	8	28	0	258	0	139	0	375
28	8	20	0	250	0	139	0	375
29	8	12	0	242	0	139	0	375
30	8	12	0	234	0	139	0	375
31	8	12	0	226	0	139	0	375
32	8	12	0	218	0	139	0	375
33	8	12	0	200	0	139	0	375
34	8	12	0	192	0	139	0	375
35	10	12	0	184	0	139	0	375
36	10	12	0	176	0	139	0	375
37	10	12	0	166	0	139	0	375
38	10	12	0	156	0	139	0	375
39	10	14	0	146	0	139	0	375
40	10	16	0	136	0	139	0	375

HIRES ROOT BEER GENERAL BEER GAME MODEL

RME GRG NonLinear

RETAILER	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line									
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t									
0	0	0																	
1	4	0.00	4	0.405848	6.497396	-2.497396	6.2369882	12	12	12									
2	4	0.00	4	0.4609	6.552448	-2.552448	6.51498898	12	12	12									
3	4	0.00	5	-1.329855	4.761893	0.2381073	0.05689508	12	12	12									
4	4	0.00	5	1.132202	7.22375	-2.22375	4.9450651	12	12	13									
5	8	0.00	8	0.224464	6.76364	1.2363601	1.5285863	8	8	14									
6	8	0.00	5	-0.684595	6.302209	-1.302209	1.6957471	4	4	18									
7	8	0.00	7	0.694992	7.917516	-0.917516	0.84183599	1	1	18									
8	8	0.00	10	-1.180028	6.254404	3.7455962	14.0294906	-2	0	20									
9	8	0.00	10	-1.286095	6.148336	3.8518637	14.8353131	-2	0	22									
10	8	0.00	12	0.816597	8.251029	3.7489711	14.0547846	-5	0	27									
11	8	0.00	10	-1.195133	6.239299	3.7607014	14.142875	-8	0	32									
12	8	0.00	8	0.306923	7.741355	0.2586449	0.06689719	-4	0	32									
13	8	0.00	20	0.412309	7.846741	12.153259	147.701703	-2	0	30									
14	8	0.00	10	-0.357121	6.853497	3.1465029	9.90048046	2	2	38									
15	8	0.00	12	0.681525	7.668329	4.4316715	19.639712	4	4	38									
16	8	0.00	8	0.300316	7.287119	0.7128905	0.50819862	4	4	42									
17	8	0.00	8	-0.681334	6.325469	1.6745308	2.80405278	4	4	42									
18	8	0.00	8	0.538864	7.301854	0.8981458	0.48740781	6	6	40									
19	8	0.00	8	0.498787	7.933219	0.0867812	0.00445972	-2	0	48									
20	8	0.00	8	-0.788815	5.996174	2.0038255	4.01531891	6	6	40									
21	8	0.00	8	-1.529314	4.114606	3.8853938	15.082852	16	16	30									
22	8	0.00	10	0.988855	5.962334	4.0378663	16.302749	22	22	24									
23	8	0.00	10	-0.829823	4.142656	5.8573444	34.3084837	22	22	28									
24	8	0.00	10	-1.422893	3.549586	6.4504142	41.6078439	22	22	28									
25	8	0.00	10	-2.769529	2.20295	7.7970503	60.7939928	22	22	30									
26	8	0.00	5	-1.811599	2.937065	2.0629348	4.25570016	24	24	30									
27	8	0.00	3	0.17667	4.70152	-1.70152	2.8951716	26	26	25									
28	8	0.00	0	-1.488082	2.812955	-2.812955	7.91271455	28	28	18									
29	8	0.00	0	0.457816	4.535039	-4.535039	20.5665774	30	30	8									
30	8	0.00	0	0.449712	4.862655	-4.862655	23.6454181	27	27	3									
31	8	0.00	0	-0.012513	4.959966	-4.959966	24.6012598	22	22	0									
32	8	0.00	0	-0.489538	5.378196	-5.378196	28.924992	14	14	0									
33	8	0.00	0	-0.675524	6.087465	-6.087465	37.0572346	6	6	0									
34	8	0.00	0	-0.472867	6.961564	-6.961564	48.4633788	-2	0	0									
35	8	0.00	0	-1.2682	6.166232	-6.166232	38.0224171	-10	0	0									
36	9	0.00	0	0.5704	8.004832	-8.004832	64.0773275	-18	0	0									
37	10	0.00	5	-0.90463	6.529802	-1.529802	2.3402946	-26	0	0									
38	11	0.00	5	1.110139	8.54467	-3.54467	12.5639793	-34	0	5									
39	12	0.00	5	0.834074	8.268506	-3.268506	10.6831314	-42	0	10									
40	13	0.00	5	0.087651	7.502083	-2.502083	6.26041831	-50	0	15									
				mean of the disturbance	-0.339511		0.5388438	mean of the standard errors											
				std dev of the disturbance	0.938734														

Incoming Orders:
 $IO = COR$
 Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
 Actual Orders:
 $AO = ROP$
 Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1
 Model Orders:
 $O_t = MAX(0, eIO + \alpha(s' - S_t - \beta SL_t) + \epsilon$
 Error Term:
 $AO - O_t$
 Squared errors:
 $(AO - O_t)^2$
 Effective Inventory:
 $EI = REI$
 Stock:
 $S_t = MAX(0, EI)$
 Supply Line:
 $SL_t = RSL = RSD1 + RSD2 + WIO + WBL$

HIRES ROOT BEER GENERAL BEER GAME MODEL

WME - GRG NonLinear

WHOLESALE	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line								
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t								
0	4	0																
1	4	0.312769	4	-0.084298	4.103605	-0.103605	0.01073397	12	12	12								
2	4	0.601082	4	-0.042791	3.643425	0.3565754	0.12714603	12	12	12								
3	4	0.866862	6	1.120655	5.87264	0.1273802	0.01622061	12	12	12								
4	5	1.11184	5	-2.612244	2.384729	2.6152708	6.83964115	12	12	14								
5	5	1.415864	8	2.299504	8.600502	-0.600502	0.36060217	11	11	15								
6	8	1.696116	10	-1.331418	6.249831	3.750169	14.0637676	10	10	19								
7	5	2.189031	8	-1.834002	8.240163	-0.240163	0.05767804	8	8	23								
8	7	2.408827	7	-0.905888	9.388072	-2.388072	6.70288945	8	8	26								
9	10	2.767822	8	-0.39079	9.262165	-1.262165	1.59308082	9	9	25								
10	10	3.333322	8	-0.811433	9.407023	-1.407023	1.97971296	9	9	23								
11	12	3.854805	8	0.879659	13.6104	-5.619397	31.5776244	7	7	23								
12	10	4.491513	12	0.537846	18.91449	-8.914492	47.8101965	2	2	24								
13	8	4.922234	12	-0.233629	20.57374	-8.573738	73.5089677	0	0	28								
14	20	5.162892	25	1.348518	22.39654	2.6034575	6.77799098	0	0	32								
15	10	6.323039	30	0.016179	22.22435	7.7756484	60.4607082	-12	0	49								
16	12	6.610549	20	-0.008851	22.48883	-2.488831	6.19428071	-12	0	69								
17	8	7.031963	20	-1.047485	21.86981	-1.869811	3.49544481	-24	0	89								
18	8	7.107666	20	1.618297	24.61109	-4.611087	21.2621209	-16	0	93								
19	8	7.17743	20	0.32323	23.38579	-3.385793	11.4635961	-6	0	95								
20	8	7.241749	30	-1.117052	20.00983	9.9901696	99.8034881	2	2	99								
21	8	7.301038	30	-0.426722	18.75945	11.24055	126.349967	4	4	119								
22	8	7.355892	30	0.035619	17.27644	12.723556	161.88888	6	6	139								
23	10	7.408072	8	-0.057044	15.23416	-7.234161	52.3330819	8	8	159								
24	10	7.609897	0	-1.008264	4.485766	-4.485766	20.1220954	18	18	147								
25	10	7.795863	0	-1.201736	0	0	0	28	28	127								
26	10	7.968209	0	-0.373651	0	0	0	48	48	97								
27	5	8.12708	0	-0.791246	0	0	0	68	68	67								
28	3	7.882568	0	-0.348657	0	0	0	113	113	17								
29	0	7.500787	0	-0.545617	0	0	0	127	127	0								
30	0	6.914283	0	0.494355	0	0	0	127	127	0								
31	0	6.373839	0	-0.715811	0	0	0	127	127	0								
32	0	5.87527	0	-0.48633	0	0	0	127	127	0								
33	0	5.415869	0	-1.219601	0	0	0	127	127	0								
34	0	4.99239	0	-0.813533	0	0	0	127	127	0								
35	0	4.602023	0	-0.747951	0	0	0	127	127	0								
36	0	4.24218	0	-0.558769	0	0	0	127	127	0								
37	0	3.910474	0	0.32323	0	0	0	127	127	0								
38	5	3.604705	0	-1.117052	0	0	0	127	127	0								
39	5	3.713807	0	-0.426722	0	0	0	122	122	0								
40	5	3.814377	0	0.035619	0	0	0	117	117	0								
		mean of the disturbance		-0.316862		-4.71E-05	mean of the standard errors											
		std dev of the disturbance		0.97811														

Incoming Orders:
 $IO = WIO$
 Expected Incoming Orders:
 $eIO = \theta^* IO_{(t-1)} + (1-\theta)^* eIO_{(t-1)}$
 Actual Orders:
 $AO = WOP$
 Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1
 Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \epsilon$
 Error Term:
 $AO - O_t$
 Squared errors:
 $(AO - O_t)^2$
 Effective Inventory:
 $EI = MWEI$
 Stock:
 $S_t = \text{MAX}(0, EI)$
 Supply Line:
 $SL_t = WSL + WSD1 + WSD2 + DIO + DBL$

HIRES ROOT BEER GENERAL BEER GAME MODEL

DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line								
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t								
0	4	0																
1	4	2.100788	4	-1.171777	2.409644	1.590356	2.52923205	12	12	12								
2	4	3.098249	4	0.743525	6.322406	-1.322406	1.74875777	12	12	12								
3	4	3.571846	8	-1.818273	3.434205	4.565795	20.846484	12	12	12								
4	6	3.796711	8	-0.718374	4.247152	3.7528479	14.0838673	12	12	16								
5	5	4.953872	12	0.508119	8.312989	3.6870108	13.5940489	10	10	20								
6	8	4.978098	10	1.082944	9.286406	0.7135936	0.50921588	9	9	28								
7	10	6.665192	8	-1.572287	8.081362	-2.081362	4.24921137	9	9	30								
8	8	8.369143	8	0.878352	14.47098	-8.47098	71.765462	7	7	28								
9	7	8.17527	4	1.467654	11.33901	-7.339015	53.8611353	11	11	22								
10	8	7.558022	4	1.111557	7.836394	-3.836394	14.717919	14	14	16								
11	8	7.790147	0	-0.190404	8.923467	-8.923467	79.628263	12	12	14								
12	8	7.900361	18	1.840808	13.53562	2.4843815	6.07317629	10	10	8								
13	12	7.952691	18	-1.861439	12.95425	6.0457492	25.4565851	6	6	20								
14	12	10.07833	18	-1.048156	20.78481	-4.784809	22.8943994	-2	0	34								
15	25	11.08758	30	-0.881954	20.905	9.0949997	82.7190195	-14	0	50								
16	30	18.39434	20	0.762881	28.55824	-8.558237	73.2434193	-23	0	64								
17	20	24.4896	30	-1.799087	31.93462	-1.934617	3.74274109	-35	0	66								
18	20	22.13168	40	-1.171777	29.10584	10.894357	119.68702	-39	0	80								
19	20	21.01213	24	0.743525	27.54777	-3.547767	12.5868528	-49	0	110								
20	20	20.48056	50	-1.818273	23.55604	26.443956	699.282798	-59	0	124								
21	30	20.22817	20	0.828442	22.6122	-2.612201	6.82369297	-69	0	164								
22	30	26.36031	40	-0.483753	26.43214	13.567858	184.086777	-79	0	164								
23	30	27.79708	20	1.185104	28.96867	-8.968667	80.4369921	-89	0	184								
24	8	28.95404	20	0.375134	30.10022	-10.10022	102.014381	-89	0	174								
25	0	17.94904	12	-0.339597	19.16504	-7.165039	51.337798	-87	0	164								
26	0	8.522256	12	1.138097	14.1952	-2.195202	4.81891073	-17	0	128								
27	0	4.046392	0	-1.039453	0	0	0	43	43	78								
28	0	1.921239	0	-0.322576	0	0	0	93	93	28								
29	0	0.91221	0	-1.760743	0	0	0	109	109	12								
30	0	0.43312	0	-0.185432	0	0	0	121	121	0								
31	0	0.205647	0	0.751016	0	0	0	121	121	0								
32	0	0.097842	0	0.363102	0	0	0	121	121	0								
33	0	0.046361	0	0.483627	0	0	0	121	121	0								
34	0	0.022012	100	-2.260723	0	100	10000	121	121	0								
35	0	0.010451	58	-0.284406	0	58	3136	121	121	100								
36	0	0.004962	0	-1.307135	0	0	0	121	121	156								
37	0	0.002356	0	1.035498	0	0	0	121	121	156								
38	0	0.001119	0	0.828442	0	0	0	221	221	56								
39	0	0.000531	0	-0.483753	0	0	0	277	277	0								
40	0	0.000252	0	1.185104	0	0	0	277	277	0								
		mean of the disturbance		-0.167388			4.4571613	mean of the standard errors										
		std dev of the disturbance		1.127566														

$\Sigma (AO-O_t)^2$ 14987.73

constraints

θ 0.53 ≥ 0 ≤ 1

as 1.00 ≥ 0 ≤ 1

β 0.08 ≥ 0 ≤ 1

S^* 14.42 ≥ 0 ≤ 100 INT

GRG NonLinear

Incoming Orders:
IO = DIO

Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
AO = DOP

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
 $O_t = \text{MAX}(0, eIO + as(s' - S_t - \beta SL_t)) + \epsilon$

Error Term:
 $AO - O_t$

Squared errors:
 $(AO - O_t)^2$

Effective Inventory:
EI = MDEI

Stock:
 $S_t = \text{MAX}(0, EI)$

Supply Line:
 $SL_t = \text{DSL} = \text{DSD1} + \text{DSD2} + \text{FIO} + \text{FBL}$

HIRES ROOT BEER GENERAL BEER GAME MODEL

FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line							
WEEK	IO	eIO	AO	ϵ	O_t	$(AO - O_t)$	$(AO - O_t)^2$	EI	S_t	SL_t							
0	4	0										$\Sigma (AO - O_t)^2$	3200.07				constraints
1	4	0.754141	4	1.840778	10.73603	-6.736029	45.3740932	12	12	8		θ	0.19		≥ 0	≤ 1	
2	4	1.3661	4	0.116725	9.823935	-5.823935	33.9182242	12	12	8		αs	0.22		≥ 0	≤ 1	
3	4	1.862684	8	1.217728	11.42152	-3.421522	11.7068108	12	12	8		β	0.00		≥ 0	≤ 1	
4	8	2.265643	10	0.066926	10.67368	-0.673679	0.45384363	12	12	12		S'	49.23		≥ 0	≤ 100	INT
5	8	3.346772	16	0.351732	12.93573	3.0842661	9.38972689	8	8	18							
6	12	4.22407	12	-0.182061	13.27924	-1.279239	1.63645201	8	8	26							
7	10	5.690108	14	-0.058816	15.31858	-1.318582	1.73865831	6	6	28		GRG NonLinear					
8	6	6.502675	14	1.840778	16.48456	-2.484563	6.17305225	12	12	26							
9	6	6.407903	10	0.116725	13.52156	-3.521558	12.4013689	18	18	28							
10	4	6.330999	4	1.217728	12.75342	-8.753417	76.6223043	26	26	24							
11	4	5.891523	6	0.066926	8.922839	-2.922839	8.54299692	36	36	14							
12	0	5.534904	4	0.351732	7.506846	-3.506846	12.2979685	42	42	10							
13	16	4.491379	2	-0.182061	5.033408	-3.033408	9.20156226	46	46	10							
14	18	6.661161	2	-0.058816	9.568735	-7.568735	57.2857493	36	36	6							
15	18	8.798933	10	1.840778	16.54052	-6.540521	42.7784124	22	22	4							
16	30	10.15659	10	0.116725	19.51054	-9.510543	90.4504366	8	8	12							
17	20	13.89777	20	1.217728	26.14497	-6.144971	37.7608677	-20	0	20							
18	30	15.04826	20	0.066926	26.14485	-6.144854	37.7567753	-30	0	30							
19	40	17.86719	30	0.351732	29.24839	0.7516083	0.56491502	-50	0	40							
20	24	22.04001	30	-0.182061	32.88742	-2.887416	8.33716911	-70	0	50							
21	50	22.40953	50	-0.058816	33.38219	16.617811	276.151639	-74	0	60							
22	20	27.61131	60	1.840778	40.28156	19.718439	388.816848	-94	0	80							
23	40	26.17631	50	0.116725	37.32251	12.677494	160.718848	-84	0	110							
24	20	26.78257	50	1.217728	41.02976	8.9702368	80.4651481	-74	0	110							
25	20	27.12674	50	0.066926	38.22314	11.776863	138.8945	-34	0	100							
26	12	25.7831	30	-0.789445	36.02312	-6.023123	36.278015	-4	0	100							
27	12	23.1845	30	0.891204	27.48815	2.5118485	6.30938271	34	34	80							
28	0	21.07582	50	-0.460032	15.5151	34.484898	1189.20816	72	72	60							
29	0	17.10229	10	-1.732449	3.548247	6.4517529	41.6251151	102	102	80							
30	0	13.8779	2	0.930646	0	2	4	132	132	60							
31	0	11.26143	2	0.142645	0	2	4	182	182	12							
32	0	9.13825	2	-0.815558	0	2	4	192	192	4							
33	0	7.415367	0	1.549388	0	0	0	194	194	4							
34	0	6.017308	0	-1.174565	0	0	0	196	196	2							
35	100	4.882833	0	-0.450219	0	0	0	198	198	0							
36	58	22.81578	0	-1.589452	10.30086	-10.30086	106.107668	98	98	0							
37	0	29.07218	23	-0.451403	30.24099	-7.240986	52.4318734	42	42	0							
38	0	23.59105	11	-0.829673	24.58158	-13.58158	184.45939	42	42	23							
39	0	19.1433	25	-0.090774	20.67274	4.3272846	18.7252188	42	42	34							
40	0	15.53411	10	-0.081348	11.92028	-1.920283	3.68748806	65	65	36							
		mean of the disturbance		0.302823		0.9922754	mean of the standard errors										
		std dev of the disturbance		0.843803													

