

Appendix A: Instructions

This is an experiment about economic decision-making. The experiment is divided into periods. Each of you will have the role of a firm. In each period firms have to decide which quantity to produce and at which price to sell. To make your decision you should take into account that:

- 1) You can produce any integer quantity between 0 and 102.
- 2) You can set any integer price between 0 and 100 ECU (experimental account units).
- 3) The production of each unit costs you 50 ECU's, whether you sell it or not.
- 4) You are not the only firm offering products, specifically there will be three firms offering products in each market.
- 5) At the beginning of the experiment it will be randomly determined which firms will be in which market.
- 6) In each market the three firms will be the same period after period.
- 7) Consumers (simulated by computer) will always buy 102 units.
- 8) If the firms set three different prices, consumers will always start buying the cheaper units,
 - a. if the firm with the lowest price has produced less than 102 units then consumers will buy the rest of the units up to 102 from the firm that has set the second lowest price
 - b. if the quantity produced by the two firms that have set lower prices is less than 102 then consumers will buy the rest of the units, up to 102, from the third firm.
 - c. if, in contrast, the firm with the lowest price has produced 102 units then consumers will buy the 102 units from him and the firms with the higher prices will sell 0 units.
- 9) if the three firms set the same price and the sum of the quantities produced by the three firms is smaller than or equal to 102 then the three firms will sell all produced units.
- 10) if, in contrast, the three firms set the same price and the sum of the quantities produced is larger than 102 then consumers will buy in proportion to the quantities produced; i.e., if one firm has produced X units, a second firm has produced Y units and the third firm has produced Z units, then the first firm will sell $\frac{X}{X+Y+Z} * 102$ units, the second firm will sell $\frac{Y}{X+Y+Z} * 102$ units and the third firm will sell $\frac{Z}{X+Y+Z} * 102$ and the rest of the units will not be sold.
- 11) if two firms set the same price, this price is the lowest and the quantity produced by these two firms is larger than 102, then consumers will buy in proportion to the quantity produced, i.e. if one firm has produced X units and the other firm has produced Y units then the first firm will sell $\frac{X}{X+Y} * 102$ units, the second firm will sell $\frac{Y}{X+Y} * 102$ units and the rest of the units will not be sold.
- 12) if two firms set the same price and it is not the lowest the same proportional rule than under 11) will be applied subject to the remaining quantity up to 102; i.e. if the third firm produces Z at the lowest price the quantities sold will be $\frac{X}{X+Y} * (102 - Z)$ and $\frac{Y}{X+Y} * (102 - Z)$.
- 13) if your firms makes losses it will be bankrupt, this means that the program will automatically set a price

and a quantity equal to zero for all remaining rounds, the other firms will continue to be able freely set prices and quantities.

14) even if you are the owner of a bankrupted firm you will have to remain in your seat until the end of the experiment to preserve anonymity.

On your computer you will see 5 screens:

- 1) The input screen where you will have to type your price and quantity in the corresponding spaces.
- 2) The results screen will inform you about the prices and quantities of the other firms, as well as about your earnings in the period and your accumulated earnings. You can press the button 'OK' after you have read it and this screen will disappear in 20 seconds.
- 3) The history screen will inform you about prices, quantities and earnings of all previous periods.
- 4) The waiting screen will appear whenever you have to wait till everybody is finished.
- 5) The total earnings screen will appear at the end of the experiment and will inform you of your total earnings in Euros.

You will not be allowed to communicate with each other during the experiment. If you have any doubt about the instructions you may now ask publicly. If you have a question or doubt during the experiment, raise your hand and we will talk to you personally.

The experiment has 50 periods You start with 20000 ECU's which will always appear added to your total earnings. You will be paid 2 cents of a Euro for each 100 EAU's plus the 3 Euros that you will already have received for your participation.

Appendix B: Overall Tables¹

Prices	2F1		2F2		2F3		2F4		2F5	
	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
1 to 5	70.00	27.39	53.00	9.75	33.20	17.43	81.14	18.06	60.80	21.91
6 to 10	69.90	26.57	56.67	20.95	81.50	8.63	100.00	0.00	100.00	0.00
11 to 15	78.68	25.52	77.00	11.51	73.10	11.45	100.00	0.00	100.00	0.00
16 to 20	100.00	0.00	90.50	9.75	75.16	4.69	100.00	0.00	100.00	0.00
21 to 25	100.00	0.00	82.00	10.95	83.70	4.13	100.00	0.00	100.00	0.00
26 to 30	100.00	0.00	76.00	8.94	84.40	12.60	100.00	0.00	100.00	0.00
31 to 35	100.00	0.00	81.00	12.45	90.00	4.85	100.00	0.00	100.00	0.00
36 to 40	100.00	0.00	100.00	0.00	96.60	2.16	100.00	0.00	100.00	0.00
41 to 45	100.00	0.00	100.00	0.00	63.40	14.42	100.00	0.00	100.00	0.00
46 to 50	100.00	0.00	100.00	0.00	57.50	10.61	100.00	0.00	100.00	0.00
	d		d		d		d		d	

Quantities	2F1		2F2		2F3		2F4		2F5	
	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
1 to 5	124.00	41.14	112.00	55.41	160.00	22.36	92.60	17.11	80.40	33.28
6 to 10	160.00	22.36	108.00	38.34	112.00	21.68	100.00	0.00	100.00	0.00
11 to 15	94.20	37.53	100.00	0.00	137.40	25.67	100.00	0.00	100.00	0.00
16 to 20	100.00	0.00	121.00	28.81	122.00	0.71	100.00	0.00	100.00	0.00
21 to 25	100.00	0.00	158.00	42.66	110.20	8.23	100.00	0.00	100.00	0.00
26 to 30	100.00	0.00	122.00	25.88	120.00	27.39	100.00	0.00	100.00	0.00
31 to 35	100.00	0.00	150.00	50.00	100.00	0.00	100.00	0.00	100.00	0.00
36 to 40	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00
41 to 45	100.00	0.00	100.00	0.00	170.00	27.39	100.00	0.00	100.00	0.00
46 to 50	100.00	0.00	100.00	0.00	110.00	14.14	100.00	0.00	100.00	0.00
	d		d		d		d		d	

Prices	2F6		2F7		2F8		2F9		2F10	
	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
1 to 5	85.96	15.28	55.20	11.08	49.82	9.35	53.02	6.50	53.36	5.60
6 to 10	100.00	0.00	50.08	0.17	58.47	24.30	43.40	6.54	51.00	11.40
11 to 15	100.00	0.00	62.00	21.68	60.00	30.16	59.79	4.35	41.26	12.35
16 to 20	100.00	0.00	100.00	0.00	100.00	0.00	92.00	17.89	67.14	25.33
21 to 25	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	81.00	19.95
26 to 30	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	70.47	24.44
31 to 35	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	75.44	11.44
36 to 40	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	81.95	3.48
41 to 45	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	65.47	19.63
46 to 50	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	47.50	0.71
	d		m		m		m		d	

Quantities	2F6		2F7		2F8		2F9		2F10	
	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
1 to 5	102.00	2.83	160.00	41.83	154.00	45.06	166.00	13.87	108.00	16.05
6 to 10	100.00	0.00	136.60	60.22	126.00	76.03	166.00	46.69	119.00	5.48
11 to 15	100.00	0.00	100.40	99.50	112.00	57.62	125.80	49.43	143.20	52.17
16 to 20	100.00	0.00	90.00	22.36	100.00	0.00	100.00	0.00	78.40	83.70
21 to 25	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	45.00	45.96
26 to 30	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	82.00	41.02
31 to 35	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	90.80	30.22
36 to 40	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	90.00	28.28
41 to 45	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	118.00	37.01
46 to 50	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	160.00	56.57
	d		m		m		m		d	

2F OVERALL TABLES (1)

¹Tables show price and quantity averages and standard deviations for every particular market. These statistics are computed for batches of five periods. "m", "d" and "t" denote that the market ends with monopoly, duopoly or triopoly respectively.

Prices	2F11		2F12		2F13		2F14	
	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
1 to 5	57.36	4.93	49.76	3.26	62.71	7.08	62.20	15.18
6 to 10	63.60	12.72	34.24	27.95	88.73	2.89	100.00	0.00
11 to 15	97.60	5.37	62.08	11.41	95.32	2.12	90.00	22.36
16 to 20	100.00	0.00	66.28	15.77	97.79	0.24	100.00	0.00
21 to 25	100.00	0.00	78.20	19.81	98.63	0.29	100.00	0.00
26 to 30	100.00	0.00	71.85	25.29	99.16	0.29	100.00	0.00
31 to 35	100.00	0.00	59.76	7.99	99.47	0.00	100.00	0.00
36 to 40	100.00	0.00	53.00	2.39	99.47	0.00	100.00	0.00
41 to 45	100.00	0.00	52.41	4.27	99.69	0.28	100.00	0.00
46 to 50	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00
	d		m		d		d	

Quantities	2F11		2F12		2F13		2F14	
	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
1 to 5	114.00	11.40	115.20	34.32	92.20	11.26	100.00	0.00
6 to 10	100.00	0.00	87.00	37.78	97.40	1.34	100.00	0.00
11 to 15	102.00	4.47	84.00	23.82	95.80	1.10	110.00	22.36
16 to 20	100.00	0.00	99.60	39.09	95.00	0.00	100.00	0.00
21 to 25	100.00	0.00	80.00	39.62	95.00	0.00	100.00	0.00
26 to 30	100.00	0.00	121.80	62.14	95.00	0.00	100.00	0.00
31 to 35	100.00	0.00	109.60	66.05	95.00	0.00	100.00	0.00
36 to 40	100.00	0.00	146.20	35.35	95.00	0.00	100.00	0.00
41 to 45	104.00	8.94	157.60	42.09	99.00	2.24	100.00	0.00
46 to 50	100.00	0.00	50.50	70.00	100.00	0.00	100.00	0.00
	d		m		d		d	

2F OVERALL TABLES (2)

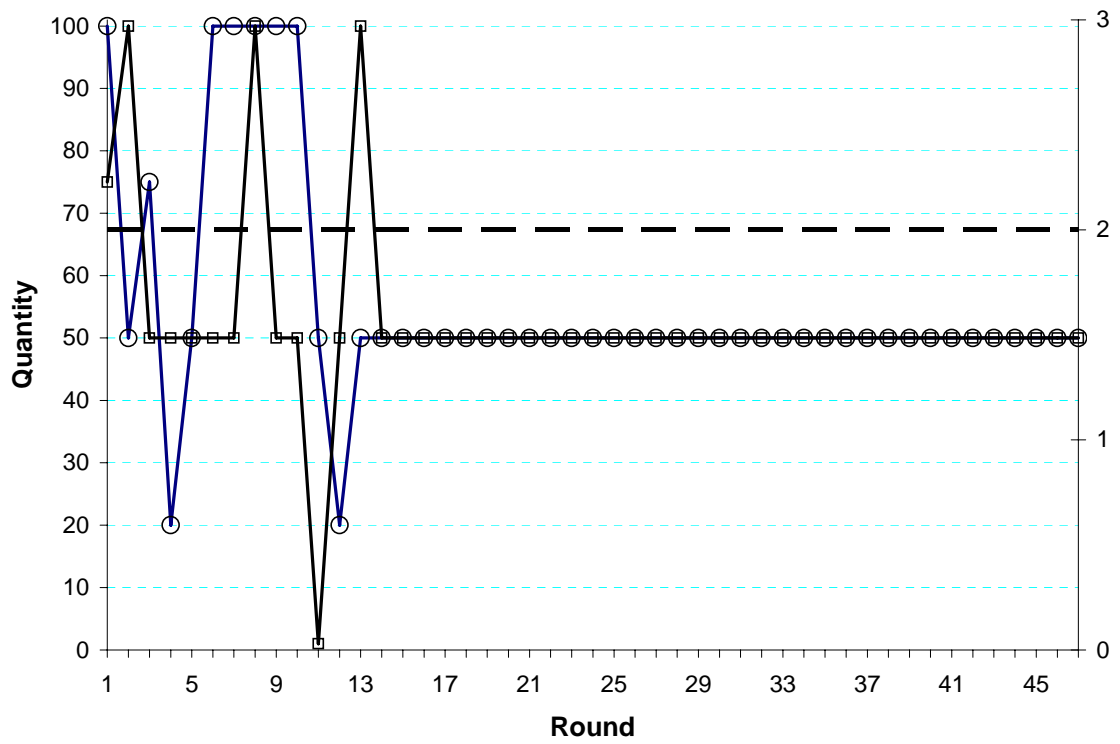
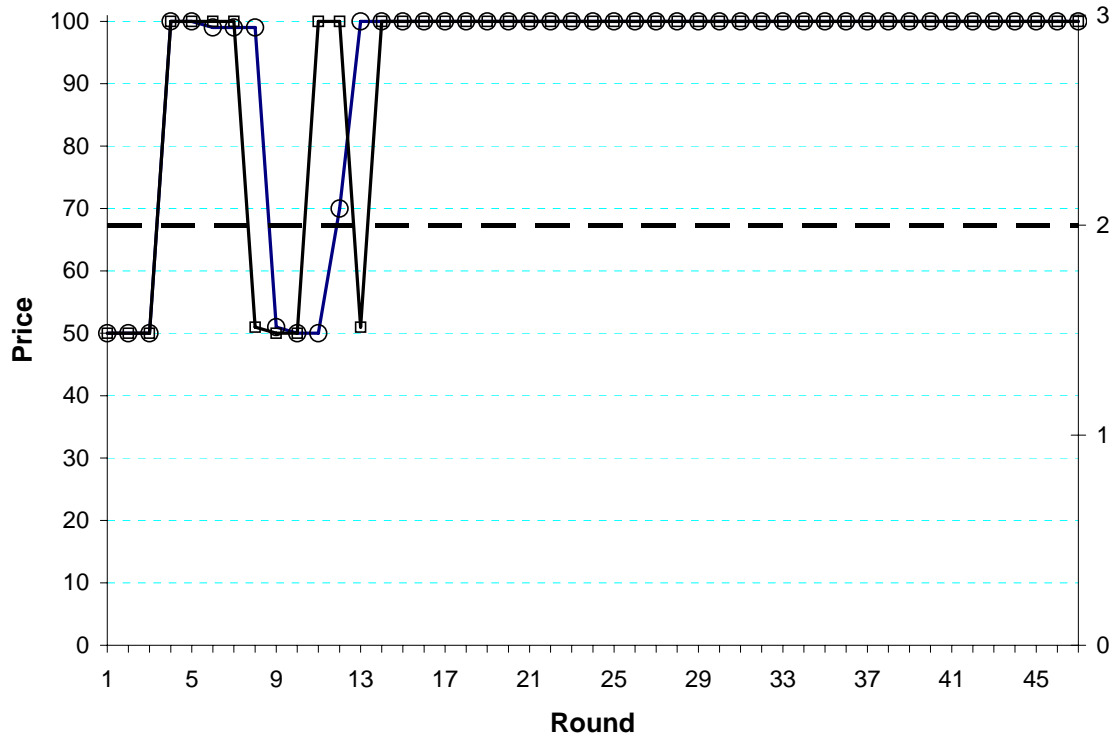
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	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
1 to 5	39.29	37.52	47.92	19.50	53.49	3.45	31.17	22.95	51.58	2.00
6 to 10	55.86	38.44	54.98	8.97	39.85	17.72	51.80	0.73	49.91	0.22
11 to 15	62.92	14.41	64.46	12.10	47.88	21.56	60.56	7.30	52.31	3.42
16 to 20	80.69	20.86	55.21	7.19	51.18	0.82	54.56	3.63	50.60	1.23
21 to 25	51.00	36.47	53.08	12.04	80.75	17.65	54.32	5.50	79.58	4.36
26 to 30	67.97	28.38	80.40	43.83	95.02	4.95	58.16	6.92	68.04	8.44
31 to 35	79.02	26.57	100.00	0.00	58.35	12.92	54.58	3.76	60.66	11.00
36 to 40	71.52	21.91	100.00	0.00	67.79	14.37	60.85	17.08	69.68	8.77
41 to 45	78.35	24.86	100.00	0.00	84.29	21.69	100.00	0.00	66.50	5.29
46 to 50	78.51	24.58	100.00	0.00	99.80	0.45	100.00	0.00	78.78	14.67
	d		m		d		m		t	