Incoming Orders:
IO = FIO

Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
AO = FPR

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \epsilon$

Error Term:
 $AO - O_t$

Squared errors:
 $(AO - O_t)^2$

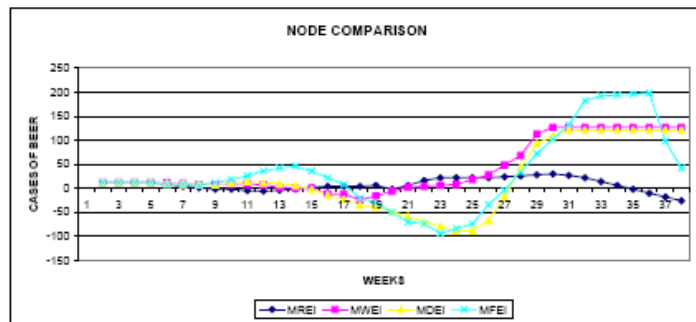
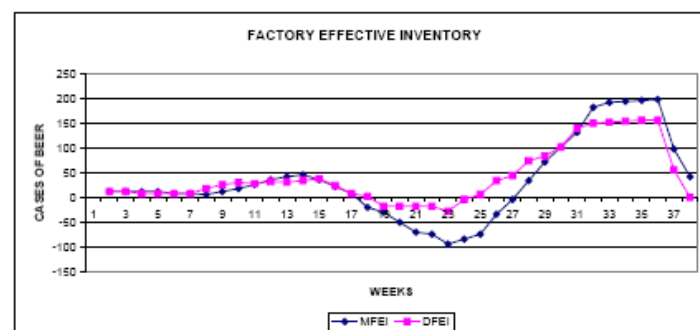
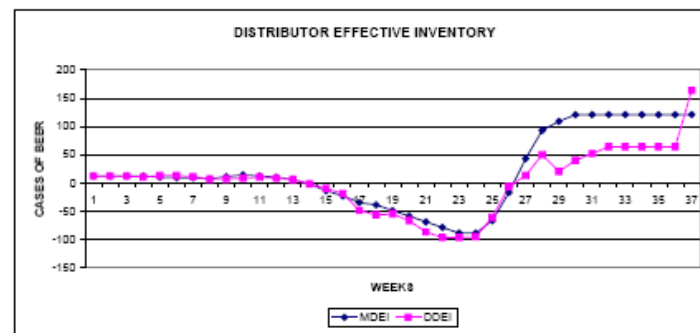
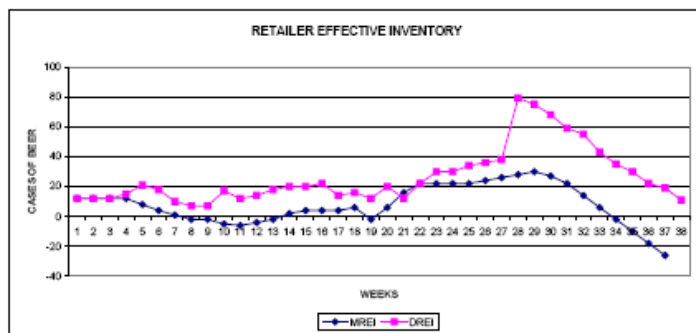
Effective Inventory:
EI = MFEI

Stock:
 $S_t = \text{MAX}(0, EI)$

Supply Line:
 $SL_t = FSL = FPD1 + FPD2$

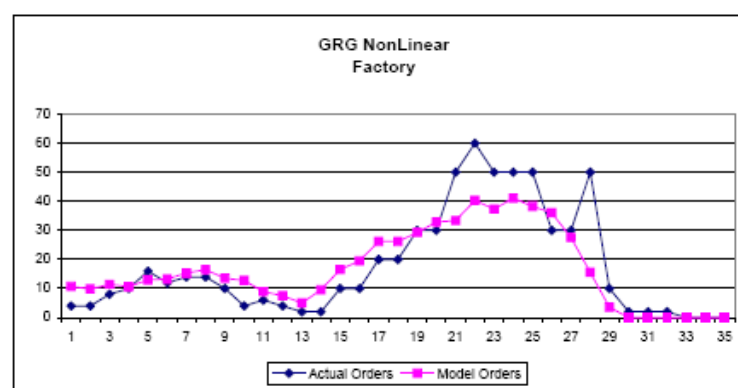
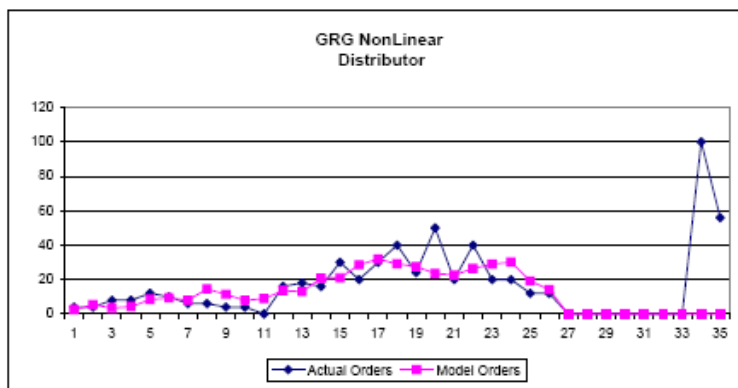
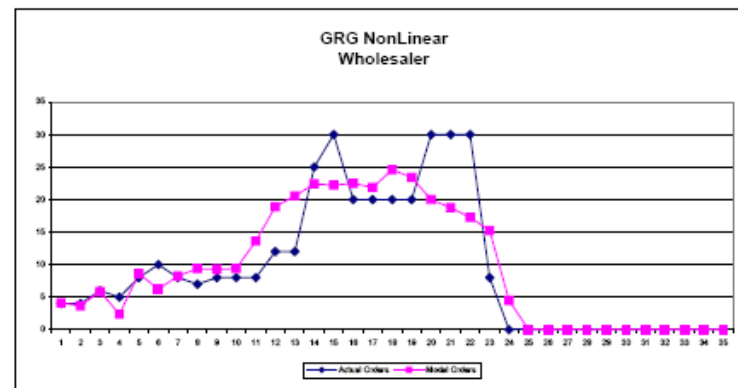
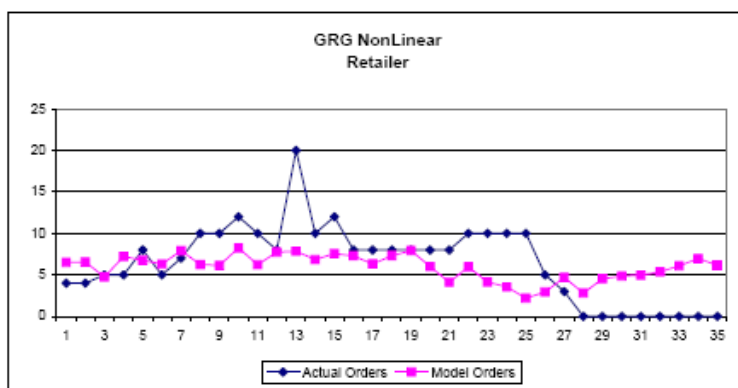
HIRES ROOT BEER GENERAL BEER GAME MODEL

MODEL CHARTS



HIRES ROOT BEER GENERAL BEER GAME MODEL

ORDER CHARTS



HIRES ROOT BEER GENERAL BEER GAME MODEL

MODEL WORKSHEET

STEP 1 Receive The Inventory and Advance the shipping Delays										STEP 2 Look at the incoming orders and fill orders all incoming orders + backlog						
HIRES ROOT BEER		NO IT								HIRES ROOT BEER	Retailer	NO IT				
Team Costs		\$ 4,597.50								Costs	\$ 389.00					
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	DREI	RCOSTS	ROP	WIO	RSL	WINV1	WSD1	
0	0	12	4	4	0	4	12	12	12	6	4	4	12	18	4	
1	4	18	4	4	0	4	12	12	12	12	4	4	12	18	4	
2	4	18	4	4	0	4	12	12	12	12	4	4	12	18	4	
3	4	18	4	4	0	4	12	12	12	18	5	4	12	18	4	
4	4	18	4	4	0	4	12	12	15	24	5	5	13	18	4	
5	8	18	4	5	0	8	8	8	21	28	8	5	14	18	4	
6	8	12	5	5	0	8	4	4	18	30	5	8	18	15	6	
7	8	9	5	8	0	8	1	1	10	30.5	7	5	18	18	5	
8	8	8	5	5	2	6	0	-2	7	32.5	10	7	20	13	8	
9	8	8	5	7	2	8	0	-2	7	34.5	10	10	22	18	10	
10	8	5	7	10	5	5	0	-5	17	39.5	12	10	27	19	8	
11	8	7	10	10	6	7	0	-8	12	45.5	10	12	32	17	7	
12	8	10	10	12	4	10	0	-4	14	49.5	8	10	32	14	8	
13	8	10	12	10	2	10	0	-2	18	51.5	20	8	30	10	8	
14	8	12	10	8	0	10	2	2	20	52.5	10	20	38	8	8	
15	8	12	8	8	0	8	4	4	20	54.5	12	10	38	8	10	
16	8	12	8	10	0	8	4	4	22	56.5	8	12	42	10	0	
17	8	12	10	0	0	8	4	4	14	58.5	8	8	42	0	18	
18	8	14	0	16	0	8	6	6	16	61.5	8	8	40	18	18	
19	8	6	16	18	2	6	0	-2	12	63.5	8	8	48	18	16	
20	8	16	18	14	0	10	6	6	20	66.5	8	8	40	18	10	
21	8	24	14	8	0	8	16	16	12	74.5	8	8	30	12	10	
22	8	30	8	8	0	8	22	22	22	85.5	10	8	24	14	10	
23	8	30	8	8	0	8	22	22	30	96.5	10	10	26	18	20	
24	8	30	8	10	0	8	22	22	30	107.5	10	10	28	28	20	
25	8	30	10	10	0	8	22	22	34	118.5	10	10	30	38	30	
26	8	32	10	10	0	8	24	24	36	130.5	5	10	30	58	30	
27	8	34	10	10	0	8	26	26	38	143.5	3	5	25	78	50	
28	8	36	10	5	0	8	28	28	79	157.5	0	3	18	118	17	
29	8	38	5	3	0	8	30	30	75	172.5	0	0	8	130	0	
30	8	35	3	0	0	8	27	27	68	186	0	0	3	127	0	
31	8	30	0	0	0	8	22	22	59	197	0	0	0	127	0	
32	8	22	0	0	0	8	14	14	55	204	0	0	0	127	0	
33	8	14	0	0	0	8	6	6	43	207	0	0	0	127	0	
34	8	6	0	0	2	6	0	-2	35	209	0	0	0	127	0	
35	8	0	0	0	10	0	0	-10	30	219	0	0	0	127	0	
36	8	0	0	0	18	0	0	-18	22	237	0	0	0	127	0	
37	8	0	0	0	26	0	0	-26	19	263	5	0	0	127	0	
38	8	0	0	0	34	0	0	-34	11	297	5	5	5	127	0	
39	8	0	0	5	42	0	0	-42	11	339	5	5	10	127	0	
40	8	0	5	5	50	0	0	-50	8	389	5	5	15	122	0	

HIRES ROOT BEER GENERAL BEER GAME MODEL

MODEL WORKSHEET

STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews							
HIF	HIRES ROOT BEER						Wholesaler	NO IT		HIRES ROOT BEER							
	Costs						\$ 1,028.00			Costs							
WEEK	WSD2	WBL	WINV2	MWEI	DWEI	WCOSTS	WOP	DIO	WSL	DINV1	DSD1	DSD2	DBL	DINV2	MDEI	DDEI	
0	4	0	12			0	4	4		12	4	4	0	12	12	12	
1	4	0	12	12	12	6	4	4	12	16	4	4	0	12	12	12	
2	4	0	12	12	12	12	4	4	12	16	4	4	0	12	12	12	
3	4	0	12	12	11	18	6	4	12	16	4	4	0	12	12	12	
4	4	0	12	12	10	24	6	6	14	16	4	4	0	12	12	10	
5	8	0	11	11	8	29.5	8	6	15	16	4	8	0	10	10	13	
6	5	0	10	10	4	34.5	10	8	19	14	8	8	0	9	9	13	
7	8	0	8	8	2	38.5	8	10	23	17	8	12	0	9	9	11	
8	10	0	8	8	0	42.5	7	8	26	17	12	10	0	7	7	7	
9	8	0	9	9	12	47	8	7	25	19	10	6	0	11	11	7	
10	7	0	9	9	10	51.5	8	8	23	21	6	6	0	14	14	8	
11	8	0	7	7	5	55	8	8	23	20	6	4	0	12	12	10	
12	8	0	2	2	2	56	12	8	24	18	4	4	0	10	10	8	
13	8	0	0	0	2	56	12	12	28	14	4	0	0	6	6	6	
14	10	0	0	0	-10	56	25	12	32	10	0	16	2	0	-2	-2	
15	0	12	0	-12	-14	68	30	25	49	0	16	18	14	0	-14	-10	
16	16	12	0	-12	-16	80	20	30	69	16	18	16	23	0	-23	-19	
17	18	24	0	-24	-20	104	20	20	89	18	16	10	35	0	-35	-49	
18	16	16	0	-16	-12	120	20	20	93	16	10	10	39	0	-39	-57	
19	10	6	0	-6	-20	126	20	20	95	10	10	10	49	0	-49	-55	
20	10	0	2	2	-12	127	30	20	99	10	10	20	59	0	-59	-67	
21	10	0	4	4	-6	129	30	30	119	10	20	20	69	0	-69	-87	
22	20	0	6	6	-2	132	30	30	139	20	20	30	79	0	-79	-97	
23	20	0	8	8	7	136	8	30	159	20	30	30	89	0	-89	-97	
24	30	0	18	18	17	145	0	8	147	30	30	50	89	0	-89	-96	
25	30	0	28	28	38	159	0	0	127	30	50	60	67	0	-67	-61	
26	50	0	48	48	21	183	0	0	97	50	60	50	17	0	-17	-7	
27	17	0	68	68	64	217	0	0	67	60	50	16	0	43	43	13	
28	0	0	113	113	124	273.5	0	0	17	93	16	12	0	93	93	50	
29	0	0	127	127	141	337	0	0	0	109	12	0	0	109	109	20	
30	0	0	127	127	141	400.5	0	0	0	121	0	0	0	121	121	40	
31	0	0	127	127	141	464	0	0	0	121	0	0	0	121	121	52	
32	0	0	127	127	141	527.5	0	0	0	121	0	0	0	121	121	64	
33	0	0	127	127	141	591	0	0	0	121	0	0	0	121	121	64	
34	0	0	127	127	141	654.5	0	0	0	121	0	0	0	121	121	64	
35	0	0	127	127	136	718	0	0	0	121	0	0	0	121	121	64	
36	0	0	127	127	136	781.5	0	0	0	121	0	100	0	121	121	64	
37	0	0	127	127	128	845	0	0	0	121	100	56	0	121	121	164	
38	0	0	127	127	123	908.5	0	0	0	221	56	0	0	221	221	220	
39	0	0	122	122	118	969.5	0	0	0	277	0	0	0	277	277	220	
40	0	0	117	117	113	1028	0	0	0	277	0	0	0	277	277	220	

HIRES ROOT BEER GENERAL BEER GAME MODEL

MODEL WORKSHEET

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HIRES ROOT BEER GENERAL BEER GAME MODEL