Quantities	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
	1 to 5	169.60	110.29	133.60	38.37	159.60	81.92	184.80	47.40	175.00
6 to 10	100.60	57.06	136.60	62.07	165.40	64.16	117.00	40.47	137.80	23.49
11 to 15	132.60	27.02	135.20	58.46	89.60	57.08	81.40	31.80	104.60	13.79
16 to 20	104.00	68.47	158.00	51.45	132.20	57.56	112.60	32.00	90.20	20.75
21 to 25	110.20	73.69	139.80	65.93	60.40	24.10	115.40	46.40	63.00	30.32
26 to 30	110.60	61.82	103.60	39.66	102.00	1.00	85.20	48.44	111.40	44.28
31 to 35	122.00	44.72	102.00	0.00	130.80	56.48	119.20	56.93	116.20	37.51
36 to 40	105.80	3.83	102.00	0.00	85.20	69.92	122.80	38.11	92.20	10.62
41 to 45	133.00	41.14	102.00	0.00	80.20	44.46	102.00	0.00	93.20	34.04
46 to 50	134.40	40.17	102.00	0.00	113.00	24.67	102.00	0.00	94.60	57.03
	d		m		d		m		t	

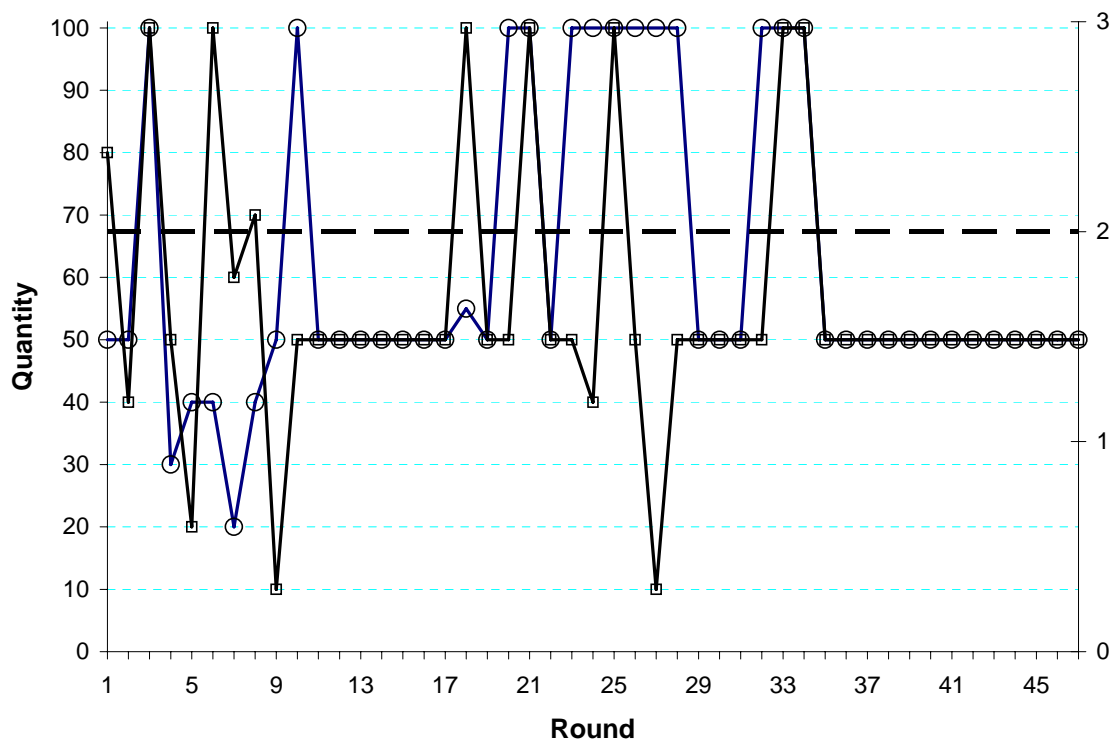
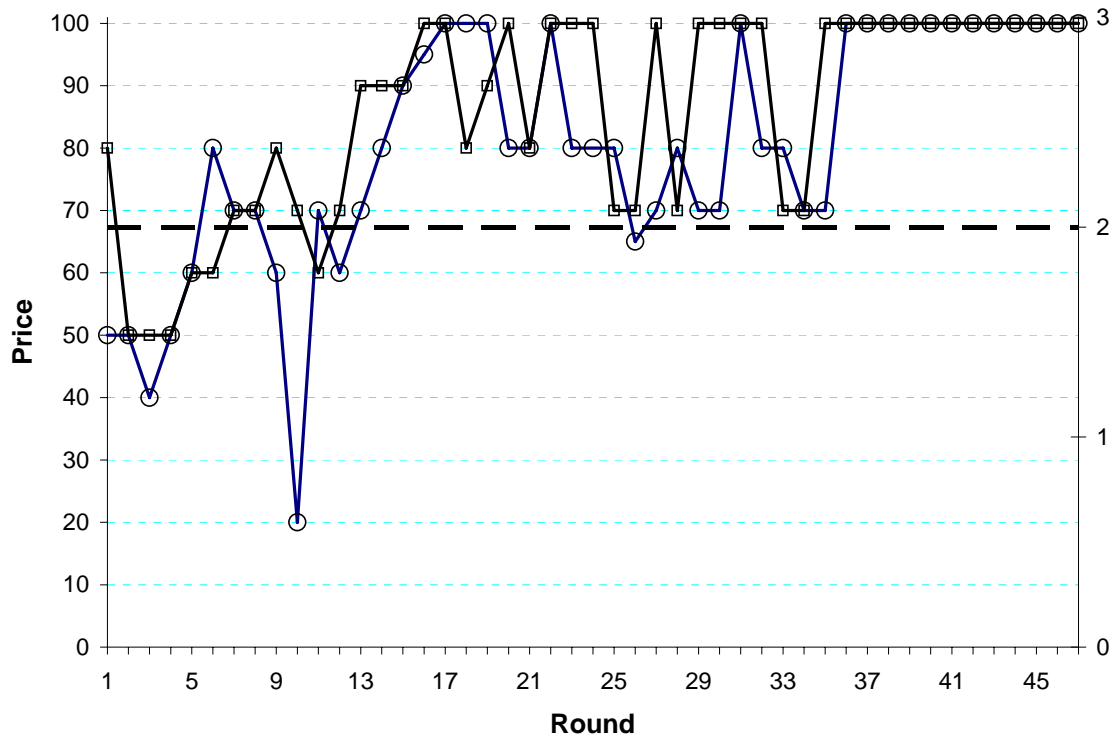
Prices	3F6		3F7		3F8		3F9	
	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
1 to 5	61.70	2.03	51.50	12.32	55.62	8.28	49.02	11.09
6 to 10	72.19	6.44	57.55	6.00	57.87	13.42	83.33	17.95
11 to 15	58.71	4.10	54.59	5.31	69.63	14.67	89.80	22.81
16 to 20	67.04	4.43	56.98	5.75	100.00	0.00	100.00	0.00
21 to 25	55.62	3.56	93.33	9.43	100.00	0.00	100.00	0.00
26 to 30	48.88	1.66	100.00	0.00	100.00	0.00	100.00	0.00
31 to 35	48.18	2.14	100.00	0.00	100.00	0.00	100.00	0.00
36 to 40	48.44	1.77	100.00	0.00	100.00	0.00	100.00	0.00
41 to 45	47.39	19.96	100.00	0.00	100.00	0.00	100.00	0.00
46 to 50	40.00	41.83	91.84	17.69	77.98	23.98	96.00	8.94
	m		t		t		t	

Quantities	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.	Avg.	Est.Dev.
	1 to 5	153.20	28.73	105.20	8.76	182.20	43.76	138.40
6 to 10	139.80	44.80	121.20	27.22	76.00	21.62	102.00	0.00
11 to 15	135.00	37.46	135.80	24.80	96.40	40.46	126.80	34.22
16 to 20	123.00	3.81	127.40	32.21	99.20	5.54	102.00	0.00
21 to 25	161.40	35.00	102.00	0.00	102.80	0.84	102.00	0.00
26 to 30	173.80	17.04	102.00	0.00	102.80	0.84	102.00	0.00
31 to 35	160.00	42.87	102.00	0.00	103.60	0.89	102.00	0.00
36 to 40	109.40	2.61	102.00	0.00	103.20	0.45	102.00	0.00
41 to 45	94.00	78.96	102.00	0.00	104.00	1.00	102.00	0.00
46 to 50	60.00	54.77	122.00	30.20	125.20	43.65	129.20	60.82
	m		t		t		t	

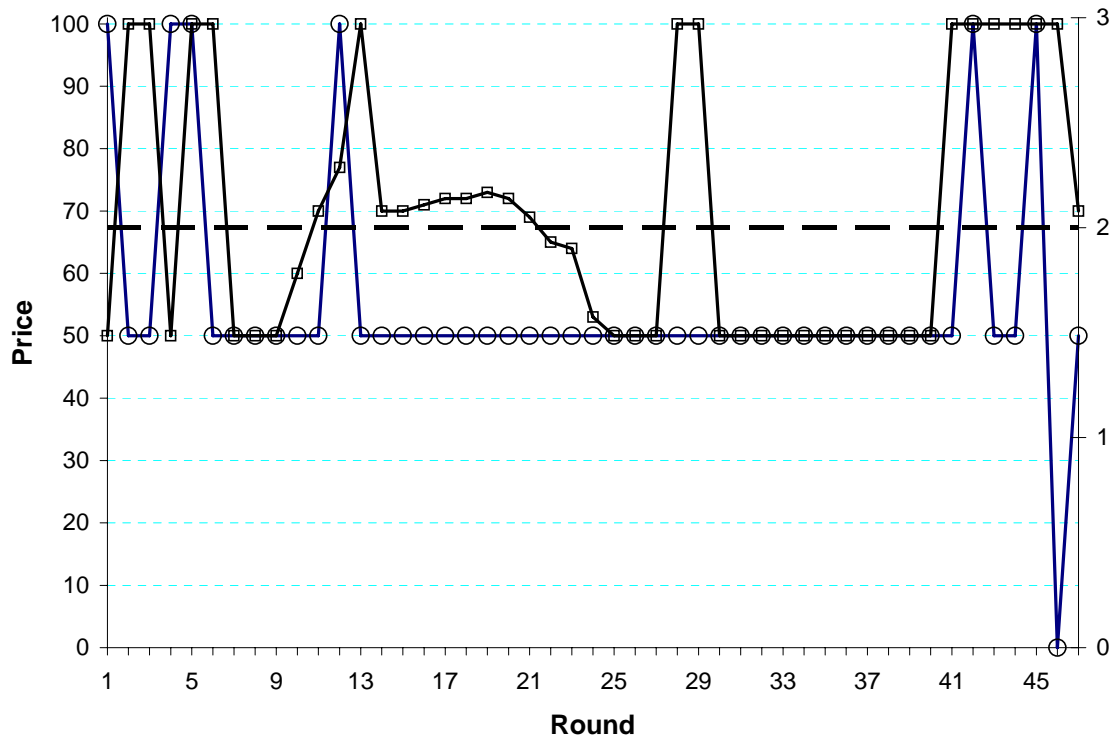
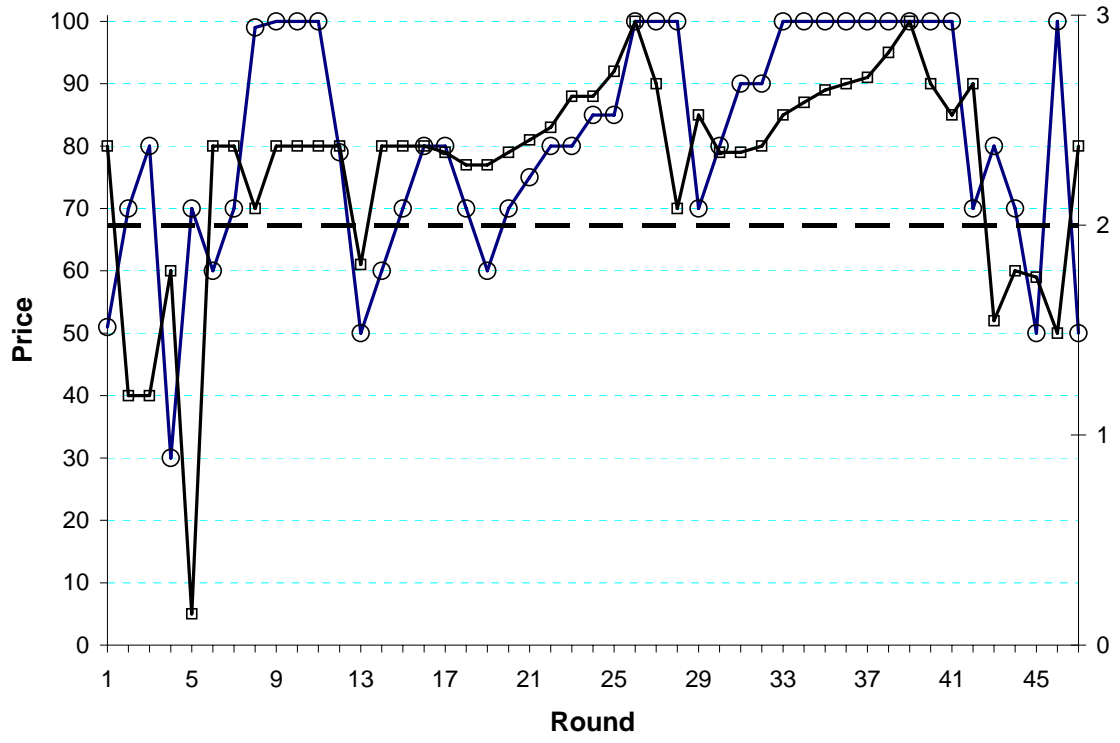
3F OVERALL TABLES



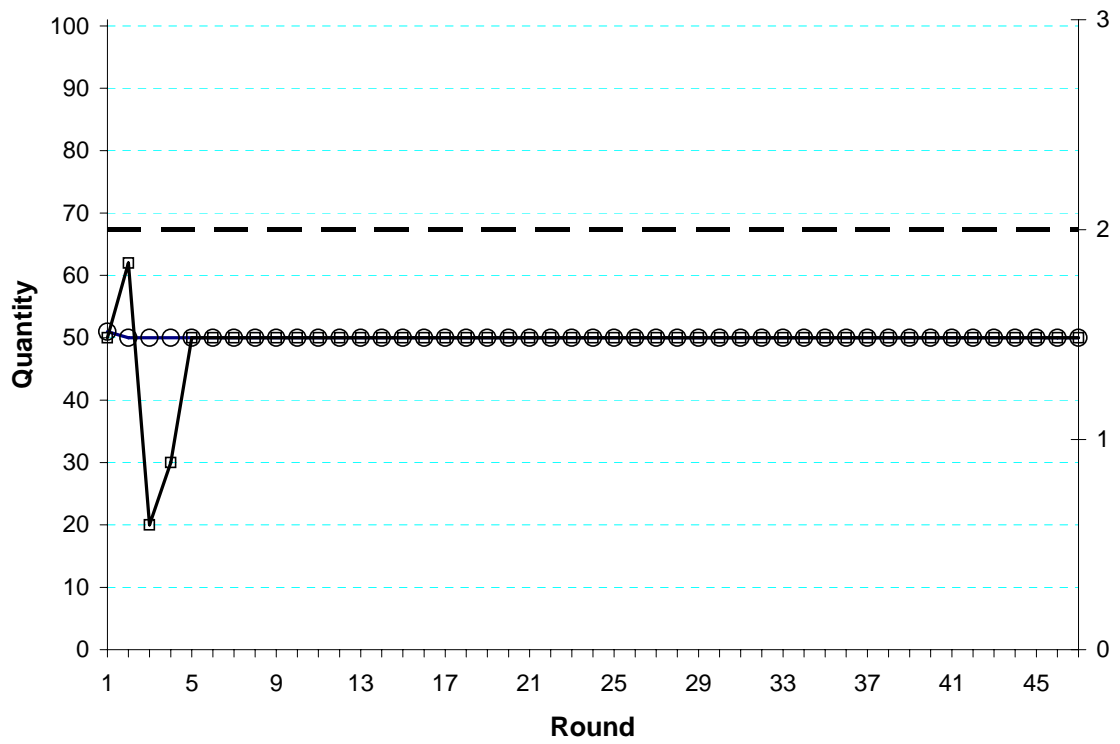
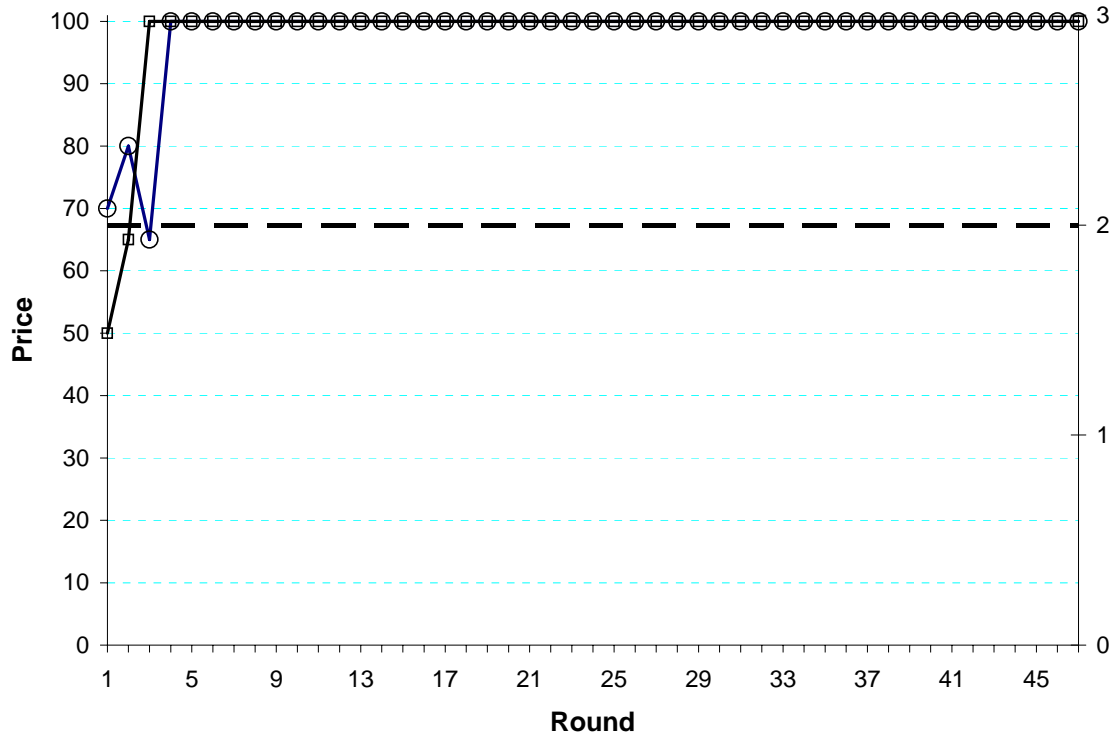
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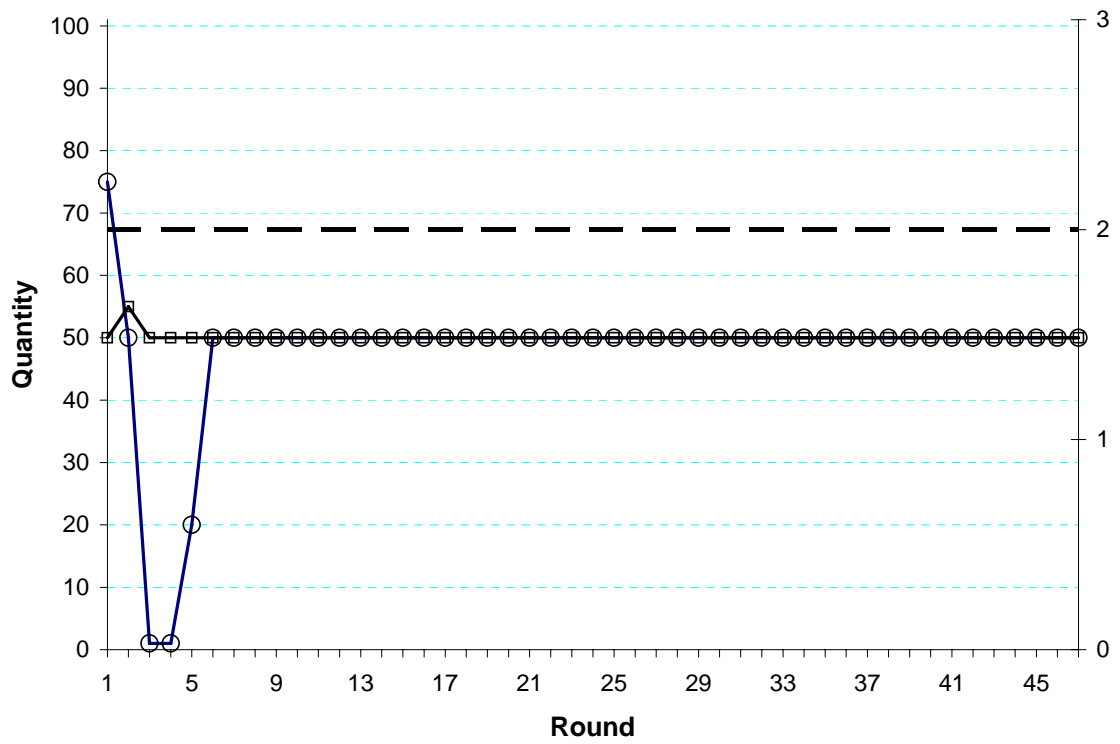
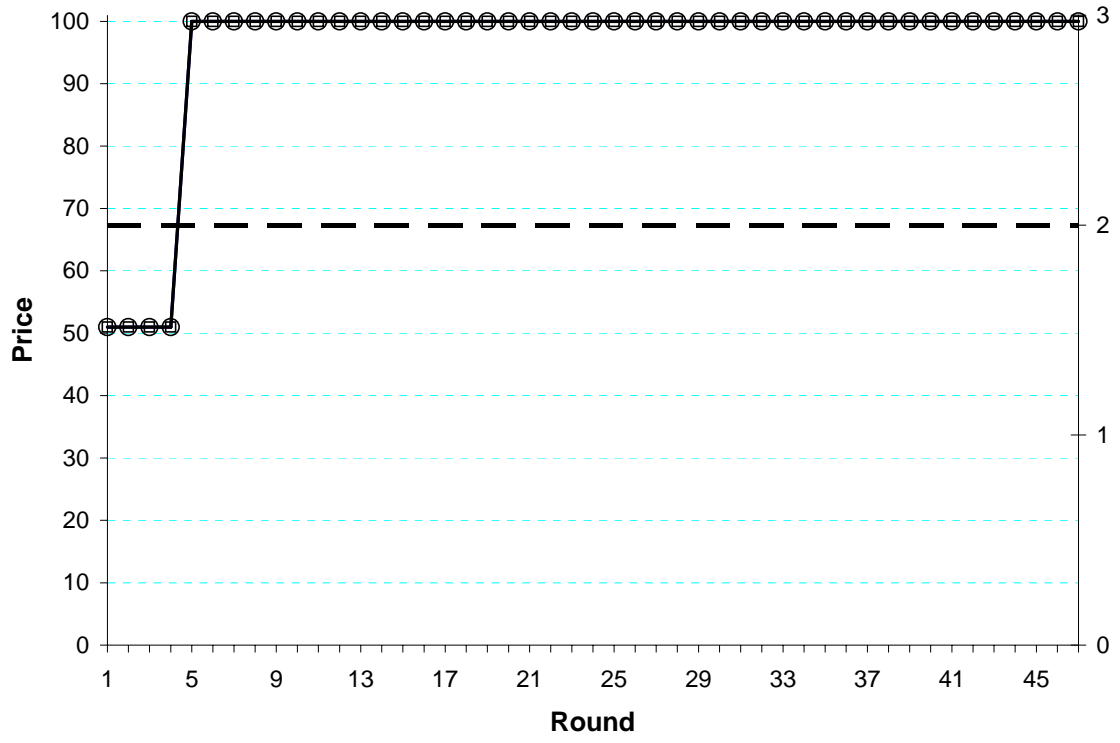
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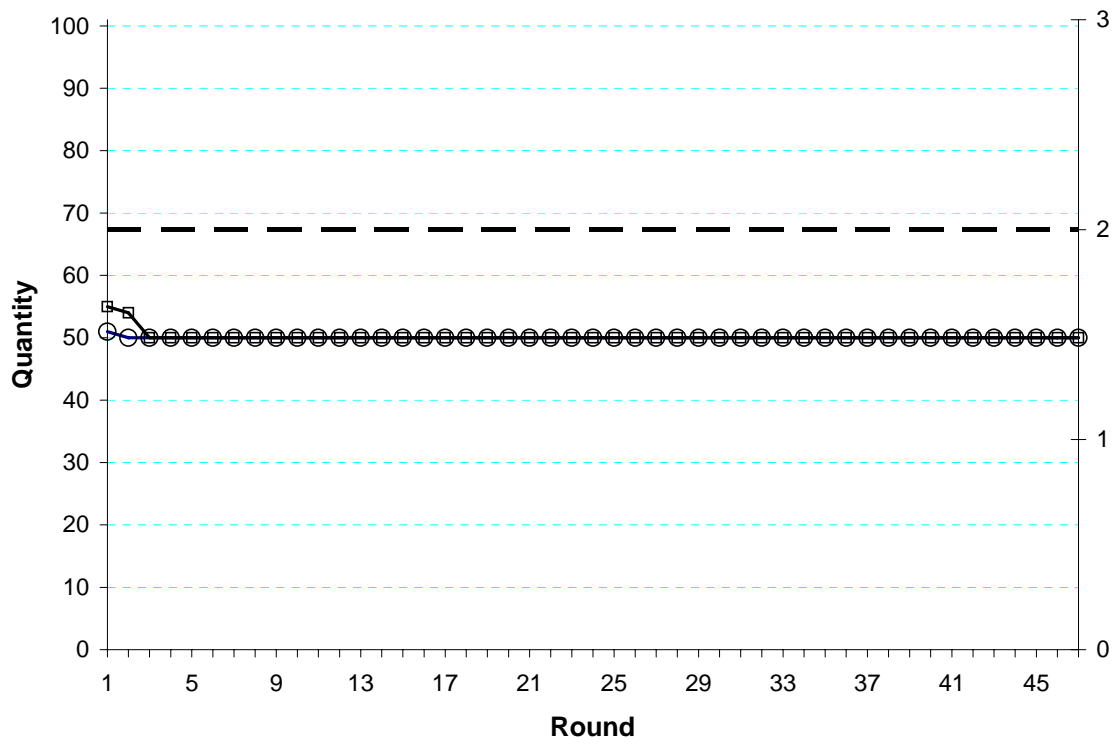
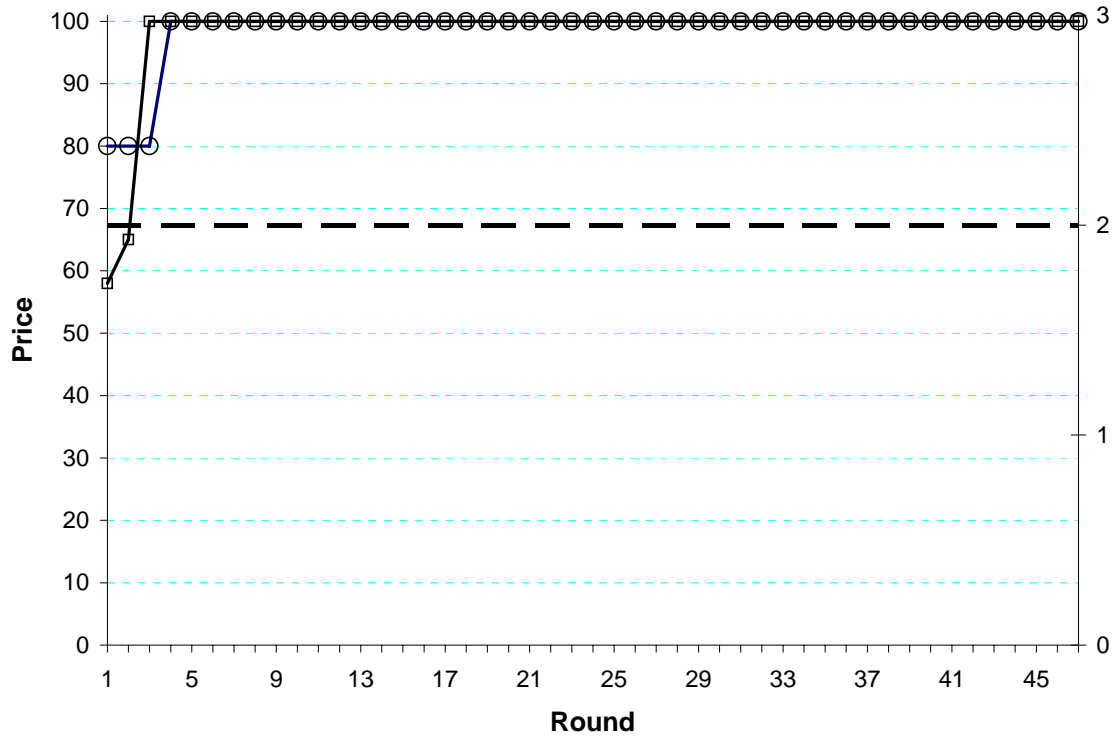
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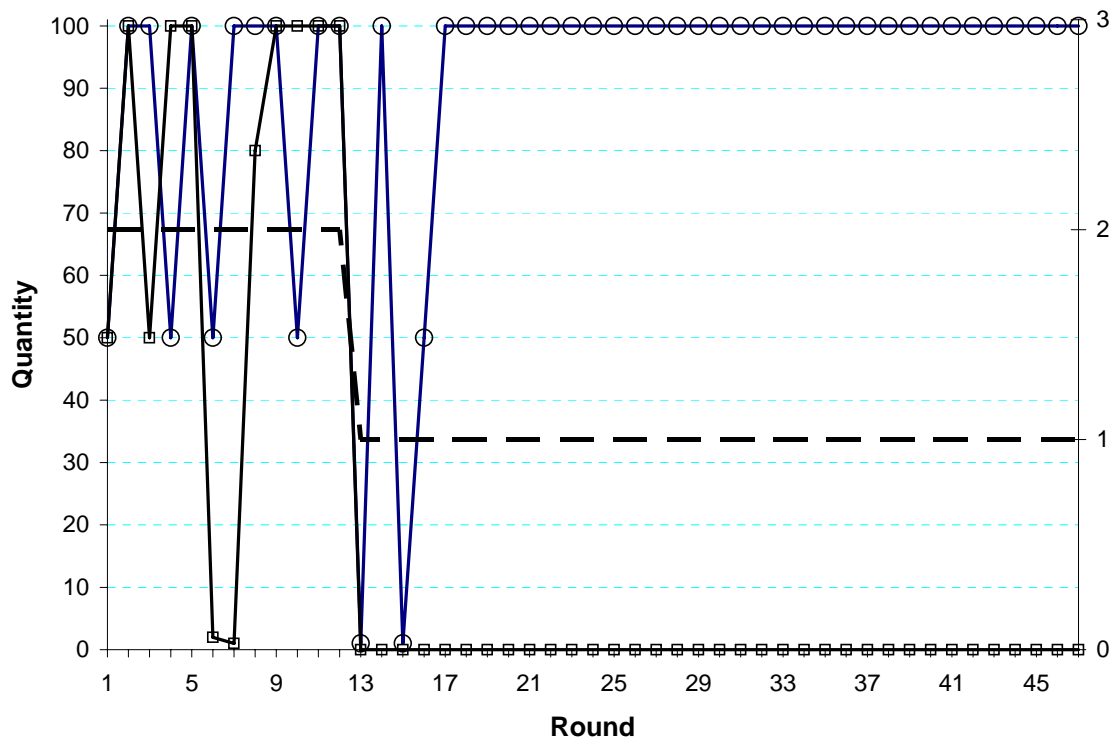