MODEL DATA

HIRES ROOT BEER								
NO IT								
Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	5	12	6	11	8	12	8	8
4	5	15	5	10	8	10	10	8
5	8	21	8	8	12	13	16	8
6	5	18	10	4	10	13	12	8
7	7	10	8	2	6	11	14	18
8	10	7	7	0	6	7	14	26
9	10	7	8	12	4	7	10	30
10	12	17	8	10	4	8	4	28
11	10	12	8	5	0	10	6	32
12	8	14	12	2	16	8	4	31
13	20	18	12	2	18	6	2	34
14	10	20	25	-10	16	-2	2	38
15	12	20	30	-14	30	-10	10	24
16	8	22	20	-16	20	-19	10	8
17	8	14	20	-20	30	-49	20	2
18	8	16	20	-12	40	-57	20	-18
19	8	12	20	-20	24	-55	30	-18
20	8	20	30	-12	50	-67	30	-18
21	8	12	30	-6	20	-87	50	-18
22	10	22	30	-2	40	-97	60	-28
23	10	30	8	7	20	-97	50	-4
24	10	30	0	17	20	-96	50	6
25	10	34	0	38	12	-61	50	34
26	5	36	0	21	12	-7	30	44
27	3	38	0	64	0	13	30	74
28	0	79	0	124	0	50	50	84
29	0	75	0	141	0	20	10	102
30	0	68	0	141	0	40	2	140
31	0	59	0	141	0	52	2	150
32	0	55	0	141	0	64	2	152
33	0	43	0	141	0	64	0	154
34	0	35	0	141	100	64	0	156
35	0	30	0	136	56	64	0	156
36	0	22	0	136	0	64	0	56
37	5	19	0	128	0	164	23	0
38	5	11	0	123	0	220	11	0
39	5	11	0	118	0	220	25	23
40	5	8	0	113	0	220	10	33

RETAILER	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line							
WEEK	IO	eIO	AO	ε	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t							
0	0	0															
1	4	0.00	4	-0.023622	4.601714	-0.601714	0.36205927	12	12	12							
2	4	0.00	4	-2.20899	2.418061	1.581949	2.50256256	12	12	12							
3	4	0.00	6	1.087785	5.71663	0.2834703	0.08035541	12	12	12							
4	4	0.01	4	1.107183	5.737631	-1.737631	3.01936203	12	12	14							
5	8	0.01	4	-0.204258	5.661234	-1.661234	2.75967989	8	8	14							
6	8	0.01	8	-0.085581	7.016679	0.9833212	0.96892063	4	4	14							
7	8	0.01	6	-0.689078	7.033238	-1.033238	1.06758074	2	2	18							
8	8	0.02	6	-0.197556	8.144834	-2.144834	4.60031276	-2	0	18							
9	8	0.02	8	-0.887835	7.477967	0.5220426	0.27252848	-8	0	20							
10	8	0.02	10	-0.083239	8.285955	1.7140464	2.93795157	-8	0	20							
11	8	0.03	8	1.190056	9.542649	-1.542649	2.37975583	-8	0	24							
12	8	0.03	10	0.155739	8.511173	1.4882897	2.21494663	-10	0	28							
13	8	0.03	10	-1.03754	7.321849	2.6781513	7.1724945	-10	0	28							
14	8	0.04	10	-1.219516	7.143268	2.866732	8.16091778	-8	0	28							
15	8	0.04	10	0.988747	9.354925	0.6450755	0.41612236	-8	0	30							
16	8	0.04	10	-1.254177	7.115393	2.8846069	8.32095707	-8	0	30							
17	8	0.05	10	0.652088	9.025049	0.974951	0.9505294	-4	0	30							
18	8	0.05	10	0.871173	9.247523	0.7524768	0.56822101	-2	0	30							
19	8	0.05	6	0.210935	8.590874	-2.590874	6.71159021	0	0	30							
20	8	0.06	6	-0.417341	7.965784	-1.965784	3.86430717	-3	0	31							
21	8	0.06	6	-0.526981	7.859549	-1.859549	3.45792208	-7	0	33							
22	8	0.06	8	-0.410754	7.97914	0.0208605	0.00043516	-9	0	33							
23	8	0.07	8	0.51247	8.905745	-0.905745	0.82037491	-7	0	31							
24	8	0.07	6	1.317895	9.714352	-3.714352	13.7984113	-7	0	31							
25	8	0.07	8	1.510395	9.910432	-1.910432	3.64974881	-9	0	31							
26	8	0.08	6	1.321715	9.725129	-3.725129	13.8765857	-9	0	31							
27	8	0.08	8	-0.584217	7.842574	0.157426	0.02478293	-9	0	29							
28	8	0.08	10	0.10195	8.512115	1.4878947	2.21380099	-9	0	29							
29	8	0.09	10	0.71391	9.127449	0.872551	0.7613452	-11	0	33							
30	8	0.09	10	-1.03754	7.379372	2.620628	6.86769118	-7	0	31							
31	8	0.09	10	-1.219516	7.200767	2.7992332	7.83570682	-7	0	33							
32	8	0.10	10	0.988747	9.412399	0.5878012	0.34527514	-10	0	38							
33	8	0.10	8	-1.254177	7.172843	0.8271571	0.68418892	-3	0	33							
34	8	0.11	6	-0.025614	8.404772	-2.404772	5.78292612	-2	0	32							
35	8	0.11	6	-0.482553	7.971198	-1.971198	3.88561993	0	0	28							
36	9	0.11	6	-1.876774	5.94387	0.0563298	0.00317306	2	2	24							
37	10	0.12	8	0.383792	8.208024	-0.208024	0.04327413	2	2	22							
38	11	0.12	8	-2.780809	5.664307	2.3356829	5.45546142	0	0	24							
39	12	0.12	8	1.677742	10.4275	-2.427466	5.89273487	0	0	24							
40	13	0.13	10	-0.301609	8.153208	1.846794	3.41084793	0	0	24							

LONESTAR GENERAL BEER GAME MODEL

WME - GRG NonLinear

WHOLES	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line							
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t							
0	4	0										$\Sigma (AO-O_t)^2$	238.0379				constraints
1	4	0	4	-0.264089	6.87673	-2.87573	8.26982042	12	12	12		θ	0.00		≥ 0	≤ 1	
2	4	0	4	-1.550977	5.588842	-1.588842	2.524419	12	12	12		αs	0.09		≥ 0	≤ 1	
3	4	0	6	0.635895	7.775714	-1.775714	3.1531598	12	12	12		β	0.00		≥ 0	≤ 1	
4	6	0	4	-0.920879	6.218939	-2.218939	4.92369243	12	12	14		S^*	88.24		≥ 0	≤ 100	INT
5	4	0	6	-1.430583	5.898541	0.1034592	0.0107038	10	10	14							
6	4	0	8	0.552848	7.879972	0.1200279	0.01440671	10	10	16							
7	8	0	10	-1.24821	5.891809	4.108391	16.878877	12	12	18		Standard GRG NonLinear					
8	6	0	12	-0.660573	6.853856	5.146144	26.4827985	8	8	24							
9	6	0	10	-0.226519	7.28791	2.71209	7.35543222	8	8	30							
10	8	0	8	-0.161718	7.165406	-1.165406	1.358171	10	10	32							
11	10	0	6	1.562627	8.702446	-2.702446	7.30321186	12	12	28							
12	8	0	12	-0.245692	6.708821	5.2931788	28.0177418	14	14	22							
13	10	0	8	0.597317	7.362525	0.6374748	0.40637384	16	16	24							
14	10	0	8	-1.24821	5.891809	2.108391	4.44531281	12	12	26							
15	10	0	6	-0.660573	6.853856	-0.853856	0.72907	8	8	28							
16	10	0	8	-0.226519	7.100605	0.8993951	0.80891148	10	10	22							
17	10	0	10	-0.161718	7.820974	2.1790264	4.74815592	3	3	27							
18	10	0	8	1.562627	9.826276	-1.826276	3.33528352	-5	0	35							
19	10	0	10	-0.245692	8.017957	1.9820434	3.92849612	-11	0	39							
20	6	0	12	0.597317	8.860986	3.1390341	9.85353536	-15	0	43							
21	6	0	6	-1.24821	7.015439	-1.015439	1.03111693	-11	0	45							
22	6	0	8	-0.660573	7.603076	0.3989238	0.15754852	-9	0	43							
23	8	0	8	-0.226519	8.03713	-0.03713	0.00137865	-9	0	45							
24	8	0	6	-0.161718	8.101931	-2.101931	4.41811482	-9	0	45							
25	6	0	10	1.562627	9.826276	0.1737241	0.03018008	-9	0	43							
26	8	0	8	-0.245692	8.017957	-0.017957	0.00032244	-7	0	45							
27	6	0	10	0.597317	8.860986	1.1390341	1.29739878	-9	0	47							
28	8	0	6	-0.907148	7.356501	-1.356501	1.84009493	-3	0	45							
29	10	0	10	-0.660905	7.576744	2.4232564	5.87217181	-3	0	43							
30	10	0	10	0.367181	8.63083	1.3691897	1.87482589	-8	0	48							
31	10	0	8	1.649021	9.91267	-1.91267	3.65830692	-3	0	43							
32	10	0	8	-0.63842	7.625229	0.374771	0.14045328	-4	0	42							
33	10	0	6	0.304819	8.568468	-2.568468	6.59702998	-4	0	40							
34	8	0	7	1.934023	10.19767	-3.197672	10.2261087	-4	0	36							
35	6	0	6	0.859217	9.122886	-3.122886	9.75229415	-4	0	35							
36	6	0	4	1.658571	9.92222	-5.92222	35.0726857	-4	0	35							
37	6	0	5	0.679088	8.942717	-3.942717	15.5450173	-2	0	31							
38	8	0	8	-1.197925	7.065724	0.9342762	0.87287196	0	0	28							
39	8	0	6	-0.004536	8.259113	-2.259113	5.10359105	-3	0	31							
40	8	0	8	-0.266916	7.996732	0.0032675	1.0677E-05	-2	0	28							
				mean of the disturbance	-0.035551		0.1133628	mean of the standard errors									
				std dev of the disturbance	0.938649												

Incoming Orders:
 $IO = WIO$
 Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
 Actual Orders:
 $AO = WOP$
 Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1
 Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha s' - S_t - \beta SL_t) + \epsilon$
 Error Term:
 $AO - O_t$
 Squared errors:
 $(AO - O_t)^2$
 Effective Inventory:
 $EI = MWEI$
 Stock:
 $S_t = \text{MAX}(0, EI)$
 Supply Line:
 $SL_t = WSL = WSD1 + WSD2 + DIO + DBL$

LONESTAR GENERAL BEER GAME MODEL

DME - GRG NonLinear

DISTRI	incoming orders	expected incoming orders	actual orders	disturb- ance	model orders	error term	squared errors	effective inventory	Stock	Supply line							
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t							
0	4	0										$\Sigma (AO-O_t)^2$	370.0187				constraints
1	4	0	4	0.753972	6.889789	-2.889789	8.35087634	12	12	12		θ	0.00		≥ 0	≤ 1	
2	4	0	4	1.111451	7.247268	-3.247268	10.5447489	12	12	12		αs	0.09		≥ 0	≤ 1	
3	4	0	6	2.041441	8.177258	-2.177258	4.74045124	12	12	12		β	0.00		≥ 0	≤ 1	
4	6	0	8	-1.745164	4.390653	3.609347	13.0273888	12	12	14		S^*	82.54		≥ 0	≤ 100	INT
5	4	0	6	1.800663	8.110446	-2.110446	4.45398408	10	10	18							
6	6	0	10	1.790919	8.100703	1.899297	3.60733077	10	10	20							
7	8	0	12	-0.360824	5.948959	6.0510412	36.6150999	10	10	24		GRG NonLinear					
8	10	0	15	-1.435686	4.874097	10.125903	102.533905	10	10	28							
9	12	0	2	0.309291	6.967006	-4.967006	24.6711535	6	6	37							
10	10	0	2	-2.02868	4.803002	-2.803002	7.85682053	4	4	29							
11	6	0	2	-1.078605	6.753077	-3.753077	14.0855844	4	4	21							
12	6	0	2	-0.667849	6.825901	-3.825901	14.6375148	8	8	13							
13	12	0	4	-0.816476	5.408324	-1.408324	1.97774687	11	11	6							
14	8	0	6	-1.238044	6.854657	0.1454128	0.02114488	1	1	8							
15	8	0	10	2.073798	9.253413	0.7465873	0.55739257	-5	0	12							
16	6	0	8	-0.840778	6.338837	1.6611627	2.75946165	-11	0	20							
17	8	0	6	-0.089104	7.090511	-1.090511	1.18921405	-13	0	24							
18	10	0	8	-0.810502	6.369113	1.6308872	2.65979302	-15	0	24							
19	8	0	8	1.392814	8.572428	-0.572428	0.32767416	-15	0	22							
20	10	0	8	-0.713153	6.466462	1.5335382	2.35173946	-15	0	22							
21	12	0	6	0.808105	7.98772	-1.98772	3.95103119	-19	0	24							
22	6	0	12	0.908907	8.086522	3.9134783	15.3153121	-23	0	22							
23	8	0	8	0.568942	7.746557	0.2534431	0.06423339	-21	0	26							
24	8	0	9	-0.392298	6.787317	2.2126829	4.89598555	-21	0	26							
25	6	0	12	-0.810502	6.369113	6.6308872	31.7068905	-23	0	29							
26	10	0	8	1.392814	8.572428	-0.572428	0.32767416	-17	0	29							
27	8	0	10	-0.713153	6.466462	3.5335382	12.4858923	-19	0	29							
28	10	0	10	0.808105	7.98772	2.0122799	4.0492704	-22	0	34							
29	6	0	8	0.908907	8.086522	-0.086522	0.00748601	-17	0	29							
30	10	0	6	0.568942	7.746557	-1.746557	3.05048108	-14	0	28							
31	10	0	8	-0.392298	6.787317	1.2126829	1.47059978	-14	0	24							
32	8	0	8	-0.810502	6.369113	1.6308872	2.65979302	-14	0	22							
33	8	0	8	1.392814	8.572428	-0.572428	0.32767416	-14	0	22							
34	6	0	6	-0.713153	6.466462	-0.466462	0.2175866	-16	0	24							
35	7	0	6	0.808105	7.98772	-1.98772	3.95103119	-14	0	22							
36	6	0	5	0.908907	8.086522	-3.086522	9.52661648	-13	0	20							
37	4	0	5	0.568942	7.746557	-2.746557	7.54357492	-14	0	20							
38	5	0	5	-0.392298	6.787317	-1.787317	3.19460247	-9	0	16							
39	8	0	5	-0.810502	6.369113	-1.369113	1.87446989	-8	0	15							
40	6	0	5	0.356055	7.53567	-2.53567	6.4296231	-11	0	15							
				mean of the disturbance	0.108149		0.3297203	mean of the standard errors									
				std dev of the disturbance	1.139426												

Incoming Orders:
 $IO = DIO$
 Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
 Actual Orders:
 $AO = DOP$
 Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1
 Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t)) + \epsilon$
 Error Term:
 $AO - O_t$
 Squared errors:
 $(AO - O_t)^2$
 Effective Inventory:
 $EI = MDEI$
 Stock:
 $S_t = \text{MAX}(0, EI)$
 Supply Line:
 $SL_t = DSL = DSD1 + DSD2 + FIO + FBL$

LONESTAR GENERAL BEER GAME MODEL

FME - GRG NonLinear

FACTOR	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line							
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t							
0	4	0															
1	4	3.293465	4	1.898577	4.788711	-0.788711	0.62206568	12	12	8							
2	4	3.875202	4	-0.262771	3.211101	0.7888993	0.62236212	12	12	8							
3	4	3.977966	0	0.571266	4.147892	-4.147892	17.2060045	12	12	8							
4	8	3.998108	8	-0.821364	4.34984	1.6501597	2.72302704	12	12	4							
5	8	5.848045	8	-0.455299	6.485487	1.5145331	2.29381053	10	10	6							
6	8	7.584212	10	-0.744108	8.81327	1.3867304	1.92302126	2	2	14							
7	10	6.279825	10	-1.140647	6.336015	4.6639848	21.7527545	2	2	18							
8	12	9.342892	10	-1.008792	8.65245	1.34755	1.81589098	0	0	20							
9	15	11.53067	12	-0.070085	11.77696	0.2230503	0.04975144	-2	0	20							
10	2	14.3872	15	-0.428602	13.48673	1.513268	2.28989009	-7	0	22							
11	2	4.187997	8	1.295312	2.586995	3.4130052	11.6486046	1	1	27							
12	2	2.386474	0	-0.061823	0	0	0	11	11	21							
13	2	2.068264	0	-1.140065	0	0	0	24	24	6							
14	4	2.012058	0	-0.907809	0	0	0	28	28	0							
15	6	3.848962	0	-0.868045	0.097378	-0.097378	0.00948245	24	24	0							
16	10	5.58471	10	0.11632	6.729073	4.2709267	18.2408149	18	18	0							
17	8	9.220111	10	-0.430834	9.415387	0.5846128	0.34177208	8	8	10							
18	8	8.215513	10	0.368055	8.887918	1.112082	1.23672643	0	0	20							
19	8	6.391334	8	1.898577	6.788606	1.2113944	1.46747641	4	4	20							
20	8	7.715865	10	-0.262771	6.834166	4.1658345	17.3541768	6	6	18							
21	8	7.94981	10	-1.437975	3.985089	8.014911	38.1791539	8	8	18							
22	8	7.991135	3	-1.960615	2.725559	0.2744412	0.07531799	8	8	20							
23	12	6.351702	0	1.79584	6.775675	-5.775675	33.3584264	12	12	13							
24	8	11.00232	15	-0.692392	12.78696	2.2130391	4.89764188	10	10	3							
25	9	8.530311	10	-0.578673	7.988954	2.0310459	4.1251475	5	5	15							
26	12	8.917037	10	0.180206	7.443058	2.5586424	6.53795447	-4	0	25							
27	8	11.45544	10	-0.875511	10.89628	-0.896284	0.80332508	-1	0	20							
28	10	8.810348	10	1.026257	9.499041	0.5009588	0.25095971	1	1	20							
29	10	9.754541	8	0.404562	10.02154	-2.021538	4.08661778	1	1	20							
30	8	9.956844	10	0.614082	11.22138	-1.221376	1.49175835	1	1	18							
31	8	8.345809	8	-1.884348	6.404084	-0.404084	0.16328348	3	3	18							
32	8	6.414314	0	0.305055	6.342578	-6.342578	40.2282928	5	5	16							
33	8	7.719914	10	0.660201	11.02657	-1.026569	1.05384314	7	7	6							
34	8	7.950527	10	-1.799256	8.139123	1.8608766	3.46286161	5	5	10							
35	8	7.991261	8	-0.524878	7.782733	-1.782733	3.17813685	-3	0	20							
36	6	6.351724	8	-2.53289	6.257699	0.7423011	0.55101093	1	1	16							
37	5	6.062128	8	0.714484	7.976248	-1.976248	3.90555493	5	5	12							
38	5	5.187607	8	0.337036	6.270368	-0.270368	0.07309884	6	6	12							
39	5	5.033138	5	-1.960615	3.374333	1.6256671	2.64279355	7	7	12							
40	5	5.005853	0	1.79584	7.033697	-7.033697	49.4728919	8	8	11							
		mean of the disturbance		-0.200692		0.5389551	mean of the standard errors										
		std dev of the disturbance		1.003264													