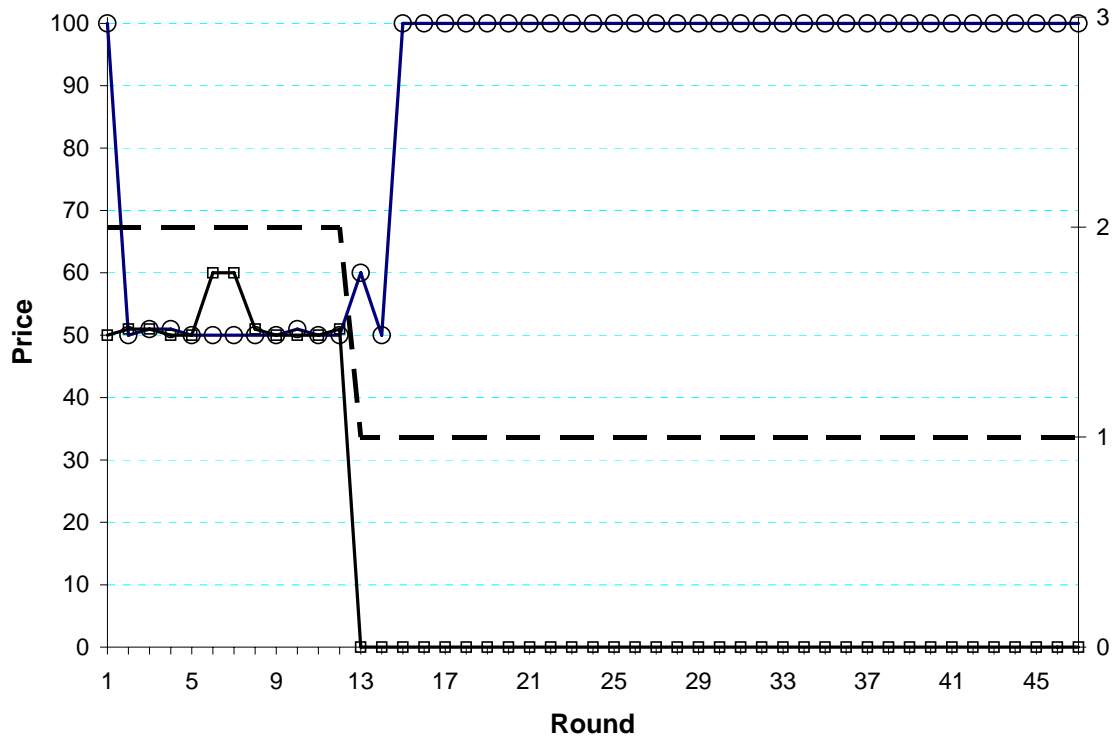
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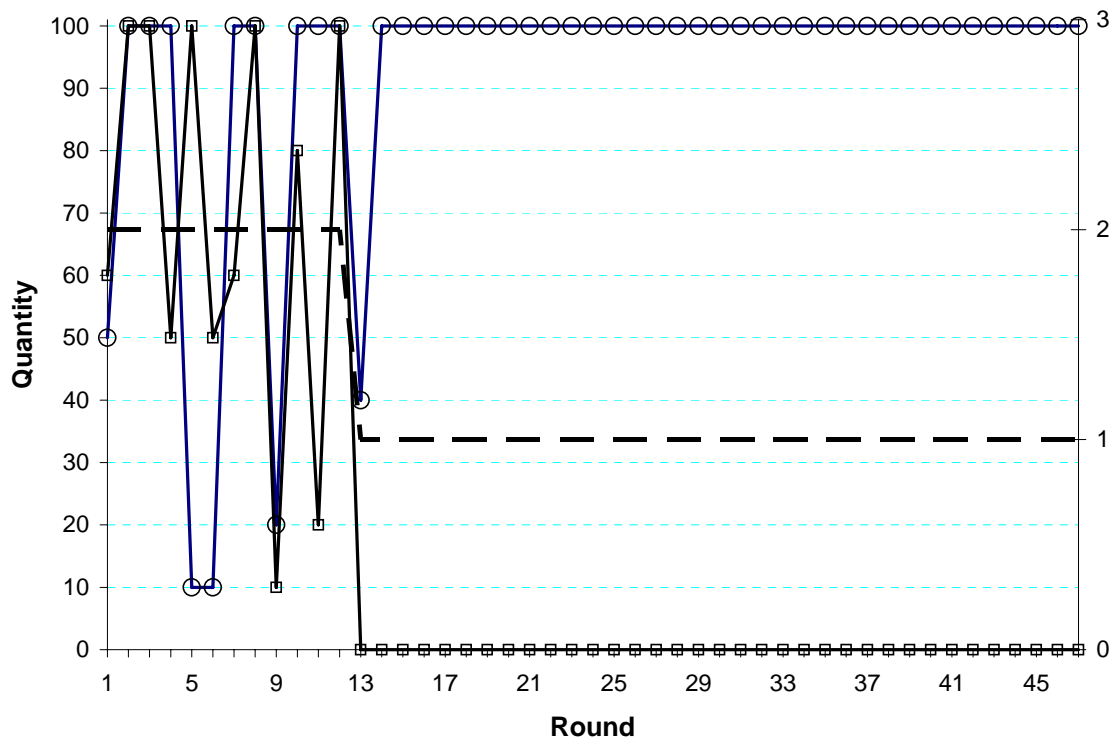
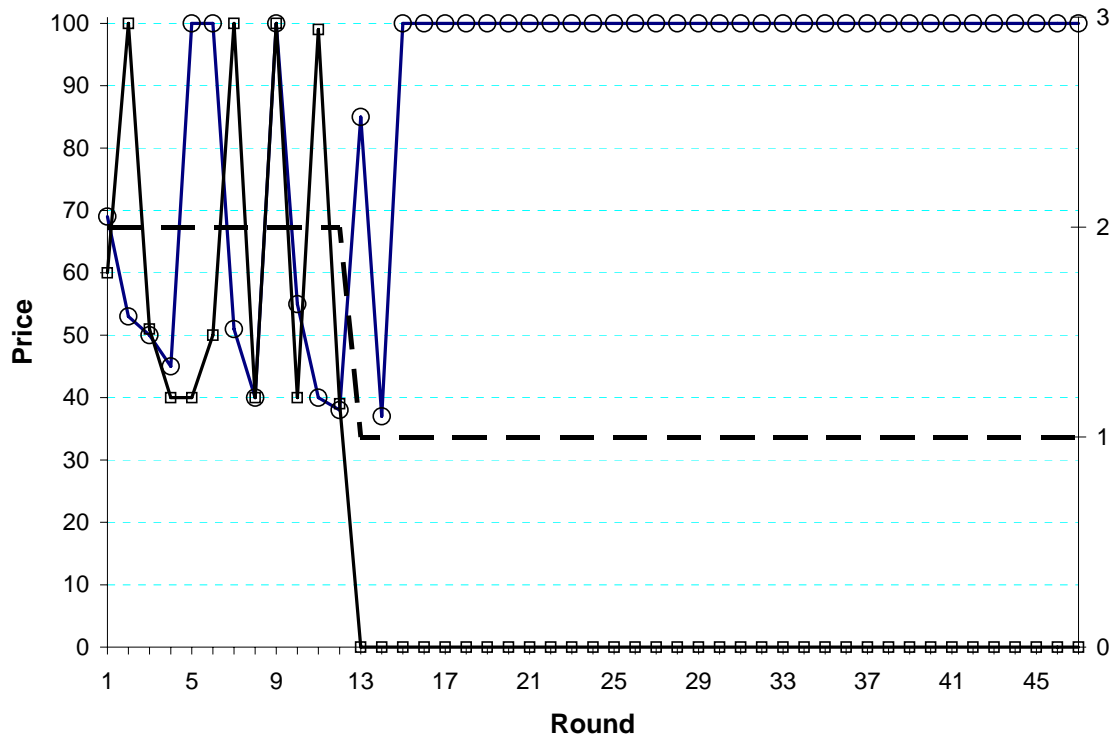
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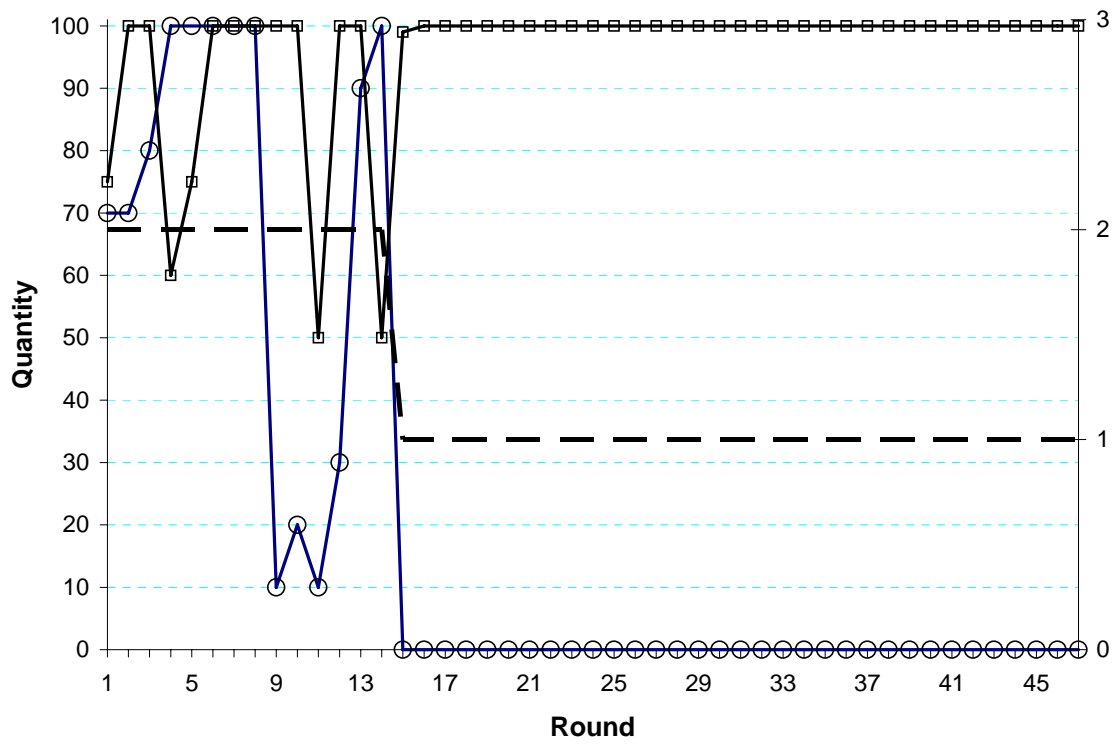
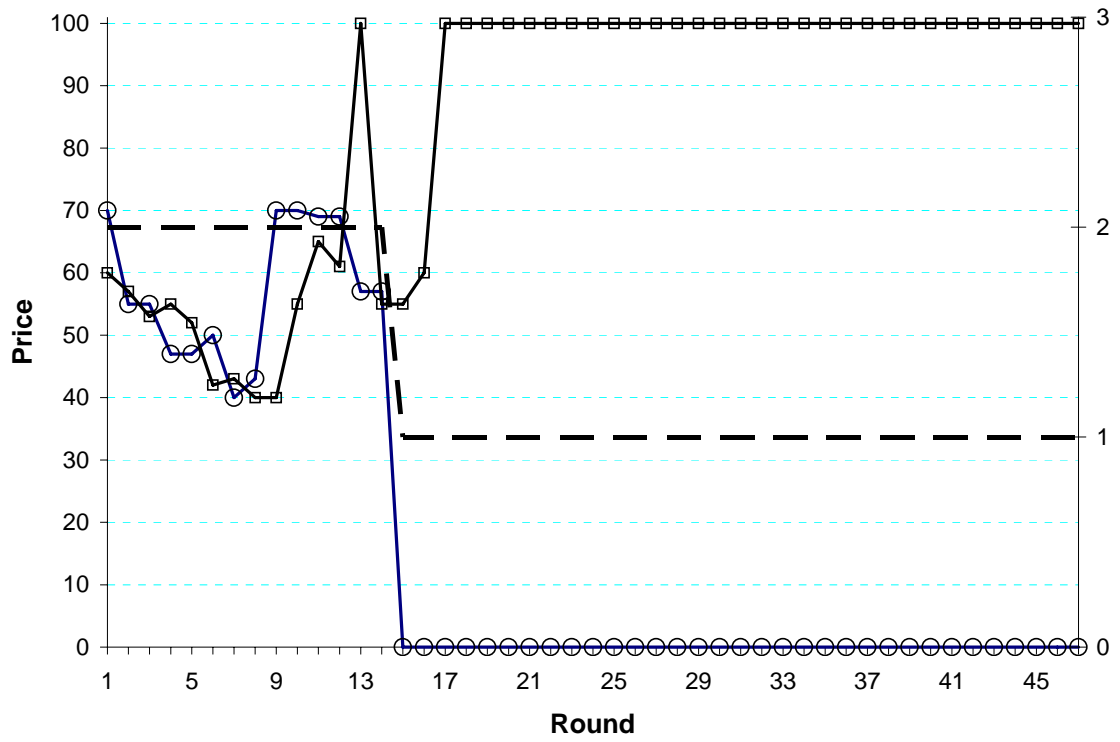
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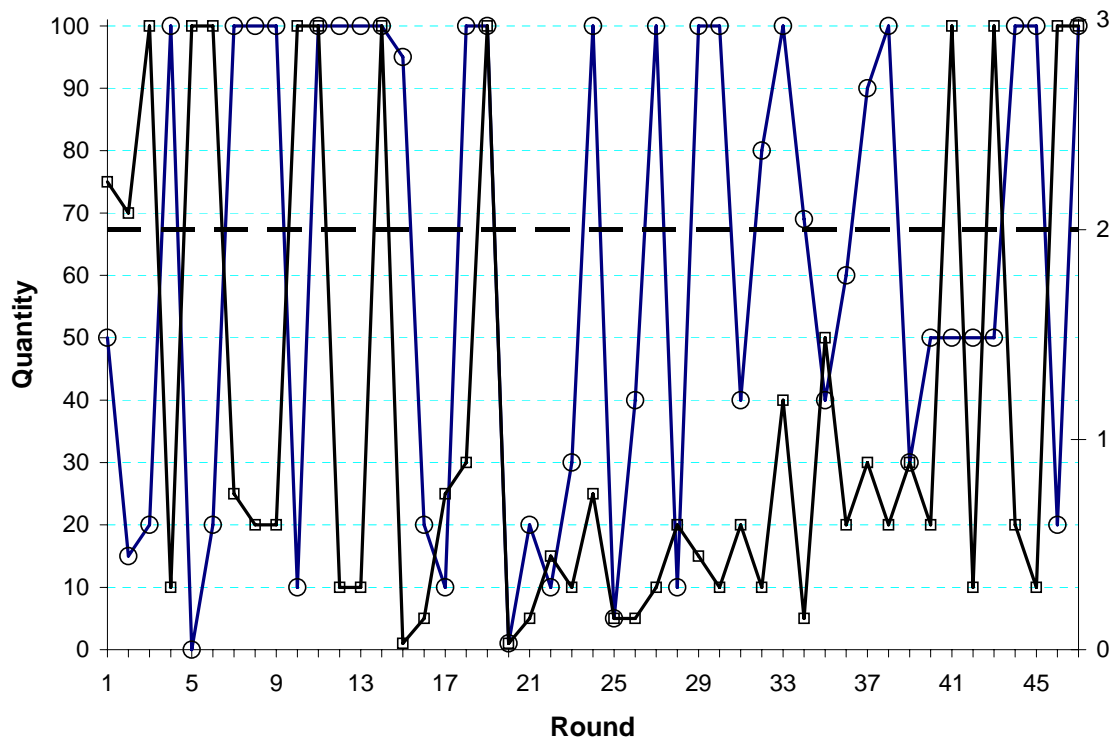
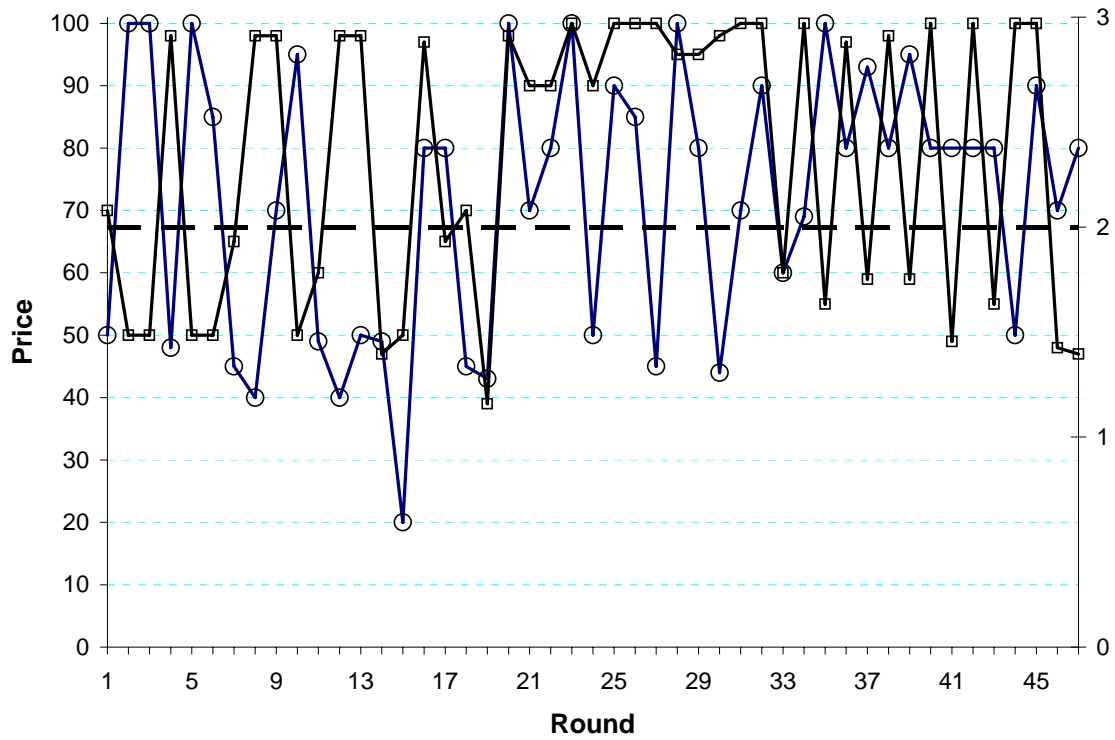
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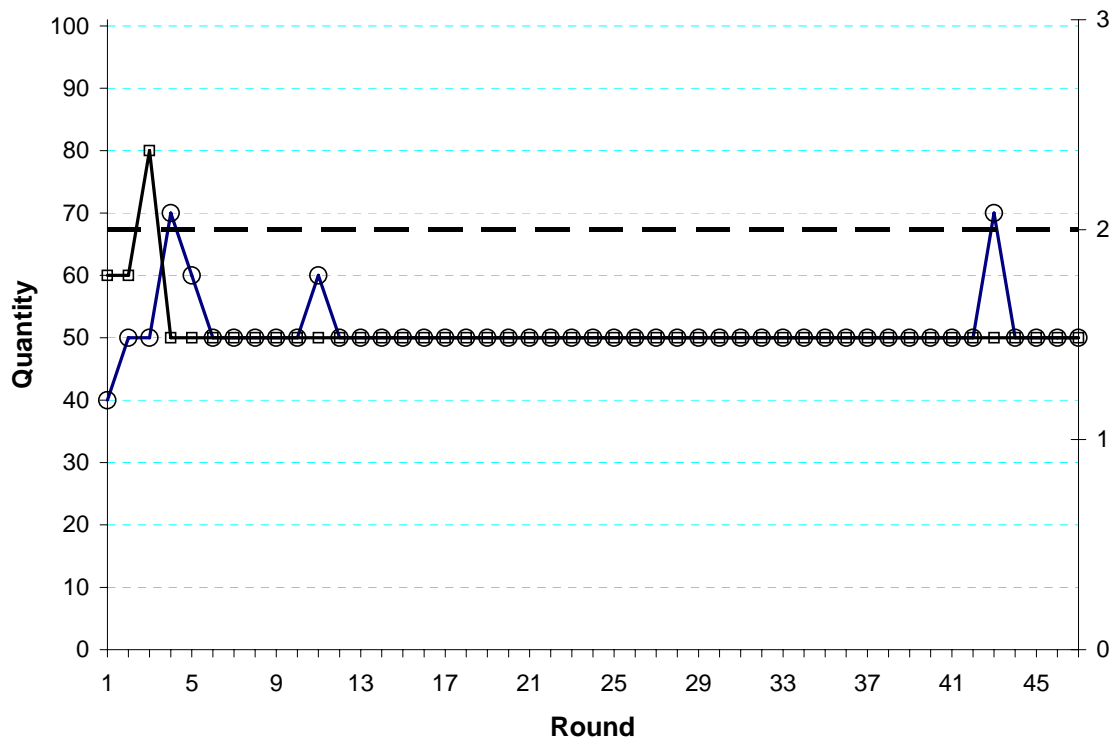
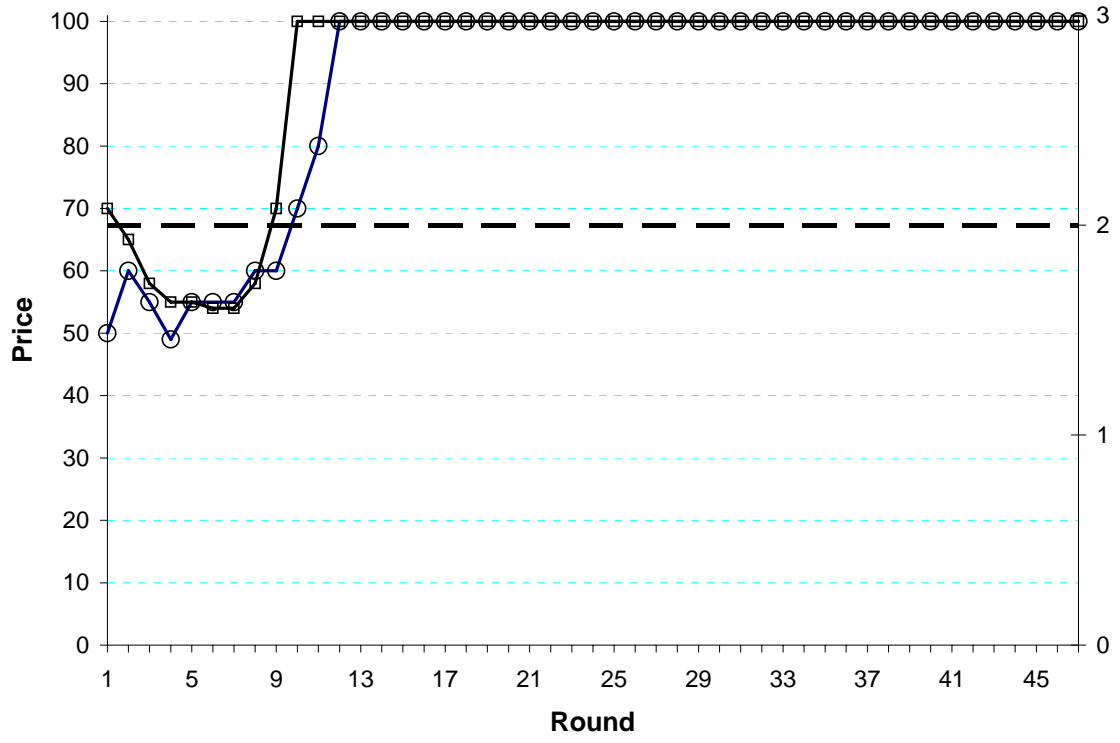
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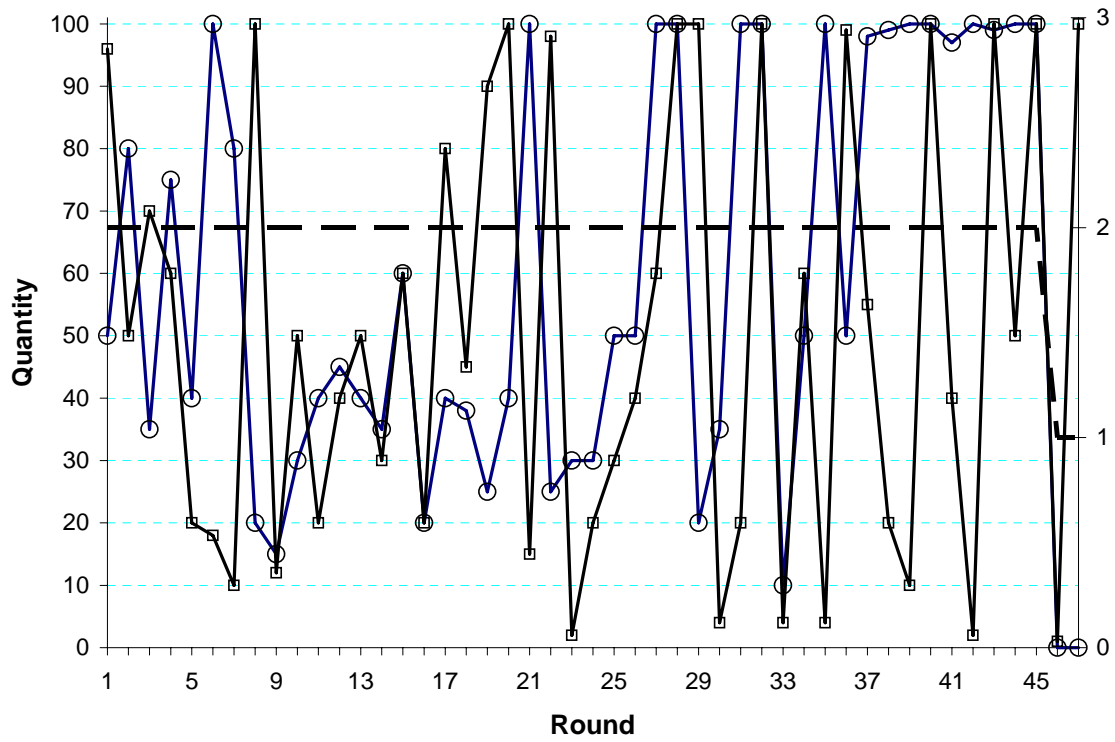
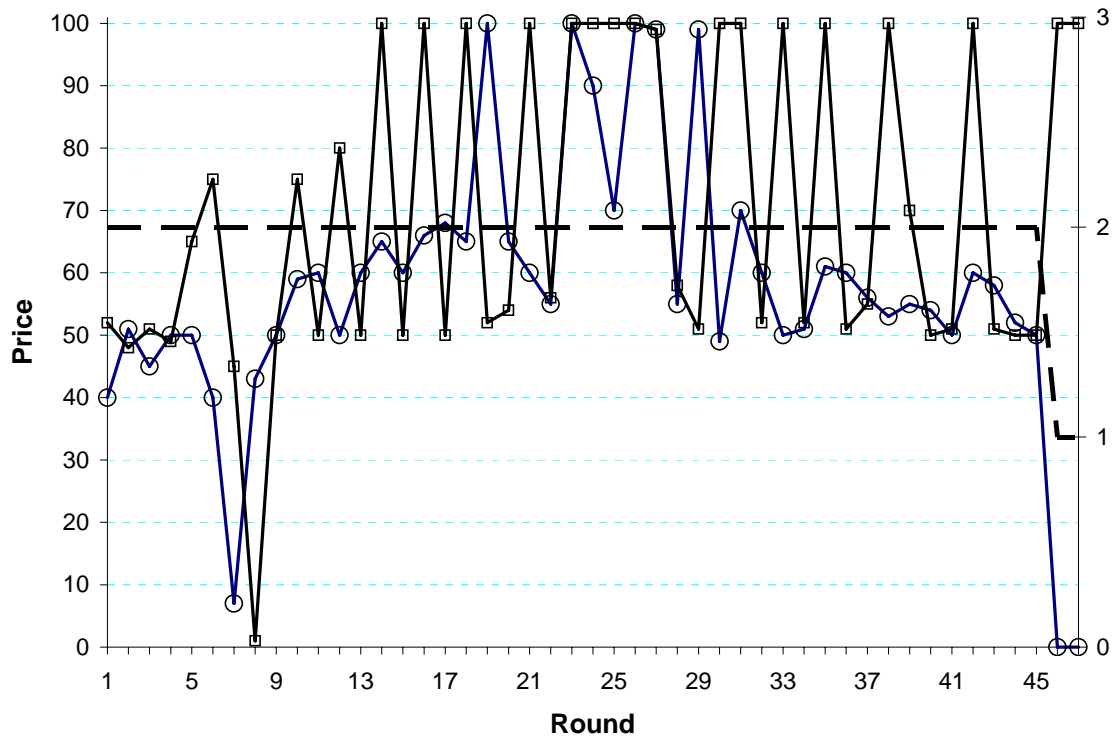
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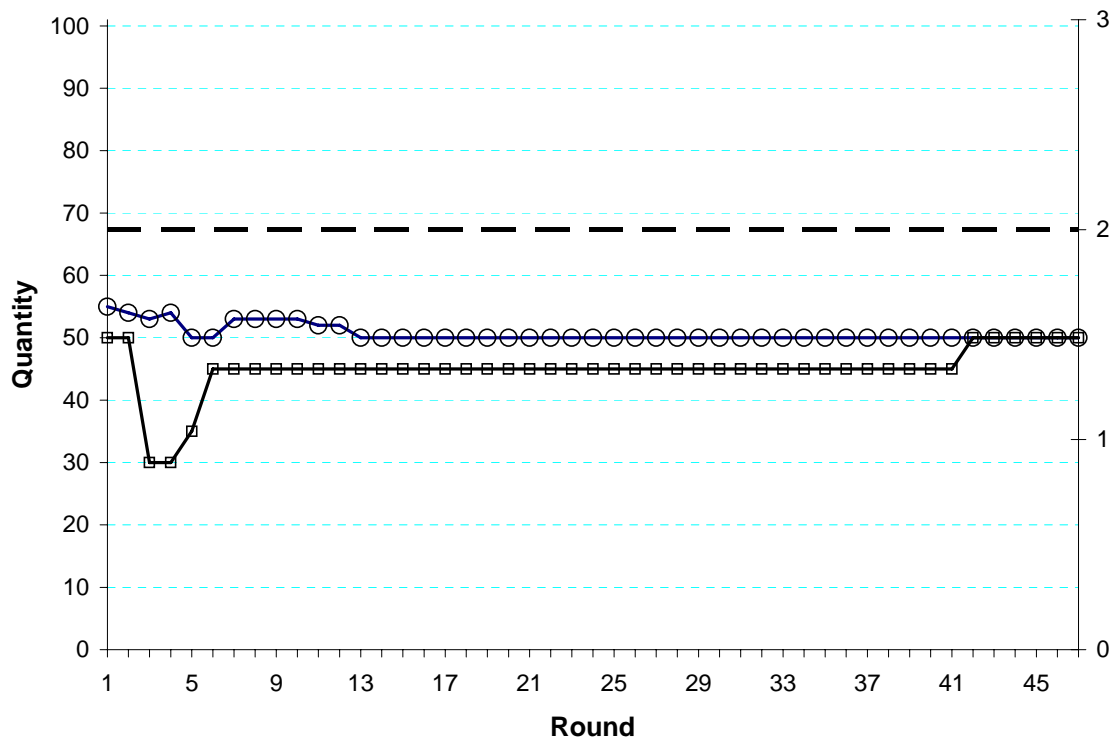