Incoming Orders:
 $IO = FIO$

Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
 $AO = FPR$

Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1

Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t)) + \epsilon$

Error Term:
 $AO - O_t$

Squared errors:
 $(AO - O_t)^2$

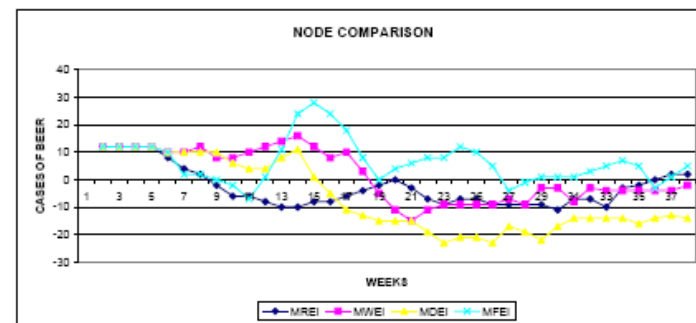
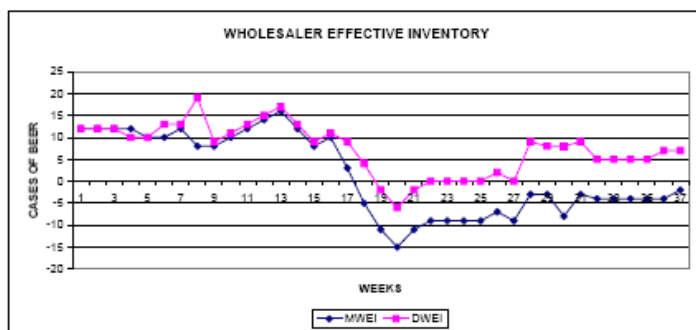
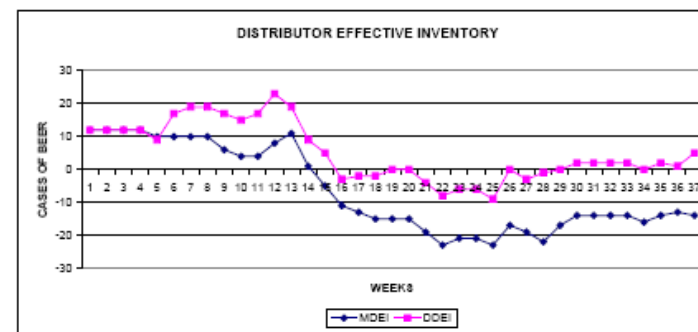
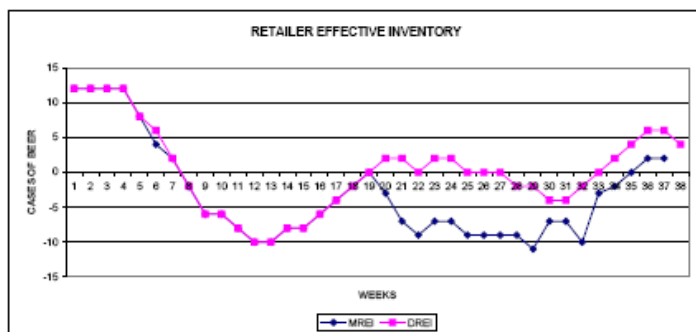
Effective Inventory:
 $EI = MFEI$

Stock:
 $S_t = \text{MAX}(0, EI)$

Supply Line:
 $SL_t = FSL = FPD1 + FPD2$

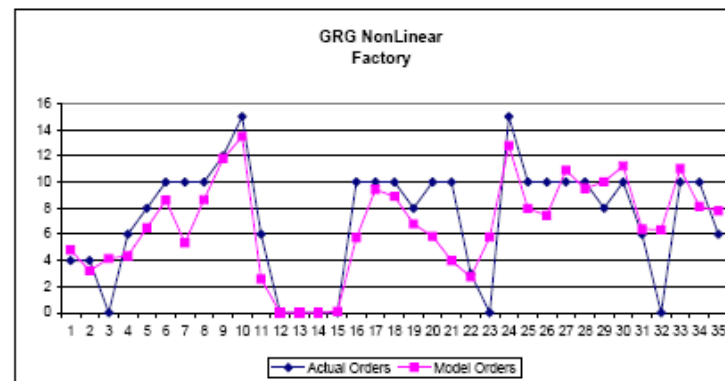
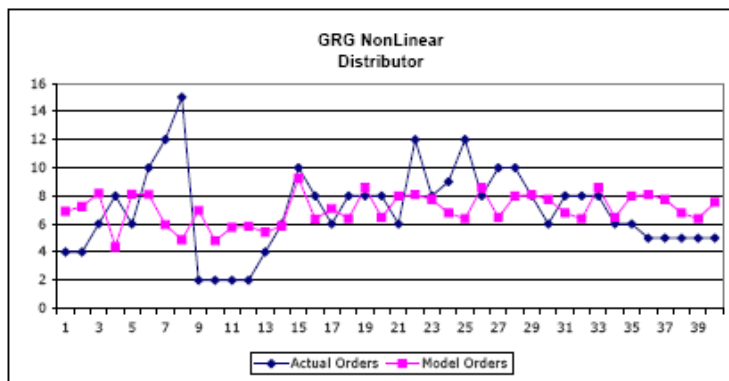
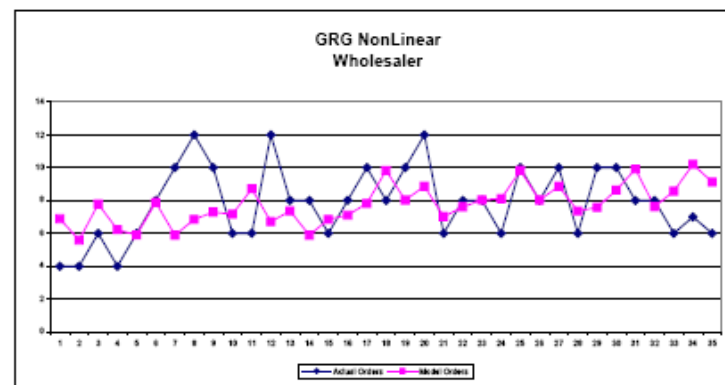
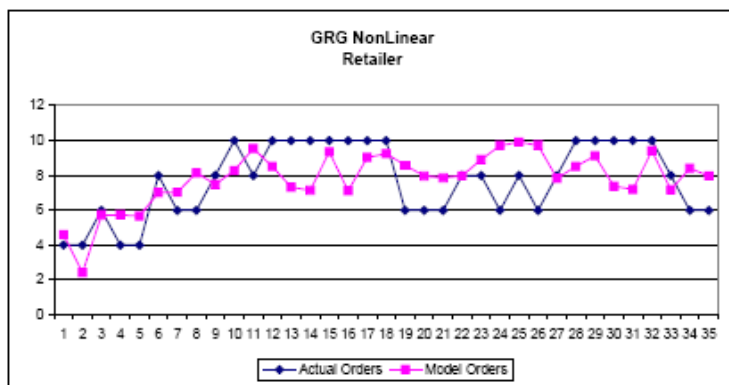
LONESTAR GENERAL BEER GAME MODEL

MODEL CHARTS



LONESTAR GENERAL BEER GAME MODEL

ORDER CHARTS



LONESTAR GENERAL BEER GAME MODEL

MODEL WORKSHEET

STEP 1 Receive The Inventory and Advance the shipping Delays																	STEP 2 Look at the incoming orders and fill orders all incoming orders + backlog																		
LONESTAR		IT															LONESTAR		Retailer	IT															
Team Costs		\$	1,055.00															Costs		\$	212.00														
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	DREI	RCOSTS	ROP	WIO	RSL	WINV1	WSD1																				
0	0	12	4	4	0	4	12	12	12	0	4	4	12	12	4																				
1	4	16	4	4	0	4	12	12	12	6	4	4	12	16	4																				
2	4	16	4	4	0	4	12	12	12	12	4	4	12	16	4																				
3	4	16	4	4	0	4	12	12	12	18	6	4	12	16	4																				
4	4	16	4	4	0	4	12	12	12	24	4	6	14	16	4																				
5	8	16	4	6	0	8	8	8	8	28	4	4	14	16	4																				
6	8	12	6	4	0	8	4	4	6	30	8	4	14	14	6																				
7	8	10	4	4	0	8	2	2	2	31	6	8	16	16	4																				
8	8	6	4	8	2	6	0	-2	-2	33	6	6	18	16	6																				
9	8	4	8	6	6	4	0	-6	-6	39	8	6	20	14	8																				
10	8	8	6	6	6	8	0	-6	-6	45	10	8	20	16	10																				
11	8	6	6	8	8	6	0	-8	-8	53	8	10	24	20	12																				
12	8	6	8	10	10	6	0	-10	-10	63	10	8	26	24	10																				
13	8	8	10	8	10	8	0	-10	-10	73	10	10	28	24	6																				
14	8	10	8	10	8	10	0	-8	-8	81	10	10	28	22	6																				
15	8	8	10	10	8	8	0	-8	-8	89	10	10	30	18	12																				
16	8	10	10	10	6	10	0	-6	-6	95	10	10	30	20	3																				
17	8	10	10	10	4	10	0	-4	-4	99	10	10	30	13	2																				
18	8	10	10	10	2	10	0	-2	-2	101	10	10	30	5	4																				
19	8	10	5	4	0	10	0	0	0	101	6	10	30	4	6																				
20	8	5	4	6	3	5	0	-3	2	104	6	6	31	6	10																				
21	8	4	6	10	7	4	0	-7	2	111	6	6	33	10	8																				
22	8	6	10	8	9	6	0	-9	0	120	8	6	33	8	6																				
23	8	10	8	6	7	10	0	-7	2	127	8	8	31	8	8																				
24	8	8	6	8	7	8	0	-7	2	134	6	8	31	8	8																				
25	8	6	8	8	9	6	0	-9	0	143	8	6	31	8	8																				
26	8	8	8	8	9	8	0	-9	0	152	6	8	31	8	6																				
27	8	8	8	6	9	8	0	-9	0	161	8	6	29	6	12																				
28	8	8	6	12	9	8	0	-9	-2	170	10	8	29	12	8																				
29	8	8	12	8	11	6	0	-11	-2	181	10	10	33	8	5																				
30	8	12	8	5	7	12	0	-7	-4	188	10	10	31	5	15																				
31	8	8	5	15	7	8	0	-7	-4	195	10	10	33	15	9																				
32	8	5	15	9	10	5	0	-10	-2	205	10	10	38	9	10																				
33	8	15	9	10	3	15	0	-3	0	208	8	10	33	10	10																				
34	8	9	10	10	2	9	0	-2	2	210	6	8	32	10	8																				
35	8	10	10	8	0	10	0	0	4	210	6	6	28	8	6																				
36	8	10	8	6	0	8	2	2	6	211	6	6	24	6	8																				
37	8	10	6	8	0	8	2	2	6	212	8	6	22	8	8																				
38	8	8	8	8	0	8	0	0	4	212	8	8	24	8	5																				
39	8	8	8	5	0	8	0	0	2	212	8	8	24	5	9																				
40	8	8	5	9	0	8	0	0	0	212	10	8	24	9	6																				

LONESTAR GENERAL BEER GAME MODEL

MODEL WORKSHEET

STEP 3 Record your inventory or backlog										STEP 4 Advance the order slips and the brewery Brews									
LONESTAR Wholesaler										LONESTAR									
Costs \$ 228.50										Costs									
WEEK	WSD2	WBL	WINV2	MWEI	DWEI	WCOSTS	WOP	DIO	WSL	DINV1	DSD1	DSD2	DBL	DINV2	MDEI	DDEI			
0	4	0	12			0	4	4		12	4	4	0	12					
1	4	0	12	12	12	6	4	4	12	16	4	4	0	12	12	12			
2	4	0	12	12	12	12	4	4	12	16	4	4	0	12	12	12			
3	4	0	12	12	12	18	6	4	12	16	4	4	0	12	12	12			
4	4	0	12	12	10	24	4	6	14	16	4	4	0	12	12	12			
5	6	0	10	10	10	29	6	4	14	16	4	6	0	10	10	9			
6	4	0	10	10	13	34	8	6	16	14	6	8	0	10	10	17			
7	6	0	12	12	13	40	10	8	18	16	8	8	0	10	10	19			
8	8	0	8	8	19	44	12	10	24	18	6	10	0	10	10	19			
9	10	0	8	8	9	48	10	12	30	16	10	10	0	8	8	17			
10	12	0	10	10	11	53	6	10	32	16	10	10	0	4	4	15			
11	10	0	12	12	13	59	6	6	28	14	10	9	0	4	4	17			
12	6	0	14	14	15	66	12	6	22	14	9	2	0	8	8	23			
13	6	0	16	16	17	74	8	12	24	17	2	2	0	11	11	19			
14	12	0	12	12	13	80	8	8	26	13	2	2	0	1	1	9			
15	3	0	8	8	9	84	6	8	28	3	2	4	5	0	-5	5			
16	2	0	10	10	11	89	8	6	22	2	4	6	11	0	-11	-3			
17	4	0	3	3	9	90.5	10	8	27	4	6	10	13	0	-13	-2			
18	6	5	0	-5	4	95.5	8	10	35	6	10	8	15	0	-15	-2			
19	10	11	0	-11	-2	106.5	10	8	39	10	8	6	15	0	-15	0			
20	8	15	0	-15	-6	121.5	12	10	43	8	6	8	15	0	-15	0			
21	6	11	0	-11	-2	132.5	6	12	45	6	8	8	19	0	-19	-4			
22	8	9	0	-9	0	141.5	8	6	43	8	8	8	23	0	-23	-8			
23	8	9	0	-9	0	150.5	8	8	45	8	8	8	21	0	-21	-6			
24	8	9	0	-9	0	159.5	6	8	45	8	6	12	21	0	-21	-6			
25	6	9	0	-9	0	169.5	10	6	43	6	12	8	23	0	-23	-9			
26	12	7	0	-7	2	175.5	8	10	45	12	8	5	17	0	-17	0			
27	8	9	0	-9	0	184.5	10	8	47	8	5	15	19	0	-19	-3			
28	5	3	0	-3	9	187.5	6	10	45	5	15	9	22	0	-22	-1			
29	15	3	0	-3	8	190.5	10	6	43	15	9	10	17	0	-17	0			
30	9	8	0	-8	8	198.5	10	10	48	9	10	10	14	0	-14	2			
31	10	3	0	-3	9	201.5	8	10	43	10	10	8	14	0	-14	2			
32	10	4	0	-4	5	205.5	8	8	42	10	8	6	14	0	-14	2			
33	8	4	0	-4	5	209.5	6	8	40	8	6	8	14	0	-14	2			
34	6	4	0	-4	5	213.5	7	6	36	6	8	8	16	0	-16	0			
35	8	4	0	-4	5	217.5	6	7	35	8	8	5	14	0	-14	2			
36	8	4	0	-4	7	221.5	4	6	35	8	5	9	13	0	-13	1			
37	5	2	0	-2	7	223.5	5	4	31	5	9	6	14	0	-14	5			
38	9	0	0	0	8	223.5	8	5	28	9	6	5	9	0	-9	7			
39	6	3	0	-3	6	226.5	6	8	31	6	5	5	8	0	-8	8			
40	5	2	0	-2	2	228.5	8	6	28	5	5	5	11	0	-11	5			

LONESTAR GENERAL BEER GAME MODEL

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LONESTAR GENERAL BEER GAME MODEL