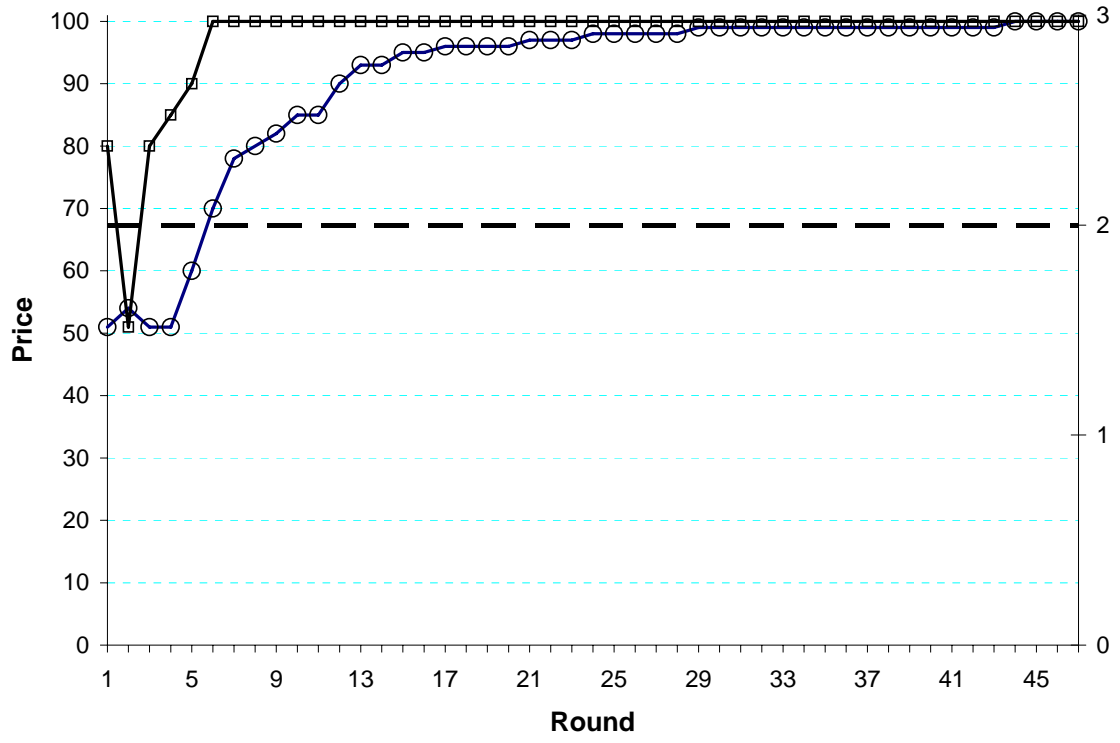
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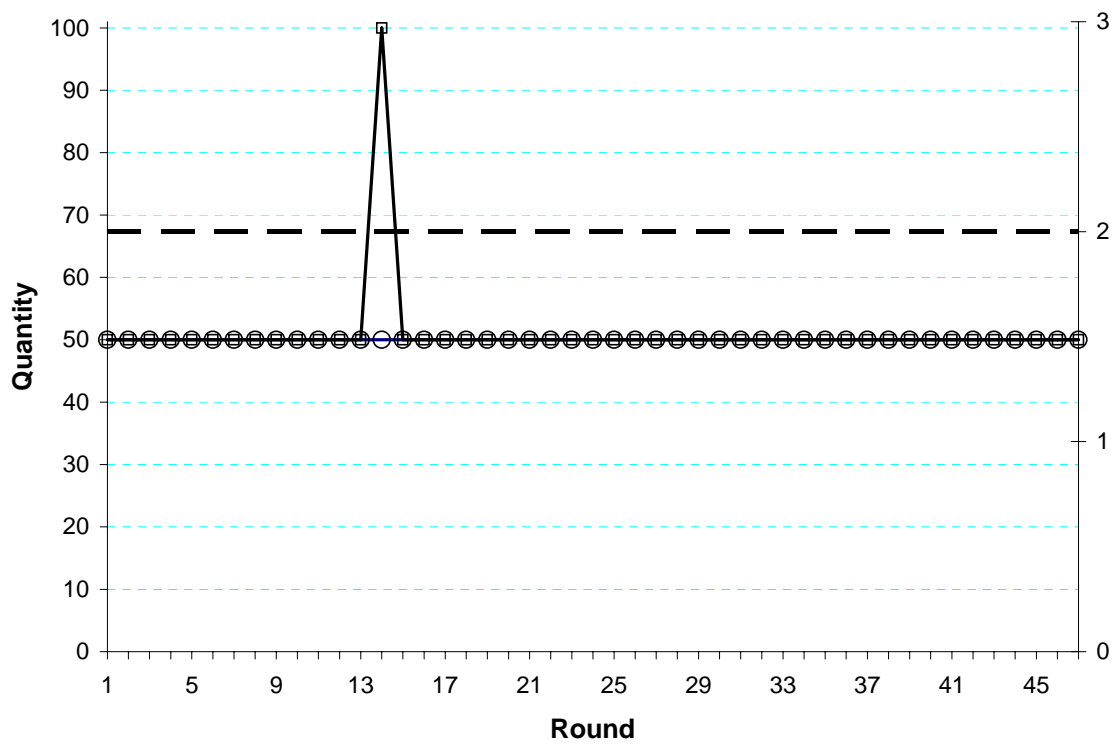
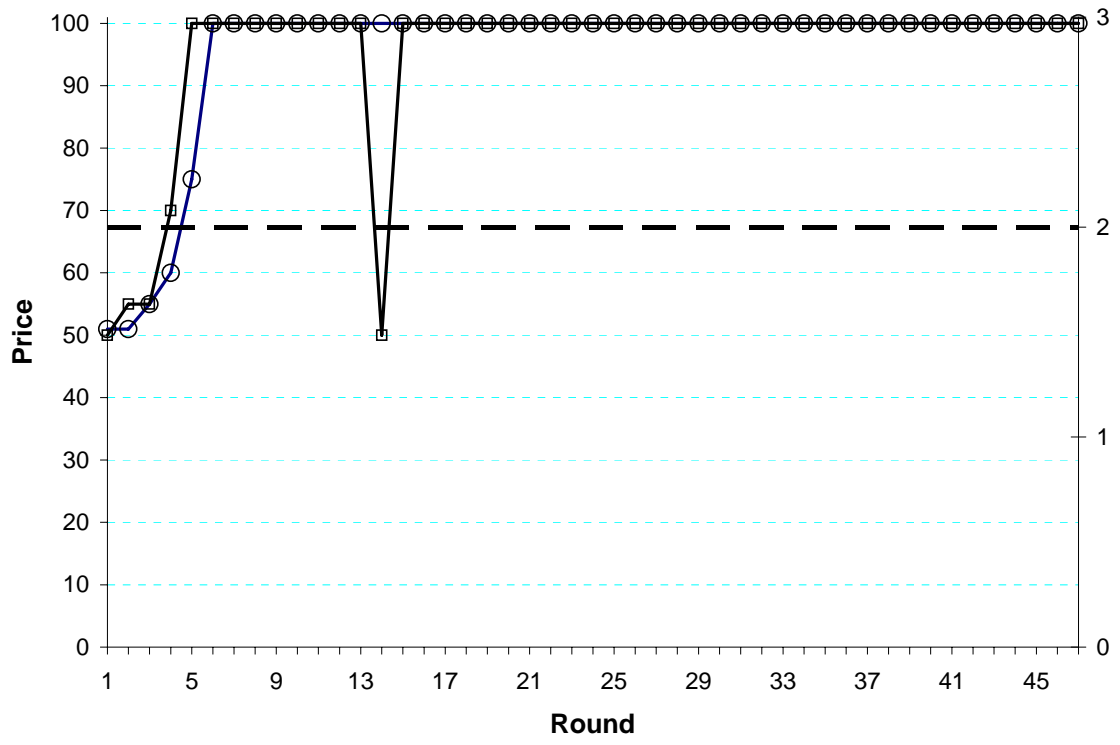
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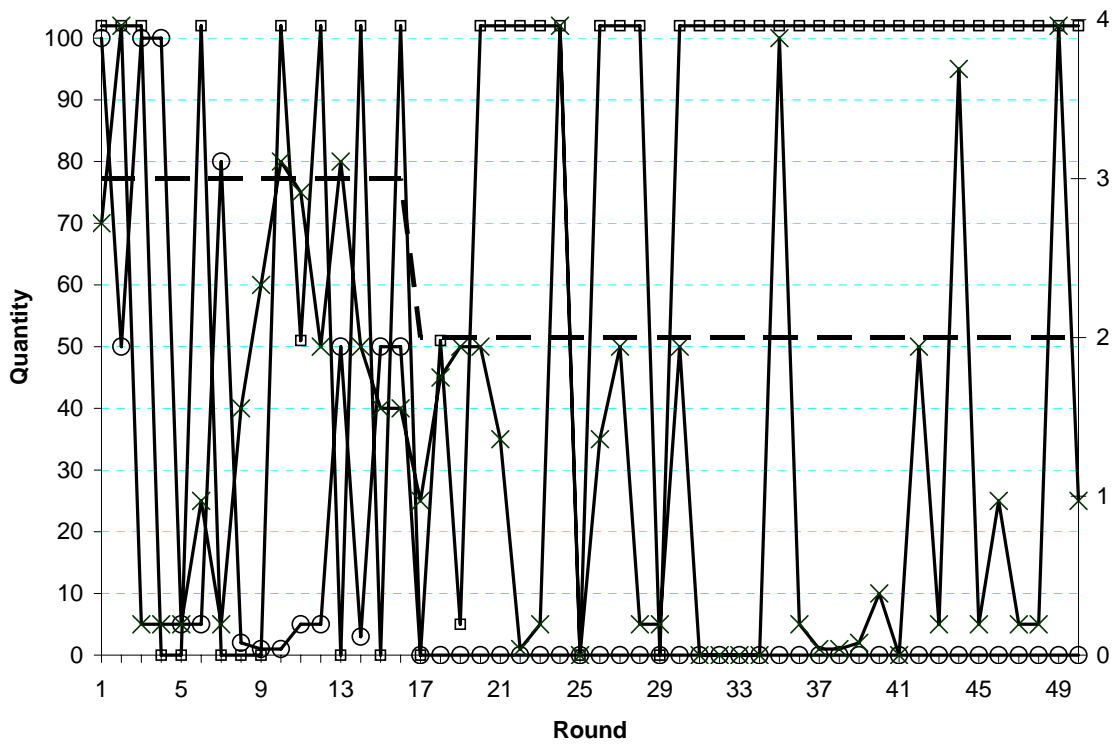
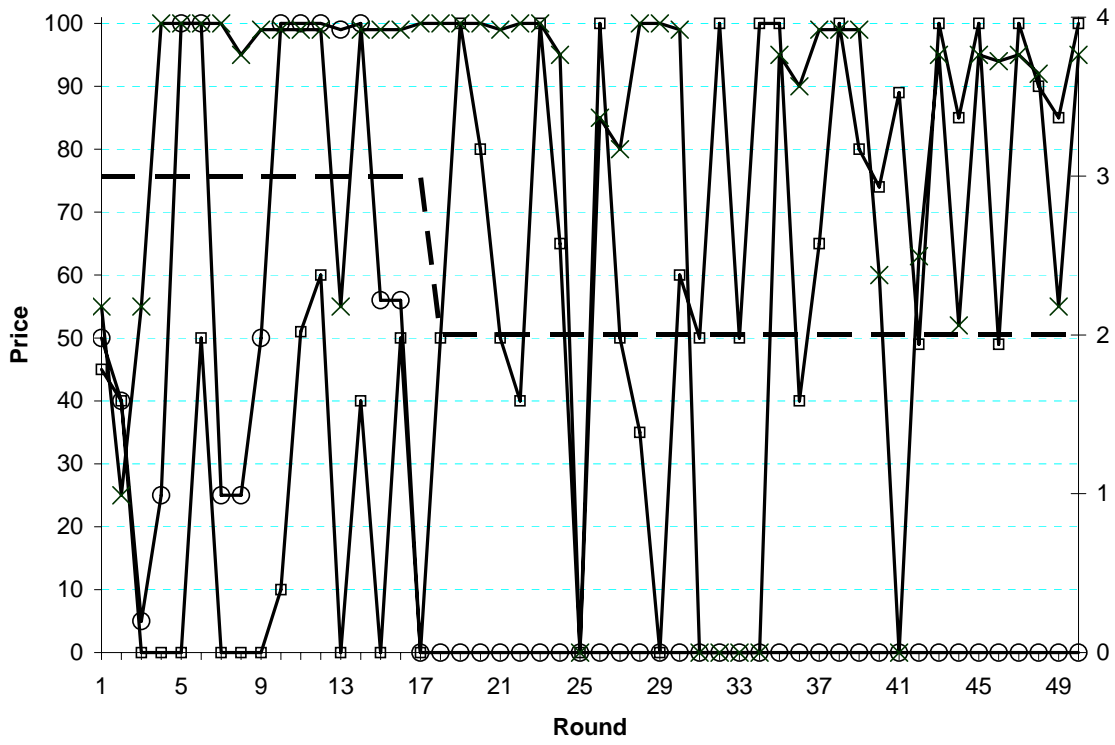
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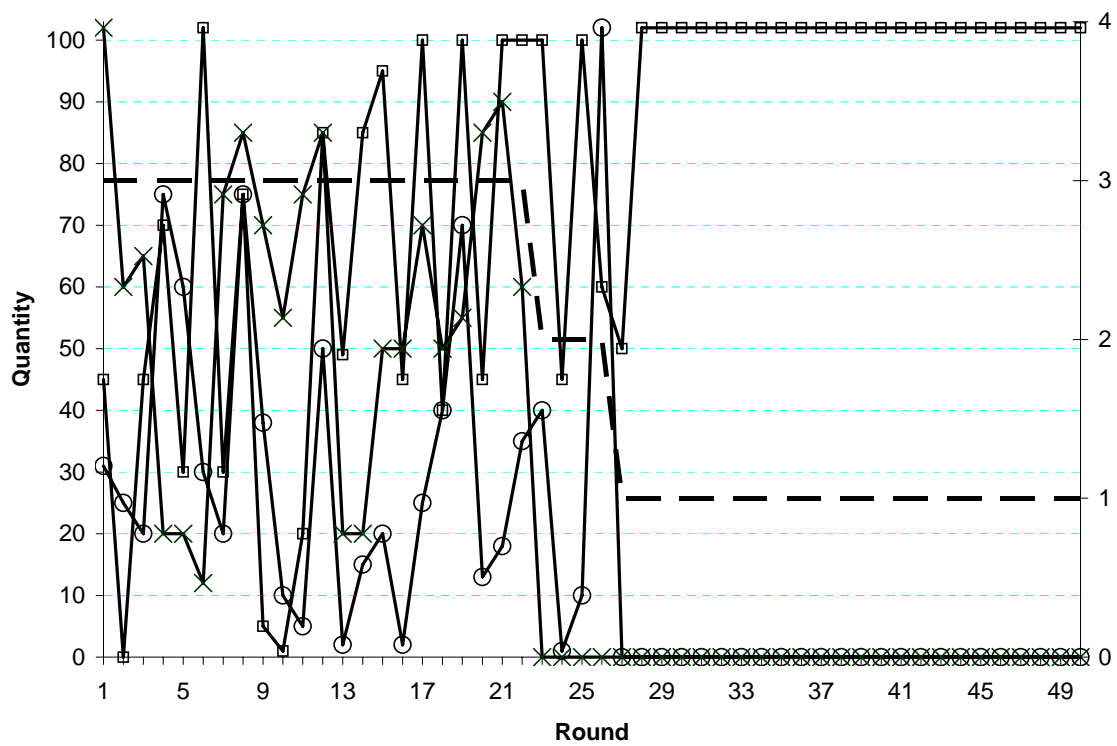
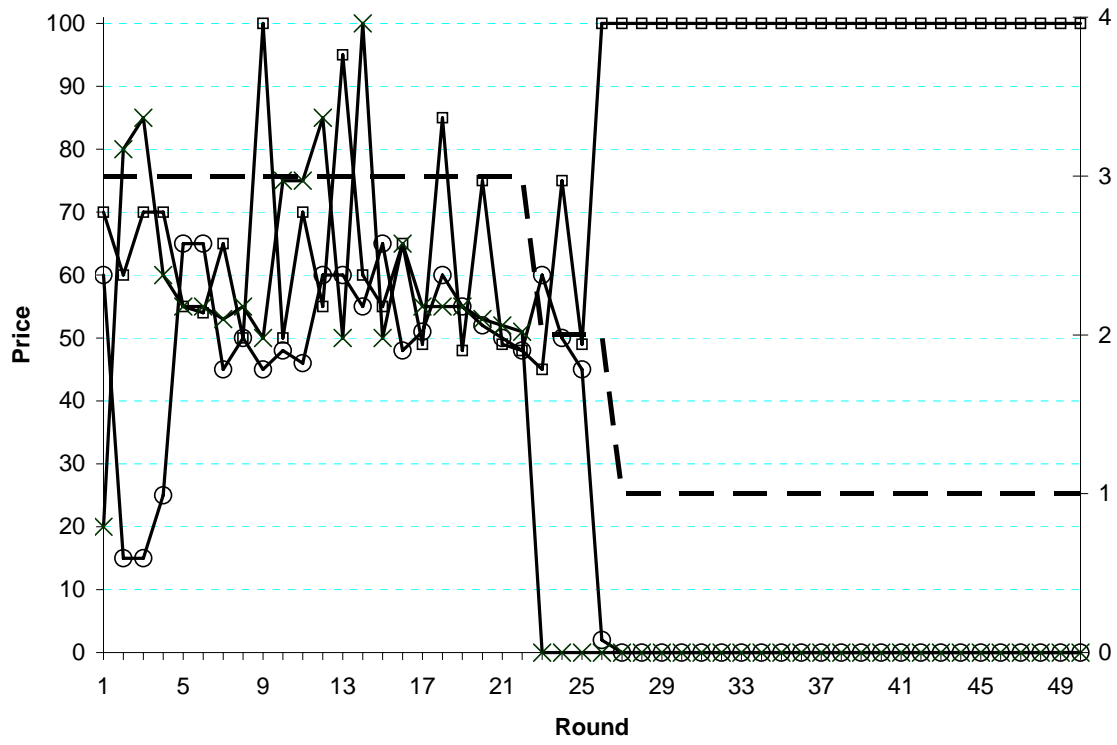
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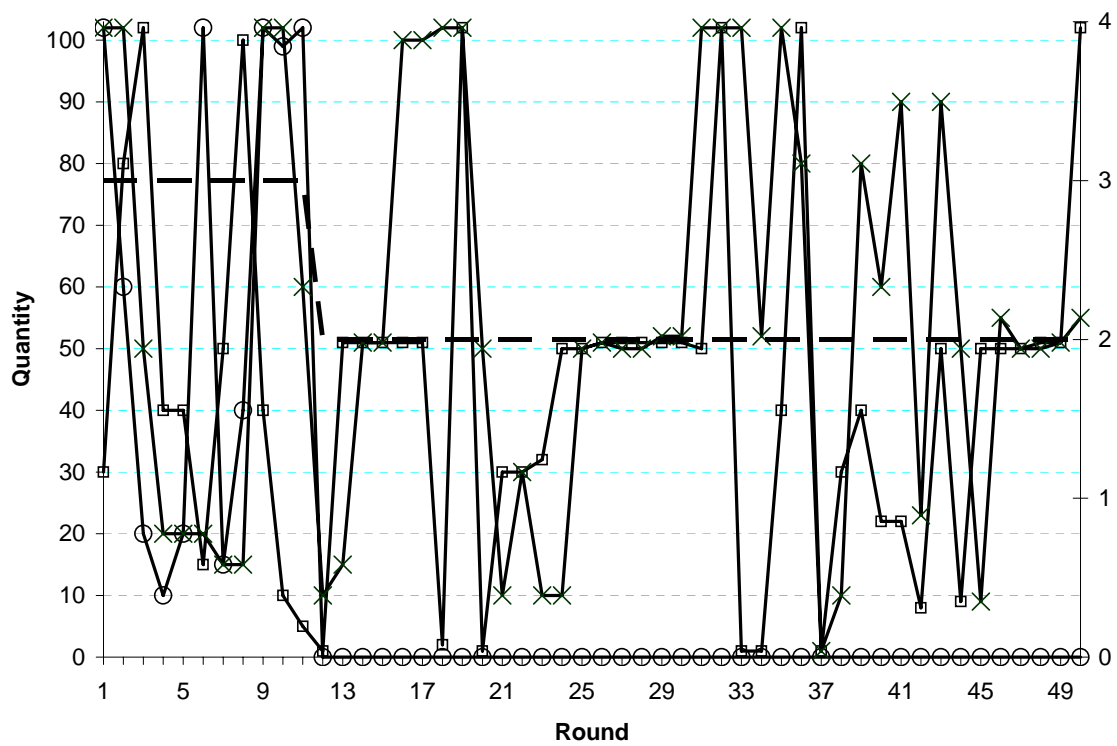
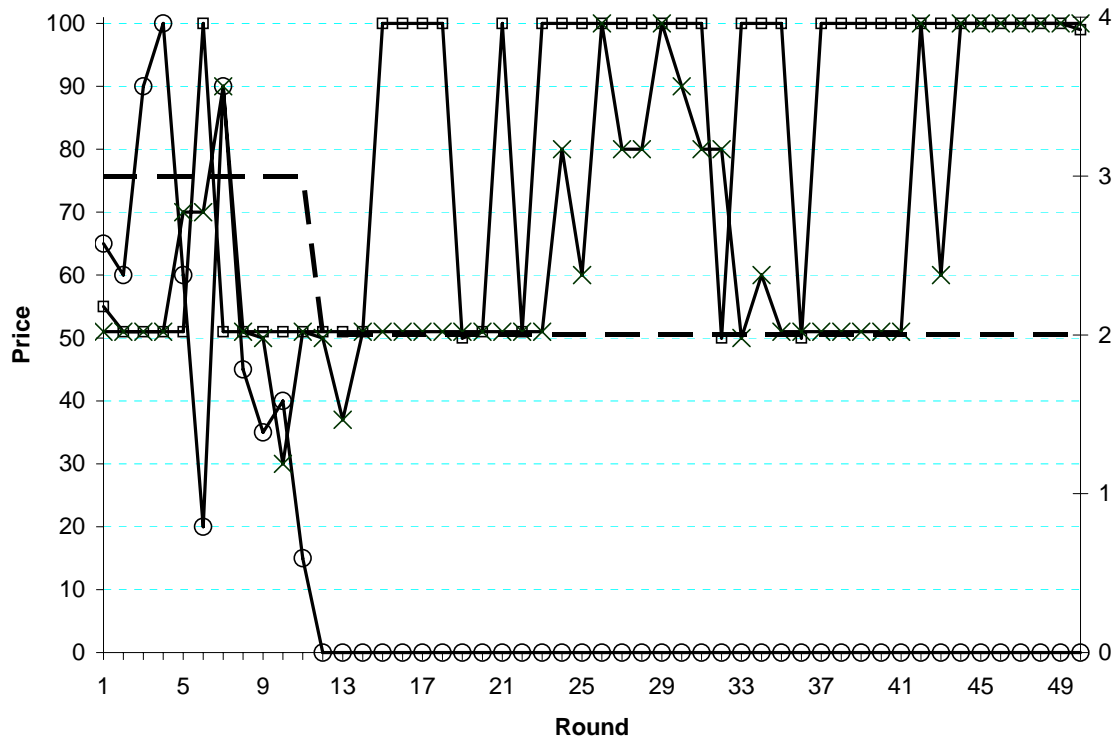
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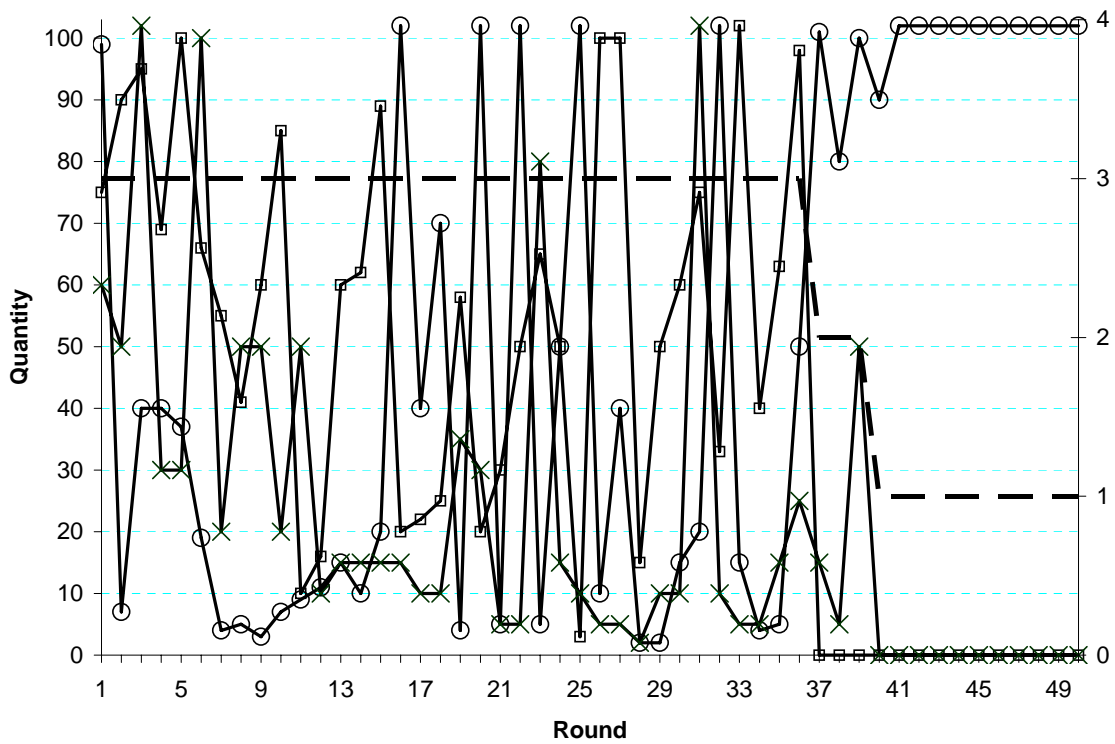
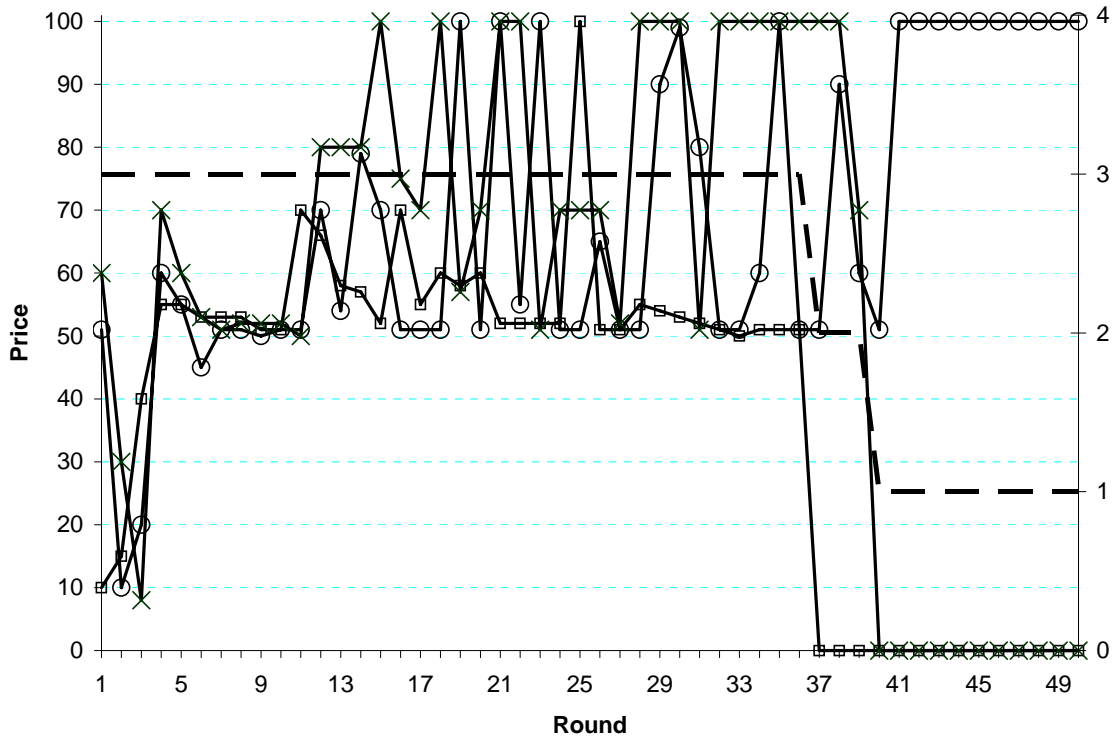
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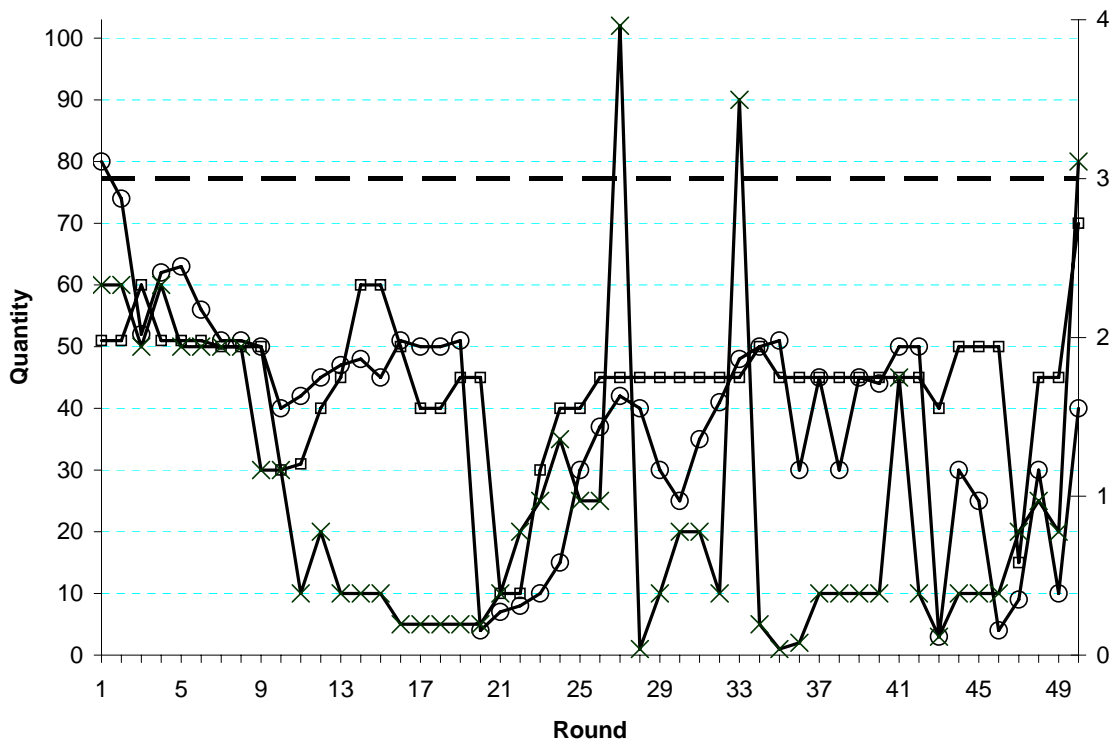