MODEL DATA

LONESTAR								
IT								
Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	6	12	6	12	6	12	0	12
4	4	12	4	10	8	12	6	10
5	4	8	6	10	6	9	8	2
6	8	6	8	13	10	17	10	2
7	6	2	10	13	12	19	10	4
8	6	-2	12	19	15	19	10	4
9	8	-6	10	9	2	17	12	2
10	10	-6	6	11	2	15	15	0
11	8	-8	6	13	2	17	6	7
12	10	-10	12	15	2	23	0	23
13	10	-10	8	17	4	19	0	27
14	10	-8	8	13	6	9	0	25
15	10	-8	6	9	10	5	0	21
16	10	-6	8	11	8	-3	10	15
17	10	-4	10	9	6	-2	10	5
18	10	-2	8	4	8	-2	10	7
19	6	0	10	-2	8	0	8	11
20	6	2	12	-6	8	0	10	13
21	6	2	6	-2	6	-4	10	13
22	8	0	8	0	12	-8	3	15
23	8	2	8	0	8	-6	0	19
24	6	2	6	0	9	-6	15	7
25	8	0	10	0	12	-9	10	-1
26	6	0	8	2	8	0	10	5
27	8	0	10	0	10	-3	10	4
28	10	-2	6	9	10	-1	10	4
29	10	-2	10	8	8	0	8	4
30	10	-4	10	8	6	2	10	4
31	10	-4	8	9	8	2	6	4
32	10	-2	8	5	8	2	0	8
33	8	0	6	5	8	2	10	6
34	6	2	7	5	6	0	10	-2
35	6	4	6	5	6	2	6	0
36	6	6	4	7	5	1	6	4
37	8	6	5	7	5	5	6	4
38	8	4	8	8	5	7	6	5
39	8	2	6	6	5	8	5	6
40	10	0	8	2	5	5	0	7

LONESTAR2 BEER GAME MODEL

RME GRG NonLinear

WEEK	IO	eIO	AO	ε	O_t	(AO-Ot)	(AO-Ot) ²	EI	S_t	SL_t										
0	0	0																		
1	4	0.00	4	0.08708	3.313025	0.686975	0.47193471	12	12	12										
2	4	0.02	4	0.058302	4.20434	-0.20434	0.04175495	12	12	12										
3	4	0.04	4	0.21889	3.484921	0.5150795	0.26530688	12	12	12										
4	4	0.08	4	0.259669	3.545592	0.4644083	0.20648693	12	12	12										
5	8	0.08	12	-0.687348	6.564057	5.4359427	29.5494727	8	8	12										
6	8	0.12	8	-0.353424	9.508884	-1.508884	2.27812847	4	4	20										
7	8	0.18	10	-1.325059	11.83494	-1.934938	3.36899829	0	0	24										
8	8	0.20	12	-0.832492	11.33581	0.6641887	0.44114686	-4	0	30										
9	8	0.24	8	-0.440573	11.76892	-3.768919	14.1996792	0	0	30										
10	8	0.28	16	0.007242	12.25373	3.7462735	14.0346848	0	0	30										
11	8	0.32	14	2.423987	12.64709	1.3529139	1.83037613	-4	0	42										
12	8	0.35	10	0.694275	10.5123	-0.512302	0.26246383	0	0	44										
13	8	0.39	8	0.595608	10.19835	-2.198349	4.83273793	0	0	48										
14	8	0.43	4	-1.085778	6.936027	-2.936027	8.62026354	2	2	44										
15	8	0.47	4	-1.589797	3.899112	0.1008979	0.01017837	6	6	38										
16	8	0.51	4	1.47542	4.431244	-0.431244	0.18597107	10	10	28										
17	8	0.54	0	-0.433692	3.247161	-3.247161	10.5440521	10	10	24										
18	8	0.58	0	-0.783977	0	0	0	18	18	8										
19	8	0.62	0	-0.791379	2.465435	-2.465435	6.0291602	14	14	4										
20	8	0.68	2	0.807651	8.72462	-6.72462	45.2205136	10	10	0										
21	8	0.69	14	1.184042	16.66569	-2.665691	7.10537802	2	2	2										
22	8	0.73	28	1.06723	16.16247	11.837525	140.127005	-8	0	16										
23	8	0.77	20	-0.459804	9.870262	10.129748	102.611795	-14	0	44										
24	8	0.80	8	0.229485	7.502815	0.4973848	0.24739159	-20	0	62										
25	8	0.84	8	0.150637	8.491024	-0.491024	0.24110436	-14	0	56										
26	8	0.87	8	-0.209223	5.685538	2.3144838	5.35874195	8	6	38										
27	8	0.91	8	1.077396	11.72356	-3.723567	13.8648793	-1	0	43										
28	8	0.95	10	-0.176195	9.130805	0.8691953	0.75550047	-9	0	51										
29	8	0.98	4	-1.435581	6.188385	-2.188385	4.78903071	-17	0	61										
30	8	1.02	0	-0.937174	9.471597	-9.471597	89.7111538	-5	0	45										
31	8	1.05	4	0.342734	7.318561	-3.318561	11.0128477	7	7	25										
32	8	1.09	4	-0.889416	0	0	0	16	19	9										
33	8	1.12	8	0.086183	2.05521	5.9447897	35.3405242	16	16	8										
34	8	1.16	8	-0.987094	6.653115	1.3468863	1.81409993	8	8	16										
35	8	1.19	8	-1.502952	9.429941	-1.429941	2.04473024	4	4	20										
36	9	1.22	8	1.287327	14.99719	-6.99719	48.9608692	-3	0	27										
37	10	1.28	16	-0.353478	12.02067	3.9793312	15.8350787	-11	0	35										
38	11	1.31	16	0.81885	10.28733	5.7126678	32.6345708	-19	0	51										
39	12	1.38	8	0.186396	7.154017	0.8469929	0.71568705	-27	0	67										
40	13	1.41	8	1.123988	8.488769	-0.488769	0.23899494	-25	0	65										
				mean of the disturbance	-0.071834		0.0225139	mean of the standard errors												
				std dev of the disturbance	0.94938															

Incoming Orders:
 $IO = COR$

Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
 $AO = ROP$

Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1

Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s'_t - S_t - \beta SL_t) + \varepsilon$

Error Term:
 $AO - O_t$

Squared errors:
 $(AO - O_t)^2$

Effective Inventory:
 $EI = REI$

Stock:
 $S_t = \text{MAX}(0, EI)$

Supply Line:
 $SL_t = RSL + RSD1 + RSD2 + WIO + WBL$

LONESTAR2 BEER GAME MODEL

WME - GRG NonLinear

WHOLESALE	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line								
WEEK	IO	eIO	AO	ε	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t								
0	4	0																
1	4	2.181173	4	0.19384	1.243957	2.7560434	7.59577547	12	12	12								
2	4	3.172967	4	0.364876	2.406787	1.5932135	2.53832917	12	12	12								
3	4	3.623942	4	-1.562856	0.93003	3.0699895	9.42471285	12	12	12								
4	4	3.829004	4	0.247405	2.945353	1.0546475	1.11228128	12	12	12								
5	4	3.922247	4	0.011617	2.802808	1.1971924	1.4332697	12	12	12								
6	12	3.964645	12	-0.14713	2.696459	9.3135413	86.7420521	12	12	12								
7	8	8.346269	8	0.659074	8.580032	-0.580032	0.31363561	4	4	20								
8	10	8.157461	10	-0.59531	7.459701	2.5402987	6.45311744	0	0	24								
9	12	9.16218	12	-1.013239	7.900649	4.0993511	16.8048796	-8	0	30								
10	8	10.70962	12	-0.854398	9.606934	2.3930661	5.72676543	-8	0	30								
11	16	9.232085	8	0.290827	9.177385	-1.177385	1.38823515	-6	0	34								
12	14	12.92258	16	1.118439	13.74211	2.2578877	6.09805697	-12	0	32								
13	10	13.51009	20	0.476089	13.59204	6.4079641	41.0620044	-14	0	36								
14	8	11.59608	20	0.162685	11.17011	8.8298873	77.9669101	-12	0	44								
15	4	9.635164	8	0.681743	9.436579	-1.436579	2.06375825	-12	0	56								
16	4	8.562343	1	-0.976461	4.900033	-3.900033	15.2102593	0	0	48								
17	4	5.185115	4	-1.283285	1.897418	2.1025818	4.4208504	16	16	29								
18	0	4.529788	0	-0.147624	1.026262	-1.026262	1.05321349	32	32	13								
19	0	2.059724	0	0.211588	0	0	0	40	40	5								
20	0	0.938571	0	-1.396681	0	0	0	41	41	4								
21	2	0.425885	0	1.081095	0	0	0	45	45	0								
22	14	1.28423	0	0.076391	0	0	0	43	43	0								
23	28	8.218053	0	0.934258	8.442505	-8.442505	41.5068719	29	29	0								
24	20	19.00501	20	-0.632187	18.74377	1.2562307	1.57811553	1	1	0								
25	8	19.54767	20	0.109585	19.65195	0.3480475	0.12113708	-19	0	20								
26	8	13.25076	20	-0.330303	12.42908	7.5709219	57.318858	-27	0	40								
27	8	10.39758	10	-1.416391	7.993612	2.006388	4.02559268	-35	0	60								
28	8	9.085638	0	0.548696	8.897868	-8.897868	79.1720571	-23	0	50								
29	10	8.493647	0	-1.886949	8.358406	-8.358406	40.429325	-11	0	30								
30	4	9.315051	0	-0.05597	9.486963	-9.486963	90.1923049	-1	0	10								
31	0	6.41679	0	0.842658	7.190283	-7.190283	51.7001751	5	5	0								
32	4	2.917758	0	-2.462118	0.396475	-0.396475	0.15719263	5	5	0								
33	4	3.507897	0	-0.976461	2.902379	-2.902379	8.42380375	1	1	0								
34	8	3.776238	10	-1.283285	2.973921	7.0260788	49.365783	-3	0	0								
35	8	6.079426	10	-0.863906	6.453402	4.5485976	20.6715495	-11	0	10								
36	8	7.126702	0	0.747471	7.868968	-7.868968	61.9206596	-19	0	20								
37	8	7.602906	20	-1.448782	6.148918	13.851082	191.852474	-27	0	20								
38	16	7.819438	0	1.03497	8.606117	-8.606117	74.0652428	-25	0	30								
39	16	12.28024	10	0.605702	12.88074	-2.88074	8.29866467	-31	0	20								
40	8	14.3088	0	1.028711	15.08902	-15.08902	227.67852	-47	0	30								
		mean of the disturbance		-0.281935			0.5881354	mean of the standard errors										
		std dev of the disturbance		0.901512														

Incoming Orders:
 $IO = WIO$

Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
 $AO = WOP$

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \varepsilon)$

Error Term:
 $AO - O_t$

Squared errors:
 $(AO - O_t)^2$

Effective Inventory:
 $EI = MWEI$

Stock:
 $S_t = \text{MAX}(0, EI)$

Supply Line:
 $SL_t = WSL = WSD1 + WSD2 + DIO + DBL$

LONESTAR2 BEER GAME MODEL

DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturb- ance	model orders	error term	squared errors	effective inventory	Stock	Supply line							
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t							
0	4	0															
1	4	1.090784	4	-0.543948	37.99165	-33.89165	1148.64381	12	12	12							
2	4	1.884087	4	-1.445524	37.78339	-33.78339	1141.31774	12	12	12							
3	4	2.461078	100	0.835968	40.84188	59.358123	3523.38671	12	12	12							
4	4	2.880728	0	0.393087	30.46362	-30.46362	928.031959	12	12	108							
5	4	3.185944	0	-1.487324	29.31157	-29.31157	859.167953	12	12	104							
6	4	3.40793	100	-0.492632	30.85147	69.048531	4767.69959	12	12	100							
7	12	3.569382	0	-1.035979	9.683842	-9.683842	93.7767932	24	24	184							
8	8	5.868337	0	0.821647	20.47511	-20.47511	419.230126	18	18	178							
9	10	6.449622	50	-1.1987	21.67074	28.329263	802.547189	16	16	172							
10	12	7.417779	0	0.998104	0	0	0	126	126	102							
11	12	8.66731	0	-1.025522	0	0	0	114	114	102							
12	8	9.576105	20	-0.612319	0	20	400	154	154	50							
13	16	9.146315	10	-0.249556	0	10	100	196	196	20							
14	20	11.01525	20	-0.683389	0	20	400	180	180	30							
15	20	13.46531	10	-0.68748	0	10	100	180	180	50							
16	8	15.24727	10	1.819527	0	10	100	143	143	57							
17	1	13.271	0	-0.415344	0	0	0	135	135	67							
18	4	9.924808	0	-0.754311	0	0	0	134	134	67							
19	0	8.309185	0	-0.63871	0	0	0	130	130	67							
20	0	6.04333	10	-0.13008	0	10	100	130	130	67							
21	0	4.395367	1	-0.2914	0	1	1	140	140	67							
22	0	3.19679	10	-0.544045	0	10	100	150	150	58							
23	0	2.325054	0	-0.02328	0	0	0	151	151	67							
24	0	1.891032	0	-1.744655	0	0	0	152	152	68							
25	20	1.229903	0	-0.492532	0	0	0	153	153	65							
26	20	6.348341	0	-1.035979	0	0	0	134	134	64							
27	20	10.07103	0	0.821647	0	0	0	114	114	64							
28	10	12.77857	0	-1.1987	0	0	0	94	94	64							
29	0	12.02088	0	0.998104	0	0	0	84	84	64							
30	0	8.742892	0	-0.843723	0	0	0	84	84	64							
31	0	6.358783	0	-0.22649	0	0	0	84	84	64							
32	0	4.624799	0	1.218613	0	0	0	84	84	64							
33	0	3.363658	0	-0.894761	0	0	0	84	84	64							
34	0	2.448418	0	-0.484076	0	0	0	84	84	64							
35	10	1.779302	0	0.510848	0	0	0	84	84	64							
36	10	4.021013	0	-0.498441	0	0	0	74	74	64							
37	0	5.65143	0	0.394659	0	0	0	64	64	64							
38	20	4.110335	0	-1.092476	0	0	0	64	64	64							
39	0	8.443305	8	2.054539	10.34205	-4.342048	18.8533598	44	44	64							
40	10	6.140891	10	-0.565778	4.784626	5.2153741	27.2001267	44	44	70							
		mean of the disturbance		-0.307507		2.5750497	mean of the standard errors										
		std dev of the disturbance		0.855156													

Incoming Orders:
 $IO = DIO$
 Expected Incoming Orders:
 $eIO = \theta^* IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
 Actual Orders:
 $AO = DOP$
 Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1
 Model Orders:
 $O_t = \text{MAX}(0, eIO + as(s' - S_t - \beta SL_t) + \epsilon$
 Error Term:
 $AO - O_t$
 Squared errors:
 $(AO - O_t)^2$
 Effective Inventory:
 $EI = MDEI$
 Stock:
 $S_t = \text{MAX}(0, EI)$
 Supply Line:
 $SL_t = \text{DSL} = \text{DSD1} + \text{DSD2} + \text{FIO} + \text{FBL}$

LONESTAR2 BEER GAME MODEL

FME - GRG NonLinear

FACTORY	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line							
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t							
0	4	0															
1	4	3.970481	4	1.208259	0	4	16	12	12	8							
2	4	3.995806	4	0.07143	0	4	16	12	12	8							
3	4	3.999964	6	0.574297	0	6	36	12	12	8							
4	100	3.999966	8	0.939173	0	8	36	12	12	10							
5	0	96.89155	120	-0.604085	85.86789	34.132315	1165.0149	-84	0	12							
6	0	3.137319	0	0.03889	0	0	0	-78	0	126							
7	100	0.101585	100	2.005936	0	100	10000	-72	0	120							
8	0	96.76532	5	-0.310638	9.623191	-4.623191	21.3738973	-52	0	100							
9	0	3.133231	0	0.888349	0	0	0	-52	0	105							
10	50	0.101453	0	-0.44845	0	0	0	48	48	5							
11	0	48.3943	0	-0.725925	44.85838	-44.85838	1994.37047	3	3	0							
12	0	1.566869	0	-0.363939	0	0	0	3	3	0							
13	20	0.050728	0	-1.115198	0	0	0	3	3	0							
14	10	19.35405	0	-1.288607	18.06744	-18.06744	326.432485	-17	0	0							
15	20	10.30288	0	-1.849882	8.453	-8.453	71.453204	-27	0	0							
16	10	19.68801	10	-1.643996	18.04202	-8.042024	64.6741476	-47	0	0							
17	10	10.31363	10	1.399966	3.030447	6.9695526	48.5748632	-57	0	10							
18	0	10.01016	1	0.104582	0	1	1	-87	0	20							
19	0	0.324128	1	-0.665616	0	1	1	-57	0	11							
20	0	0.010495	1	1.651962	0	1	1	-47	0	2							
21	10	0.00034	1	-0.010718	0	1	1	-46	0	2							
22	1	9.676214	0	0.542175	8.48176	-8.48176	71.9402453	-55	0	2							
23	10	1.280933	0	-0.63268	0	0	0	-55	0	1							
24	0	9.717679	0	1.136903	10.85458	-10.85458	117.821949	-64	0	0							
25	0	0.314855	0	0.363042	0.667698	-0.667698	0.4458203	-64	0	0							
26	0	0.010188	0	-2.177712	0	0	0	-64	0	0							
27	0	0.00033	0	-0.305399	0	0	0	-64	0	0							
28	0	1.07E-05	0	0.017794	0.017804	-0.017804	0.00031699	-64	0	0							
29	0	3.46E-07	0	1.157835	1.157836	-1.157836	1.34058314	-64	0	0							
30	0	1.12E-08	0	0.398994	0.398994	-0.398994	0.15919638	-64	0	0							
31	0	3.63E-10	0	-0.970953	0	0	0	-64	0	0							
32	0	1.17E-11	0	1.102042	1.102042	-1.102042	1.21449714	-64	0	0							
33	0	3.8E-13	0	-0.073798	0	0	0	-64	0	0							
34	0	1.23E-14	0	-0.07141	0	0	0	-64	0	0							
35	0	3.99E-16	0	-0.622388	0	0	0	-64	0	0							
36	0	1.29E-17	0	0.324908	0.324908	-0.324908	0.10568552	-64	0	0							
37	0	4.18E-19	0	1.972118	1.972118	-1.972118	3.88925084	-64	0	0							
38	0	1.35E-20	0	1.830677	1.830677	-1.830677	3.35137678	-64	0	0							
39	0	4.38E-22	0	0.360447	0.360447	-0.360447	0.1299222	-64	0	0							
40	6	1.42E-23	0	0.328983	0.328983	-0.328983	0.10822957	-64	0	0							
		mean of the disturbance		-0.013941			1.673632	mean of the standard errors									
		std dev of the disturbance		0.99499													

Incoming Orders:
 $IO = FIO$

Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
 $AO = FPR$

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \epsilon$

Error Term:
 $AO - O_t$

Squared errors:
 $(AO - O_t)^2$

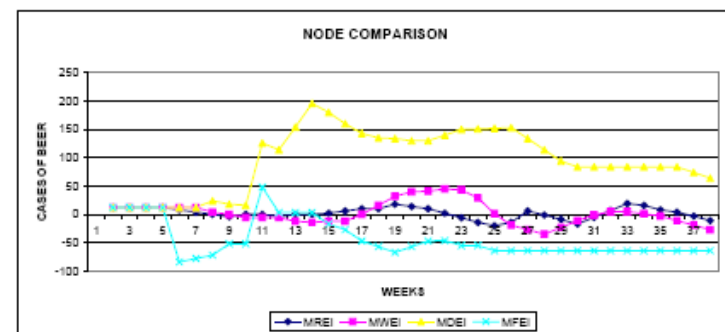
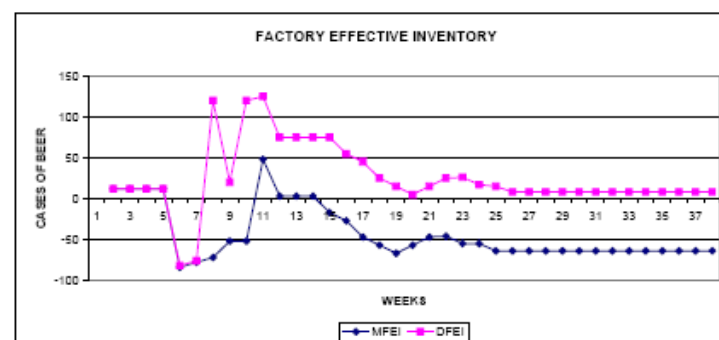
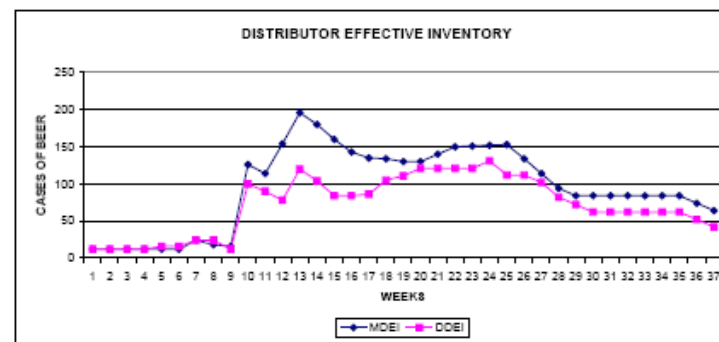
Effective Inventory:
 $EI = MFEI$

Stock:
 $S_t = \text{MAX}(0, EI)$

Supply Line:
 $SL_t = FSL = FPD1 + FPD2$

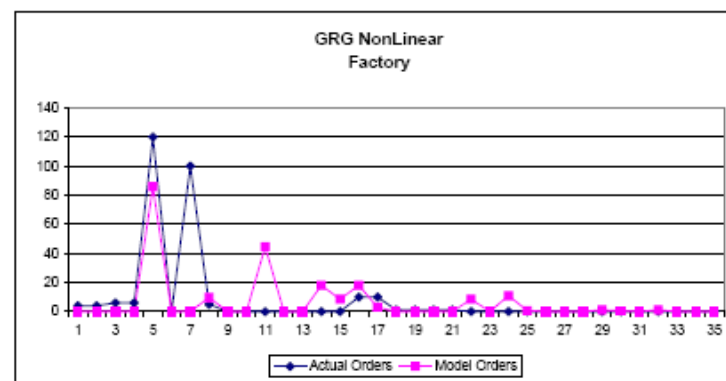
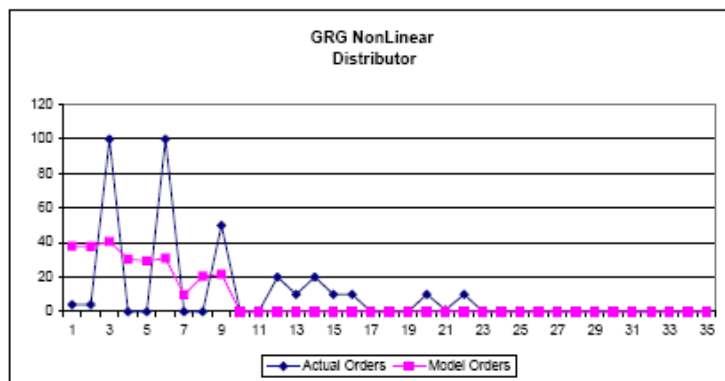
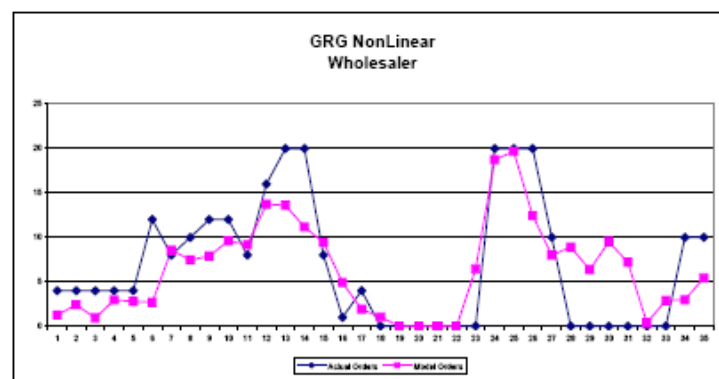
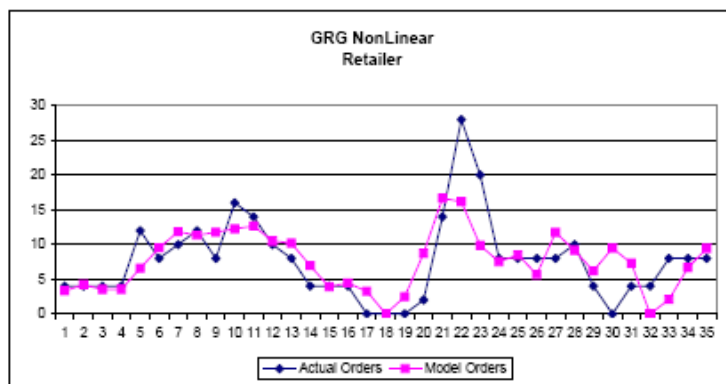
LONESTAR2 BEER GAME MODEL

MODEL CHARTS



LONESTAR2 BEER GAME MODEL

ORDER CHARTS



LONESTAR2 BEER GAME MODEL

MODEL WORKSHEET

STEP 1 Receive The Inventory and Advance the shipping Delays																	STEP 2 Look at the incoming orders and fill orders all incoming orders + backlog																		
LONESTAR		IT															LONESTAR		Retailer	IT															
Team Costs		\$	4,591.50															Costs		\$	275.00														
WEEK	COR	RINV1		RSD1	RSD2	RBL	RSR	RINV2		MREI	DREI		RCOSTS	ROP	WIO	RSL			WINV1	WSD1															
0	0																																		
1	4																																		
2	4																																		
3	4																																		
4	4																																		
5	8																																		
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LONESTAR2 BEER GAME MODEL

MODEL WORKSHEET

	STEP 3 Record your inventory or backlog												STEP 4 Advance the order slips and the brewery Brews										
					LONESTAR	Wholesaler		IT										LONESTAR					
					Costs	\$ 514.00												Costs					
WEEK	WSD2	WBL	WINV2	MWEI	DWEI	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	DDEI						
0	4	0	12			0	4	4	12		12	4	4	0	12								
1	4	0	12	12	12	6	4	4	12		16	4	4	0	12	12	12						
2	4	0	12	12	12	12	4	4	12		16	4	4	0	12	12	12						
3	4	0	12	12	12	18	4	4	12		16	4	4	0	12	12	12						
4	4	0	12	12	12	24	4	4	12		16	4	4	0	12	12	12						
5	4	0	12	12	12	30	4	4	12		16	4	16	0	12	12	16						
6	4	0	12	12	12	36	12	4	12		16	16	6	0	12	12	16						
7	4	0	4	4	8	38	8	12	20		28	6	6	0	24	24	24						
8	12	0	0	0	8	38	10	8	24		30	6	120	0	18	18	24						
9	8	6	0	-6	12	44	12	10	30		24	120	0	0	16	16	12						
10	10	6	0	-6	12	50	12	12	30		136	0	52	0	126	126	100						
11	12	6	0	-6	6	56	8	12	34		126	52	50	0	114	114	90						
12	12	12	0	-12	2	68	16	8	32		166	50	0	0	154	154	78						
13	8	14	0	-14	-2	82	20	16	36		204	0	0	0	196	196	120						
14	16	12	0	-12	0	94	20	20	44		196	0	3	0	180	180	104						
15	20	12	0	-12	0	106	8	20	56		180	3	0	0	160	160	84						
16	20	0	0	0	12	106	1	8	48		163	0	0	0	143	143	84						
17	8	0	16	16	28	114	4	1	29		143	0	0	0	135	135	86						
18	1	0	32	32	44	130	0	4	13		135	0	0	0	134	134	105						
19	4	0	40	40	52	150	0	0	5		134	0	10	0	130	130	111						
20	0	0	41	41	53	170.5	0	0	4		130	10	10	0	130	130	121						
21	0	0	45	45	57	193	0	0	0		140	10	1	0	140	140	121						
22	0	0	43	43	51	214.5	0	0	0		150	1	1	0	150	150	121						
23	0	0	29	29	37	229	0	0	0		151	1	1	0	151	151	121						
24	0	0	1	1	9	229.5	20	0	0		152	1	1	0	152	152	131						
25	0	19	0	-19	-11	249.5	20	20	20		153	1	0	0	153	153	112						
26	20	27	0	-27	-19	275.5	20	20	40		154	0	0	0	134	134	112						
27	20	35	0	-35	-15	310.5	10	20	60		134	0	0	0	114	114	102						
28	20	23	0	-23	7	333.5	0	10	50		114	0	0	0	94	94	82						
29	10	11	0	-11	20	344.5	0	0	30		94	0	0	0	84	84	72						
30	0	1	0	-1	20	345.5	0	0	10		84	0	0	0	84	84	62						
31	0	0	5	5	26	348	0	0	0		84	0	0	0	84	84	62						
32	0	0	5	5	26	350.5	0	0	0		84	0	0	0	84	84	62						
33	0	0	1	1	22	351	0	0	0		84	0	0	0	84	84	62						
34	0	3	0	-3	18	354	10	0	0		84	0	0	0	84	84	62						
35	0	11	0	-11	10	365	10	10	10		84	0	0	0	84	84	62						
36	10	19	0	-19	2	384	0	10	20		84	0	0	0	74	74	52						
37	10	27	0	-27	4	411	20	0	20		74	0	0	0	64	64	42						
38	0	25	0	-25	6	436	0	20	30		64	0	0	0	64	64	42						
39	20	31	0	-31	-10	467	10	0	20		64	0	0	0	44	44	22						
40	0	47	0	-47	20	514	0	10	30		44	0	0	0	44	44	22						

LONESTAR2 BEER GAME MODEL

MODEL WORKSHEET

STEP 5 Place and record your orders																
	Distributor		IT									LONESTAR	Factory		IT	
	\$ 1,849.00											Costs	\$ 1,953.50			
WEEK	DCOSTS	DOP	FIO	DSL		FPD1	FPD2	FSD2	FBL	FINV2	MFEI	DFEI	FCOSTS	FPR	FSL	
0	0	4	4	12		12	4	4	0	12			0	4	8	
1	6	4	4	12		16	4	4	0	12	12	12	6	4	8	
2	12	4	4	12		16	4	4	0	12	12	12	12	4	8	
3	18	100	4	12		16	4	4	0	12	12	12	18	8	8	
4	24	0	100	108		16	4	6	0	12	12	12	24	8	10	
5	30	0	0	104		16	6	6	84	0	-84	-82	108	120	12	
6	36	100	0	100		6	6	120	78	0	-78	-76	188	0	126	
7	48	0	100	184		6	120	0	72	0	-72	120	258	100	120	
8	57	0	0	178		120	0	100	52	0	-52	20	310	5	100	
9	65	50	0	172		0	100	5	52	0	-52	120	362	0	105	
10	128	0	50	102		100	5	0	0	48	48	125	388	0	5	
11	185	0	0	102		53	0	0	0	3	3	75	387.5	0	0	
12	262	20	0	60		3	0	0	0	3	3	75	389	0	0	
13	380	10	20	20		3	0	0	0	3	3	75	390.5	0	0	
14	450	20	10	30		3	0	0	17	0	-17	75	407.5	0	0	
15	530	10	20	50		0	0	0	27	0	-27	55	434.5	0	0	
16	601.5	10	10	67		0	0	0	47	0	-47	45	481.5	10	0	
17	669	0	10	67		0	0	10	57	0	-57	25	538.5	10	10	
18	736	0	0	67		0	10	10	67	0	-67	15	605.5	1	20	
19	801	0	0	67		10	10	1	57	0	-57	5	662.5	1	11	
20	866	10	0	67		10	1	1	47	0	-47	15	709.5	1	2	
21	936	1	10	67		1	1	1	46	0	-46	25	755.5	1	2	
22	1011	10	1	58		1	1	1	55	0	-55	26	810.5	0	2	
23	1086.5	0	10	67		1	1	0	55	0	-55	17	865.5	0	1	
24	1162.5	0	0	68		1	0	0	64	0	-64	15	929.5	0	0	
25	1239	0	0	65		0	0	0	64	0	-64	8	993.5	0	0	
26	1306	0	0	64		0	0	0	64	0	-64	8	1057.5	0	0	
27	1383	0	0	64		0	0	0	64	0	-64	8	1121.5	0	0	
28	1410	0	0	64		0	0	0	64	0	-64	8	1185.5	0	0	
29	1452	0	0	64		0	0	0	64	0	-64	8	1249.5	0	0	
30	1494	0	0	64		0	0	0	64	0	-64	8	1313.5	0	0	
31	1536	0	0	64		0	0	0	64	0	-64	8	1377.5	0	0	
32	1578	0	0	64		0	0	0	64	0	-64	8	1441.5	0	0	
33	1620	0	0	64		0	0	0	64	0	-64	8	1505.5	0	0	
34	1662	0	0	64		0	0	0	64	0	-64	8	1569.5	0	0	
35	1704	0	0	64		0	0	0	64	0	-64	8	1633.5	0	0	
36	1741	0	0	64		0	0	0	64	0	-64	8	1697.5	0	0	
37	1773	0	0	64		0	0	0	64	0	-64	8	1761.5	0	0	
38	1805	0	0	64		0	0	0	64	0	-64	8	1825.5	0	0	
39	1827	6	0	64		0	0	0	64	0	-64	8	1889.5	0	0	
40	1849	10	8	70		0	0	0	64	0	-64	2	1953.5	0	0	

LONESTAR2 BEER GAME MODEL

MODEL DATA

LONESTAR								
IT								
Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	4	12	4	12	100	12	6	12
4	4	12	4	12	0	12	6	12
5	12	8	4	12	0	16	120	-82
6	8	4	12	12	100	16	0	-76
7	10	0	8	8	0	24	100	120
8	12	-4	10	8	0	24	5	20
9	8	0	12	12	50	12	0	120
10	16	-8	12	12	0	100	0	125
11	14	-6	8	6	0	90	0	75
12	10	-2	16	2	20	78	0	75
13	8	-2	20	-2	10	120	0	75
14	4	6	20	0	20	104	0	75
15	4	10	8	0	10	84	0	55
16	4	14	1	12	10	84	10	45
17	0	14	4	28	0	86	10	25
18	0	10	0	44	0	105	1	15
19	0	6	0	52	0	111	1	5
20	2	2	0	53	10	121	1	15
21	14	-6	0	57	1	121	1	25
22	28	-14	0	51	10	121	0	26
23	20	-22	0	37	0	121	0	17
24	8	-24	20	9	0	131	0	15
25	8	-18	20	-11	0	112	0	8
26	8	2	20	-19	0	112	0	8
27	8	3	10	-15	0	102	0	8
28	10	-5	0	7	0	82	0	8
29	4	8	0	20	0	72	0	8
30	0	14	0	20	0	62	0	8
31	4	12	0	26	0	62	0	8
32	4	14	0	26	0	62	0	8
33	8	10	0	22	0	62	0	8
34	8	2	10	18	0	62	0	8
35	8	-2	10	10	0	62	0	8
36	8	-8	0	2	0	52	0	8
37	16	-8	20	4	0	42	0	8
38	16	-8	0	6	0	42	0	8
39	8	-8	10	-10	6	22	0	8
40	8	-8	0	20	10	22	0	2

MILLER BEER GAME MODEL

RME GRG NonLinear

WEEK	IO	eIO	AO	ϵ	O_t	(AO-Ot)	(AO-Ot) ²	EI	St	SLt										
0	0	0																		
1	4	0.00	4	-1.416172	6.365705	-2.365705	5.54934463	12	12	12										
2	4	0.06	4	1.409688	9.2448	-5.2448	27.5079272	12	12	12										
3	4	0.13	9	-0.023646	7.873542	1.1264578	1.26890869	12	12	12										
4	4	0.19	9	0.183995	8.142654	0.867346	0.73504226	12	12	17										
5	8	0.25	9	0.369799	8.898392	0.1016082	0.01032422	8	8	22										
6	8	0.37	9	1.136299	10.29713	-1.297127	1.68253878	4	4	27										
7	8	0.49	9	0.626415	9.780501	-0.780501	0.60918112	5	5	27										
8	8	0.61	9	-0.015283	9.130152	-0.130152	0.01683964	6	6	27										
9	8	0.73	9	0.165926	9.428241	-0.428241	0.18339011	6	6	28										
10	8	0.84	9	-0.471785	9.160397	-0.160397	0.02572725	4	4	31										
11	8	0.95	9	2.487248	12.61485	-3.614845	13.0671064	1	1	35										
12	8	1.07	9	-0.595781	9.388442	-0.388442	0.15088999	3	3	34										
13	8	1.18	9	-1.215384	8.751071	0.2489294	0.06196594	4	4	34										
14	8	1.28	9	-0.089209	10.4958	-1.495902	2.23742418	0	0	39										
15	8	1.39	9	1.626683	12.21891	-3.218913	10.3486321	0	0	40										
16	8	1.49	12	1.435785	12.23055	-0.230554	0.05315517	-3	0	44										
17	8	1.60	12	-0.998122	9.999533	2.100467	4.41196175	-8	0	53										
18	8	1.70	12	0.212051	11.21096	0.7990361	0.62257846	-1	0	50										
19	8	1.80	12	-0.048427	10.54251	1.4574988	2.12426784	4	4	49										
20	8	1.90	12	-0.496542	8.661586	3.3384138	11.1450085	16	16	41										
21	8	1.99	12	-1.27293	8.363951	3.6360487	13.2208499	13	13	48										
22	8	2.09	10	1.108056	8.799417	1.2005835	1.44140063	29	29	38										
23	8	2.18	10	-0.696575	6.580656	3.419344	11.6919131	33	33	34										
24	8	2.27	10	-0.790353	6.069269	3.9307308	15.4506447	37	37	32										
25	8	2.36	10	-0.704318	5.736242	4.2637585	18.1796364	41	41	30										
26	8	2.45	10	0.498796	6.773674	3.2263258	10.4091771	43	43	30										
27	8	2.54	6	-0.674281	5.433508	0.5664919	0.32091304	45	45	30										
28	8	2.63	6	-0.690695	5.248417	0.7515828	0.56487865	47	47	28										
29	8	2.71	6	-0.832629	4.93684	1.06316	1.13030911	49	49	22										
30	8	2.80	6	-0.261982	5.336322	0.6636784	0.44046908	51	51	18										
31	8	2.88	6	0.394104	6.329509	-0.329509	0.10857849	49	49	18										
32	8	2.96	6	-0.294238	5.976889	0.0230112	0.00052952	47	47	18										
33	8	3.04	6	-0.647718	5.968049	0.0419513	0.00175991	45	45	18										
34	8	3.12	6	-0.526015	6.413031	-0.413031	0.17056458	43	43	18										
35	8	3.19	6	-0.804017	6.467067	-0.467067	0.21815191	41	41	18										
36	9	3.27	6	-0.998122	6.603779	-0.603779	0.36454877	39	39	18										
37	10	3.36	6	0.212051	8.159381	-2.159381	4.66292855	37	37	18										
38	11	3.47	6	-0.048427	8.260713	-2.260713	5.11082499	35	35	18										
39	12	3.58	6	-0.496542	8.184563	-2.184563	4.77231334	33	33	18										
40	13	3.72	6	-1.27293	7.766067	-1.766067	3.22586786	31	31	18										
				mean of the disturbance	-0.057448		0.350095	mean of the standard errors												
				std dev of the disturbance	0.902083															

Incoming Orders:
 $IO = COR$
 Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
 Actual Orders:
 $AO = ROP$
 Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1
 Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \epsilon$
 Error Term:
 $AO - O_t$
 Squared errors:
 $(AO - O_t)^2$
 Effective Inventory:
 $EI = REI$
 Stock:
 $St = \text{MAX}(0, EI)$
 Supply Line:
 $SLt = RSL = RSD1 + RSD2 + WIO + WBL$

MILLER BEER GAME MODEL

WME - GRG NonLinear

WHOLESALE	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line								
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t								
0	4	0																
1	4	1.023278	4	0.558155	6.756228	-2.756228	7.59879342	12	12	12								
2	4	1.784778	4	0.865856	7.825431	-3.825431	14.6339242	12	12	12								
3	4	2.351474	6	0.992199	8.51847	-2.51847	6.34269081	12	12	12								
4	9	2.773198	6	0.048426	7.864822	-1.864822	3.47756255	12	12	14								
5	9	4.366132	5	-0.085627	10.80272	-5.802716	33.6715182	7	7	16								
6	9	5.551563	10	-0.467714	13.16087	-3.160874	9.99112377	2	2	17								
7	9	6.433739	15	-1.027158	13.85465	1.1453474	1.31182087	-1	0	21								
8	9	7.090237	12	-1.499713	13.4464	-1.446401	2.09207462	-4	0	30								
9	9	7.57879	20	-1.798129	13.17794	6.8220578	46.540473	-8	0	37								
10	9	7.942363	18	-1.730282	12.94937	5.0506329	25.5088927	-7	0	47								
11	9	8.212928	20	0.565717	14.92374	5.0762646	25.7684622	-7	0	56								
12	9	8.414275	20	-0.030297	13.47628	6.5237215	42.5589428	-12	0	72								
13	9	8.564114	20	0.081933	12.94876	7.0512449	49.7200551	-13	0	84								
14	9	8.675622	20	-1.239868	10.75147	9.248529	85.5352882	-17	0	99								
15	9	8.759804	10	0.114624	11.07025	-1.070255	1.14544523	-23	0	116								
16	9	8.820366	10	-0.666949	10.68953	-0.689532	0.47545485	-17	0	111								
17	12	8.868314	10	-0.727781	10.86205	-0.862055	0.74313817	-13	0	108								
18	12	9.66797	12	-0.897319	12.15217	-0.152167	0.02315485	-5	0	98								
19	12	10.28465	5	-0.248669	12.9389	-7.938899	63.0260988	-12	0	105								
20	12	10.70851	1	-0.521616	12.82006	-11.82006	139.713922	6	6	80								
21	12	11.0389	1	-0.342452	9.439595	-8.439595	71.2267699	24	24	51								
22	12	11.28477	5	-1.018822	1.274227	3.7257728	13.8813814	57	57	7								
23	10	11.46774	5	-0.008766	4.722111	0.2778887	0.07722212	50	50	7								
24	10	11.09226	10	0.767007	7.748314	2.251686	5.07008971	41	41	11								
25	10	10.81284	10	-1.027158	7.991635	2.0083651	4.03353033	32	32	20								
26	10	10.6049	15	-1.499713	8.592755	6.4072453	41.052792	27	27	25								
27	10	10.45016	10	-1.798129	9.094212	0.9057882	0.82045224	22	22	35								
28	6	10.335	7	-1.730282	9.0449	-2.0449	4.18161792	22	22	35								
29	6	9.226023	3	0.462652	9.057769	-8.057769	64.9365889	26	26	32								
30	6	8.400745	3	1.563248	7.203578	-4.203578	17.6700711	35	35	20								
31	6	7.786589	3	-1.40518	2.7931	0.2088996	0.04280743	39	39	13								
32	6	7.329546	3	-0.016293	3.666019	-0.666019	0.44358184	40	40	9								
33	6	6.989423	5	0.14898	4.457537	0.5424631	0.29426617	37	37	9								
34	6	6.73631	5	-1.901106	2.989107	2.0108935	4.04369248	34	34	11								
35	6	6.547948	5	-1.518017	4.018602	0.9813981	0.96314216	31	31	13								
36	6	6.407772	5	-0.916903	5.314309	-0.314309	0.09879009	28	28	15								
37	6	6.303456	6	0.765512	7.214531	-1.214531	1.47508558	27	27	15								
38	6	6.225827	7	-2.646148	3.981563	3.0184365	9.1109589	26	26	18								
39	6	6.168056	10	0.847437	7.607901	2.3920988	5.72213657	25	25	18								
40	6	6.125064	9	1.088568	7.799186	1.2008337	1.44200166	24	24	23								
		mean of the disturbance		-0.485778		-0.145245	mean of the standard errors											
		std dev of the disturbance		0.929135														

Incoming Orders:
 $IO = WIO$
 Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$
 Actual Orders:
 $AO = WOP$
 Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1
 Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \epsilon$
 Error Term:
 $AO - O_t$
 Squared errors:
 $(AO - O_t)^2$
 Effective Inventory:
 $EI = MWEI$
 Stock:
 $St = \text{MAX}(0, EI)$
 Supply Line:
 $SL_t = WSL = WSD1 + WSD2 + DIO + DBL$

MILLER BEER GAME MODEL

DME - GRG NonLinear

DISTRIB	incoming orders	expected incoming orders	actual orders	disturbance	model orders	error term	squared errors	effective inventory	Stock	Supply line								
WEEK	IO	eIO	AO	ϵ	O_t	$(AO-O_t)$	$(AO-O_t)^2$	EI	S_t	SL_t								
0	4	0																
1	4	2.839029	4	-0.445805	3.789433	0.2105671	0.0443385	12	12	12								
2	4	3.53894	4	-0.027855	5.105394	-1.105394	1.22189605	12	12	12								
3	4	3.842447	3	-0.513447	4.925309	-1.925309	3.70681653	12	12	12								
4	6	3.948394	5	0.204753	5.747456	-0.747456	0.55869088	12	12	11								
5	6	5.301275	8	0.825988	8.153	-0.153	0.02340909	10	10	12								
6	5	5.762264	4	-0.968981	7.250448	-3.250448	10.5654149	8	8	16								
7	10	5.259355	8	1.761522	9.90547	-1.90547	3.63081601	6	6	17								
8	15	8.38703	5	-0.039039	12.30615	-7.306154	53.3798905	1	1	20								
9	12	12.74999	3	-0.321124	16.80174	-13.80174	185.007275	-6	0	17								
10	20	12.25518	15	2.710047	19.1381	-4.138101	17.1238821	-14	0	16								
11	18	17.36488	30	0.457786	21.99552	8.0044785	64.0716443	-26	0	23								
12	20	17.78391	20	-0.991442	20.96534	-0.96534	0.93188187	-39	0	48								
13	20	19.24599	20	0.051086	23.46995	-3.469953	12.040571	-56	0	65								
14	20	19.74345	50	1.669698	25.58603	24.413972	596.042008	-81	0	70								
15	20	19.91271	30	-0.442735	23.84285	6.3571459	40.4133042	-88	0	107								
16	10	19.9703	30	0.354835	24.49801	5.5019871	30.2718621	-88	0	117								
17	10	13.39232	10	-2.746038	14.81916	-4.819161	23.2243151	-73	0	142								
18	10	11.15421	20	-0.384369	14.94272	5.0572788	25.5760673	-53	0	122								
19	12	10.39271	10	-0.445905	14.11968	-4.119684	16.9717996	-33	0	112								
20	5	11.45313	10	0.322311	14.87475	-4.87475	23.7631892	5	5	72								
21	1	7.195831	3	0.358866	2.707387	0.2926131	0.0856224	42	42	40								
22	1	3.108019	0	-1.955019	0	0	0	61	61	23								
23	5	1.717238	5	-0.191855	0	0	0	25	70	13								
24	5	3.883064	0	-0.262171	0	0	0	75	75	8								
25	10	4.619971	5	-1.997875	0	0	0	25	73	5								
26	10	8.169484	0	-1.109699	0	0	0	63	63	10								
27	15	9.37718	5	0.322311	1.418956	3.5910436	12.8238732	58	58	5								
28	10	13.08888	10	0.358866	8.383918	1.6180819	2.61172064	43	43	10								
29	7	11.05029	3	-1.955019	5.109014	-2.109014	4.44793973	38	38	15								
30	3	8.378081	3	-0.191855	5.702969	-2.702969	7.30804115	31	31	19								
31	3	4.829853	3	-0.262171	1.654997	1.3450028	1.80903187	33	33	16								
32	3	3.622594	0	-1.997875	0	0	0	40	40	9								
33	3	3.211833	0	-1.109699	0	0	0	40	40	6								
34	5	3.072075	0	0.322311	0	0	0	40	40	3								
35	5	4.344037	0	0.358866	0.714649	-0.714649	0.51072329	38	38	0								
36	5	4.776814	0	-1.955019	0	0	0	33	33	0								
37	5	4.924062	0	-0.191855	2.893093	-2.893093	8.36998459	28	28	0								
38	6	4.974163	3	-0.262171	3.946447	-0.946447	0.89576254	23	23	0								
39	7	5.650966	7	-1.997875	4.175831	2.8241694	7.97593299	17	17	3								
40	10	6.541001	10	-1.109699	7.457039	2.542961	6.46865057	10	10	10								
		mean of the disturbance		-0.23671		0.242045	mean of the standard errors											
		std dev of the disturbance		1.110119														

Incoming Orders:
 $IO = DIO$

Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
 $AO = DOP$

Disturbance:
 normally distributed white noise
 mean = 0
 std dev = 1

Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \epsilon)$

Error Term:
 $AO - O_t$

Squared errors:
 $(AO - O_t)^2$

Effective Inventory:
 $EI = MDEI$

Stock:
 $S_t = \text{MAX}(0, EI)$

Supply Line:
 $SL_t = \text{DSL} = \text{DSD1} + \text{DSD2} + \text{FIO} + \text{FBL}$

MILLER BEER GAME MODEL

FME - GRG NonLinear

WEEK	incoming orders IO	expected incoming orders eIO	actual orders AO	disturbance ε	model orders O_t	error term (AO-Ot)	squared errors (AO-Ot) ²	effective inventory EI	Stock S_t	Supply line SL_t								
0	4	0																
1	4	4	4	0.28506	10.38763	-8.387628	40.8017852	12	12	8								
2	4	4	4	-1.531237	8.571331	-4.571331	20.8970864	12	12	8								
3	4	4	4	0.254202	10.35677	-5.356769	28.6949748	12	12	8								
4	3	4	4	0.022365	10.12493	-6.124933	37.5148001	12	12	9								
5	5	3	3	-0.025001	8.962498	-5.962498	35.5513809	13	13	9								
6	8	5	5	0.034089	11.02159	-6.021587	36.2595141	13	13	7								
7	4	8	10	-0.60751	13.84026	-3.840264	14.7478249	9	9	8								
8	8	4	5	0.539335	11.10218	-6.102177	37.2365664	8	8	15								
9	5	8	10	-0.466697	14.44135	-4.441352	19.7256109	5	5	15								
10	3	5	8	-0.478977	10.85373	-4.853728	23.5586727	10	10	15								
11	15	3	20	0.308156	9.408723	10.591277	112.17514	12	12	16								
12	30	15	5	-1.29805	20.37986	-15.37986	236.540134	7	7	26								
13	20	30	30	0.367991	37.85138	-7.851383	61.6442202	-17	0	25								
14	20	20	30	0.139972	27.62336	2.3786358	5.64839754	-17	0	35								
15	50	20	50	0.803254	28.28665	21.713353	471.469703	-32	0	60								
16	30	50	100	-0.385683	57.09771	42.902291	1840.60663	-52	0	80								
17	30	30	30	0.771403	38.2548	-8.254798	68.1418494	-52	0	150								
18	10	30	30	0.308156	37.78955	-7.789549	60.6770677	-32	0	130								
19	20	10	32	-1.29805	9.511354	22.488646	506.739193	58	58	60								
20	10	20	20	0.367991	20.02671	-0.026707	0.00071327	68	68	62								
21	10	10	5	0.139972	7.497313	-2.497313	6.23657036	88	88	52								
22	3	10	5	0.803254	5.629082	-0.629082	0.39574465	110	110	25								
23	0	3	2	-0.385683		0	2	4	127	127	10							
24	5	0	0	0.771403		0	0	0	132	132	7							
25	0	5	0	0.308156		0	0	0	132	132	2							
26	5	0	0	-1.29805		0	0	0	134	134	0							
27	0	5	0	0.367991		0	0	0	129	129	0							
28	5	0	0	0.139972		0	0	0	129	129	0							
29	10	5	0	0.803254		0	0	0	124	124	0							
30	3	10	0	-0.385683	3.97987	-3.97987	15.8393644	114	114	0								
31	3	3	0	0.771403		0	0	0	111	111	0							
32	3	3	0	-1.231428		0	0	0	108	108	0							
33	0	3	0	-0.248727		0	0	0	105	105	0							
34	0	0	0	-1.599298		0	0	0	105	105	0							
35	0	0	5	0.09634		0	5	25	105	105	0							
36	0	0	0	-0.68304		0	0	0	105	105	5							
37	0	0	0	-0.349671		0	0	0	105	105	5							
38	0	0	0	-1.011142		0	0	0	110	110	0							
39	3	0	0	-1.231428		0	0	0	110	110	0							
40	7	3	0	-0.248727		0	0	0	107	107	0							
				mean of the disturbance	-0.081239		0.2000393	mean of the standard errors										
				std dev of the disturbance	0.717087													

Incoming Orders:
 $IO = FIO$

Expected Incoming Orders:
 $eIO = \theta * IO_{(t-1)} + (1-\theta) * eIO_{(t-1)}$

Actual Orders:
 $AO = FPR$

Disturbance:
normally distributed white noise
mean = 0
std dev = 1

Model Orders:
 $O_t = \text{MAX}(0, eIO + \alpha(s' - S_t - \beta SL_t) + \varepsilon)$

Error Term:
 $AO - O_t$

Squared errors:
 $(AO - O_t)^2$

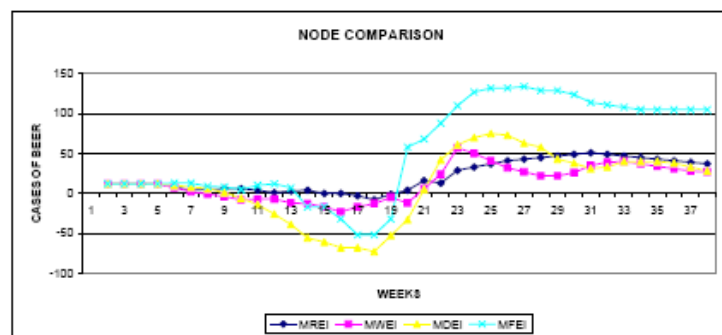
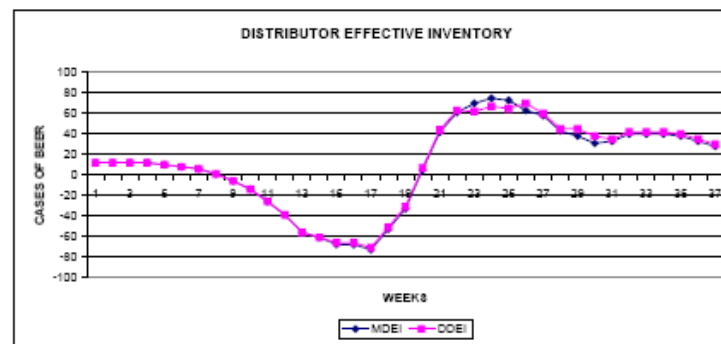
Effective Inventory:
 $EI = MFEI$

Stock:
 $S_t = \text{MAX}(0, EI)$

Supply Line:
 $SL_t = FSL = FPD1 + FPD2$

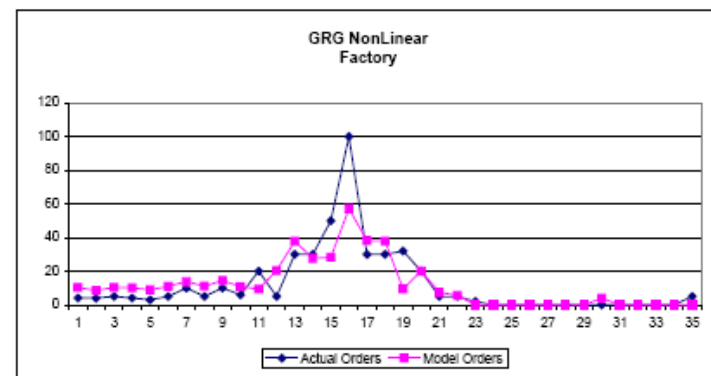
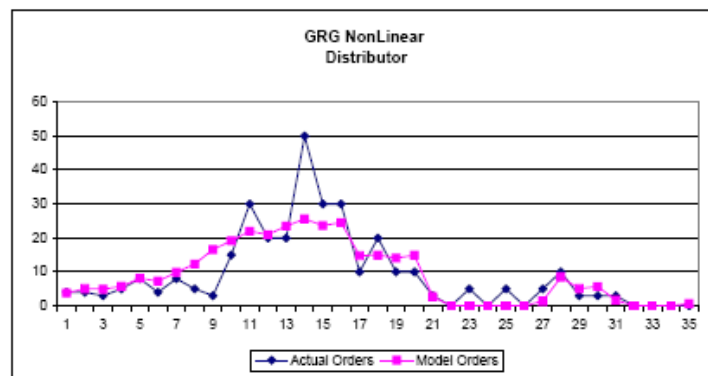
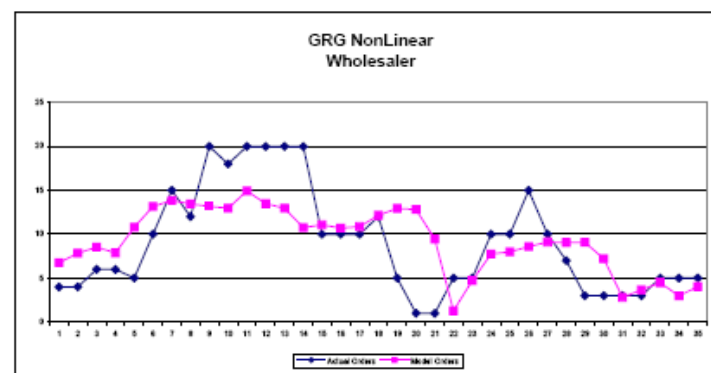
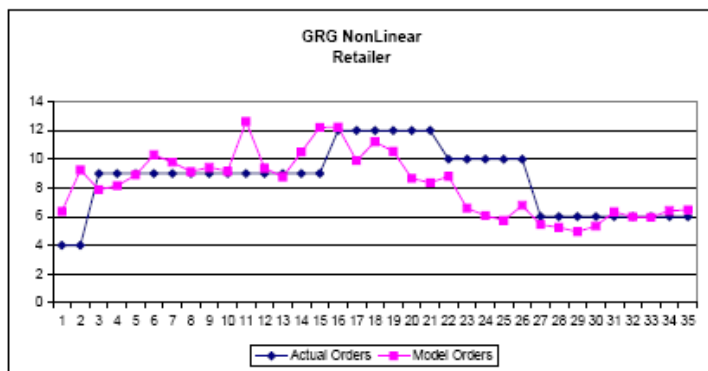
MILLER BEER GAME MODEL

MODEL CHARTS



MILLER BEER GAME MODEL

ORDER CHARTS



MILLER BEER GAME MODEL

MODEL WORKSHEET

STEP 1 Receive The Inventory and Advance the shipping Delays										STEP 2 Look at the incoming orders and fill orders all incoming orders + backlog									
MILLER IT Team Costs \$ 3,391.00										MILLER Retailer IT Costs \$ 460.50									
WEEK	COR	RINV1	RSD1	RSD2	RBL	RSR	RINV2	MREI	DREI	RCOSTS	ROP	WIO	RSL		WINV1	WSD1			
0	0	12	4	4	0	4	12	12	12	0	4	4	12		12	4			
1	4	16	4	4	0	4	12	12	12	6	4	4	12		16	4			
2	4	16	4	4	0	4	12	12	12	12	4	4	12		16	4			
3	4	16	4	4	0	4	12	12	12	18	9	4	12		16	4			
4	4	16	4	4	0	4	12	12	12	24	9	9	17		16	4			
5	8	16	4	9	0	8	8	8	8	28	9	9	22		16	4			
6	8	12	9	9	0	8	4	4	4	30	9	9	27		11	6			
7	8	13	9	8	0	8	5	5	5	32.5	9	9	27		8	6			
8	8	14	8	6	0	8	6	6	6	35.5	9	9	27		6	5			
9	8	14	6	5	0	8	6	6	6	38.5	9	9	28		5	10			
10	8	12	5	10	0	8	4	4	4	40.5	9	9	31		10	9			
11	8	9	10	9	0	8	1	1	1	41	9	9	35		9	4			
12	8	11	9	4	0	8	3	3	3	42.5	9	9	34		4	8			
13	8	12	4	8	0	8	4	4	4	44.5	9	9	34		8	5			
14	8	8	8	5	0	8	0	0	0	44.5	9	9	39		5	3			
15	8	8	5	3	0	8	0	0	0	44.5	9	9	40		3	15			
16	8	5	3	15	3	5	0	-3	-3	47.5	12	9	44		15	13			
17	8	3	15	13	8	3	0	-8	-8	55.5	12	12	53		13	20			
18	8	15	13	20	1	15	0	-1	-1	58.5	12	12	50		20	5			
19	8	13	20	5	0	9	4	4	4	58.5	12	12	49		5	30			
20	8	24	5	24	0	8	16	16	16	66.5	12	12	41		30	30			
21	8	21	24	12	0	8	13	13	13	73	12	12	48		36	45			
22	8	37	12	12	0	8	29	29	29	87.5	10	12	38		69	5			
23	8	41	12	12	0	8	33	33	33	104	10	10	34		62	1			
24	8	45	12	10	0	8	37	37	47	122.5	10	10	32		51	1			
25	8	49	10	10	0	8	41	41	61	143	10	10	30		42	5			
26	8	51	10	10	0	8	43	43	63	164.5	10	10	30		37	5			
27	8	53	10	10	0	8	45	45	65	187	6	10	30		32	10			
28	8	55	10	10	0	8	47	47	67	210.5	6	6	28		32	10			
29	8	57	10	6	0	8	49	49	68	235	6	6	22		32	15			
30	8	59	6	6	0	8	51	51	70	260.5	6	6	18		41	10			
31	8	57	6	6	0	8	49	49	69	285	6	6	18		45	7			
32	8	55	6	6	0	8	47	47	67	308.5	6	6	18		48	3			
33	8	53	6	6	0	8	45	45	65	331	6	6	18		43	3			
34	8	51	6	6	0	8	43	43	63	352.5	6	6	18		40	3			
35	8	49	6	6	0	8	41	41	61	373	6	6	18		37	3			
36	8	47	6	6	0	8	39	39	59	392.5	6	6	18		34	5			
37	8	45	6	6	0	8	37	37	57	411	6	6	18		33	5			
38	8	43	6	6	0	8	35	35	55	428.5	6	6	18		32	5			
39	8	41	6	6	0	8	33	33	53	445	6	6	18		31	5			
40	8	39	6	6	0	8	31	31	51	460.5	6	6	18		30	6			

MILLER BEER GAME MODEL

MODEL WORKSHEET

	STEP 3 Record your inventory or backlog											STEP 4 Advance the order slips and the brewery Brews							
						MILLER Costs	Wholesaler \$ 494.00		IT									MILLER Costs	
WEEK	WSD2	WBL	WINV2	MWEI	DWEI	WCOSTS	WOP	DIO	WSL		DINV1	DSD1	DSD2	DBL	DINV2	MDEI	DDEI		
0	4	0	12			0	4	4			12	4	4	0	12				
1	4	0	12	12	12	6	4	4	12		16	4	4	0	12	12	12		
2	4	0	12	12	12	12	4	4	12		16	4	4	0	12	12	12		
3	4	0	12	12	12	18	6	4	12		16	4	4	0	12	12	12		
4	4	0	12	12	12	24	6	6	14		16	4	4	0	12	12	12		
5	6	0	7	7	7	27.5	5	6	16		16	4	3	0	10	10	10		
6	6	0	2	2	2	28.5	10	5	17		14	3	5	0	8	8	8		
7	5	1	0	-1	-1	29.5	15	10	21		11	5	8	0	6	6	6		
8	10	4	0	-4	-4	33.5	12	15	30		11	8	4	0	1	1	1		
9	9	8	0	-8	-8	41.5	20	12	37		9	4	8	6	0	-6	-6		
10	4	7	0	-7	-7	48.5	18	20	47		4	8	5	14	0	-14	-14		
11	8	7	0	-7	-7	55.5	20	18	56		8	5	3	26	0	-26	-26		
12	5	12	0	-12	-12	67.5	20	20	72		5	3	15	39	0	-39	-39		
13	3	13	0	-13	-13	80.5	20	20	84		3	15	13	58	0	-58	-56		
14	15	17	0	-17	-17	97.5	20	20	99		15	13	20	61	0	-61	-61		
15	13	23	0	-23	-23	120.5	10	20	116		13	20	5	68	0	-68	-66		
16	20	17	0	-17	-17	137.5	10	10	111		20	5	30	68	0	-68	-66		
17	5	13	0	-13	-13	150.5	10	10	108		5	30	30	73	0	-73	-71		
18	30	5	0	-5	-5	155.5	12	10	98		30	30	50	53	0	-53	-51		
19	30	12	0	-12	-12	167.5	5	12	105		30	50	42	33	0	-33	-31		
20	45	0	6	6	6	170.5	1	5	80		50	42	20	0	5	5	7		
21	5	0	24	24	24	182.5	1	1	51		47	20	10	0	42	42	44		
22	1	0	57	57	46	211	5	1	7		62	10	10	0	61	61	63		
23	1	0	50	50	28	236	5	5	7		71	10	3	0	70	70	62		
24	5	0	41	41	19	256.5	10	5	11		80	3	0	0	75	75	67		
25	5	0	32	32	10	272.5	10	10	20		78	0	5	0	73	73	65		
26	10	0	27	27	4	286	15	10	25		73	5	0	0	63	63	70		
27	10	0	22	22	-1	297	10	15	35		68	0	5	0	58	58	60		
28	15	0	22	22	-1	308	7	10	35		58	5	0	0	43	43	45		
29	10	0	26	26	3	321	3	7	32		48	0	5	0	38	38	45		
30	7	0	35	35	12	339.5	3	3	20		38	5	10	0	31	31	38		
31	3	0	39	39	16	358	3	3	13		36	10	3	0	33	33	35		
32	3	0	40	40	14	378	3	3	9		43	3	3	0	40	40	42		
33	3	0	37	37	17	396.5	5	3	9		43	3	3	0	40	40	42		
34	3	0	34	34	11	413.5	5	5	11		43	3	0	0	40	40	42		
35	5	0	31	31	8	429	5	5	13		43	0	0	0	38	38	40		
36	5	0	28	28	5	443	5	5	15		38	0	0	0	33	33	35		
37	5	0	27	27	4	456.5	6	5	15		33	0	0	0	28	28	30		
38	5	0	26	26	3	469.5	7	6	16		28	0	0	0	23	23	25		
39	6	0	25	25	2	482	10	7	18		23	0	0	0	17	17	19		
40	7	0	24	24	1	494	9	10	23		17	0	3	0	10	10	12		

MILLER BEER GAME MODEL

MODEL WORKSHEET

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Week	ROR	REI	WOR	WEI	DOR	DEI	FOR	FEI
1	4	12	4	12	4	12	4	12
2	4	12	4	12	4	12	4	12
3	9	12	6	12	3	12	5	12
4	9	12	6	12	5	12	4	12
5	9	8	5	7	8	10	3	13
6	9	4	10	2	4	8	5	13
7	9	5	15	-1	8	6	10	9
8	9	6	12	-4	5	1	5	8
9	9	6	20	-8	3	-6	10	5
10	9	4	18	-7	15	-14	6	10
11	9	1	20	-7	30	-26	20	12
12	9	3	20	-12	20	-39	5	7
13	9	4	20	-13	20	-56	30	-17
14	9	0	20	-17	50	-61	30	-17
15	9	0	10	-23	30	-66	50	-32
16	12	-3	10	-17	30	-66	100	-52
17	12	-8	10	-13	10	-71	30	-52
18	12	-1	12	-5	20	-51	30	-32
19	12	4	5	-12	10	-31	32	8
20	12	16	1	6	10	7	20	18
21	12	13	1	24	3	44	5	38
22	10	29	5	46	0	63	5	60
23	10	33	5	28	5	62	2	77
24	10	47	10	19	0	67	0	82
25	10	61	10	10	5	65	0	82
26	10	63	15	4	0	70	0	84
27	6	65	10	-1	5	60	0	79
28	6	67	7	-1	10	45	0	79
29	6	68	3	3	3	45	0	74
30	6	70	3	12	3	38	0	64
31	6	69	3	16	3	35	0	61
32	6	67	3	14	0	42	0	58
33	6	65	5	17	0	42	0	55
34	6	63	5	11	0	42	0	55
35	6	61	5	8	0	40	5	55
36	6	59	5	5	0	35	0	55
37	6	57	6	4	0	30	0	55
38	6	55	7	3	3	25	0	60
39	6	53	10	2	7	19	0	60
40	6	51	9	1	10	12	0	57