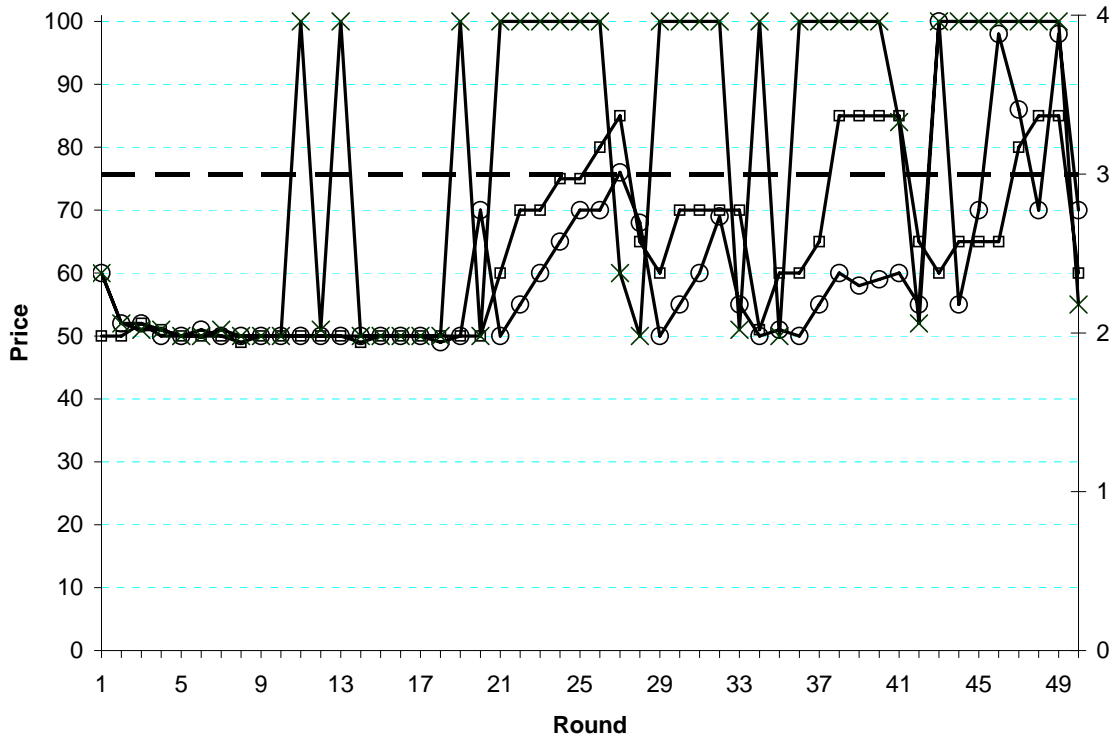
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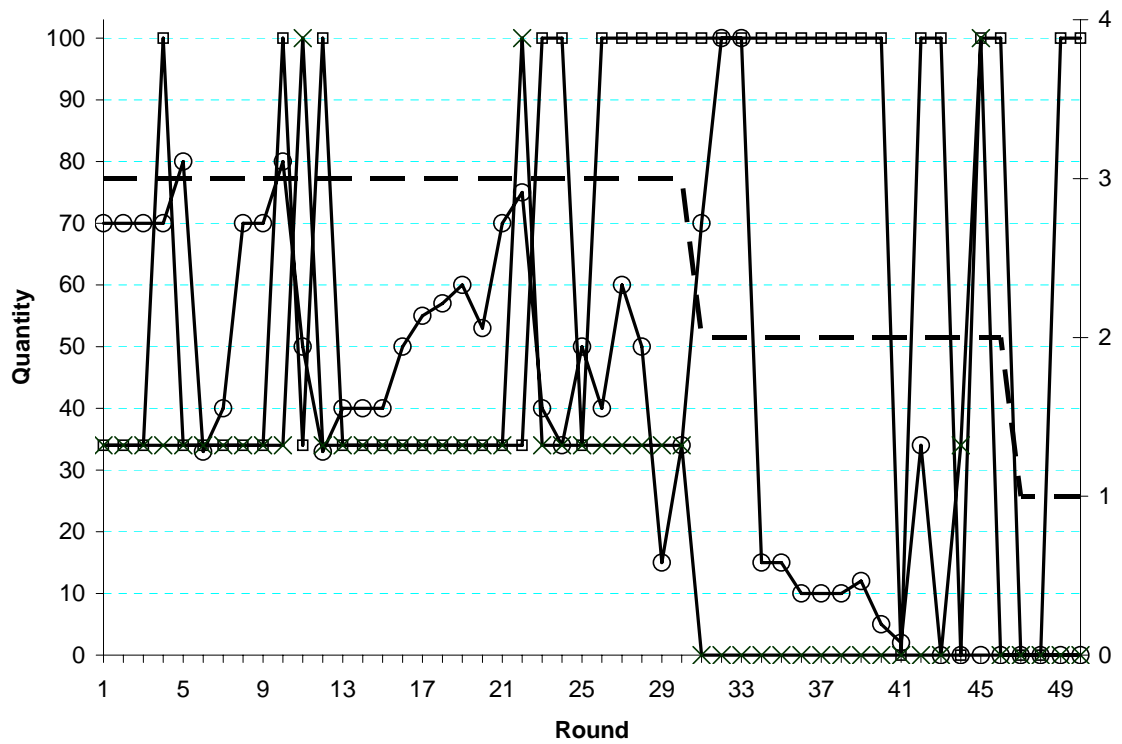
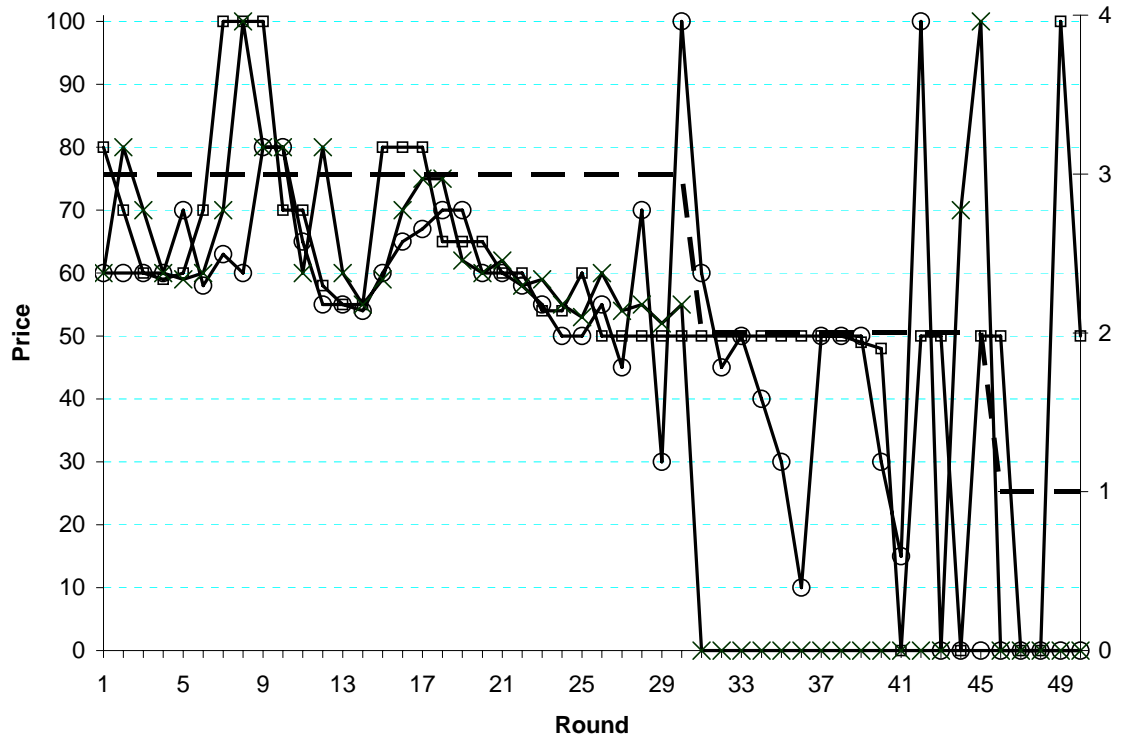
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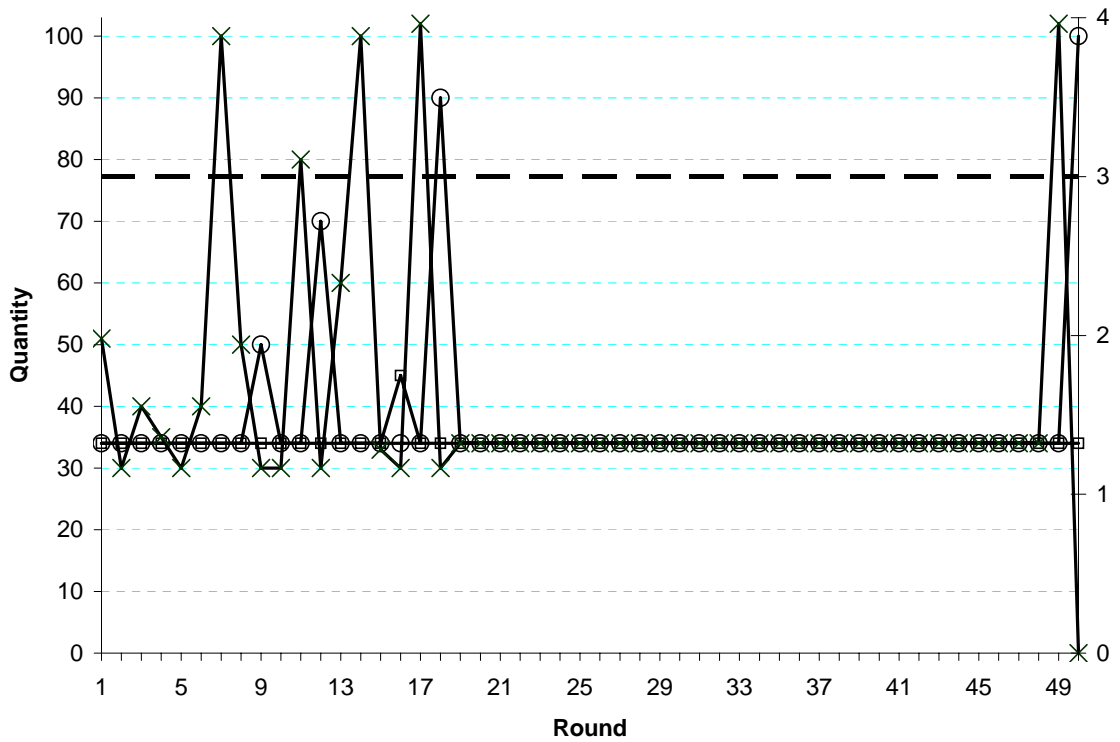
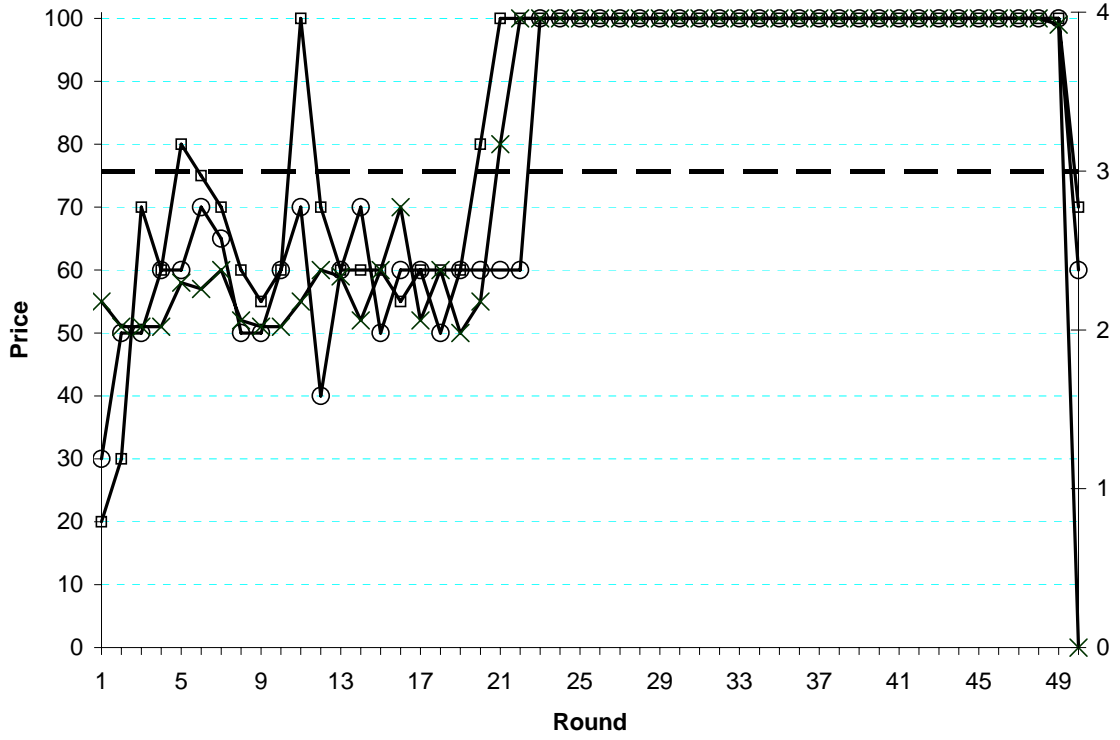
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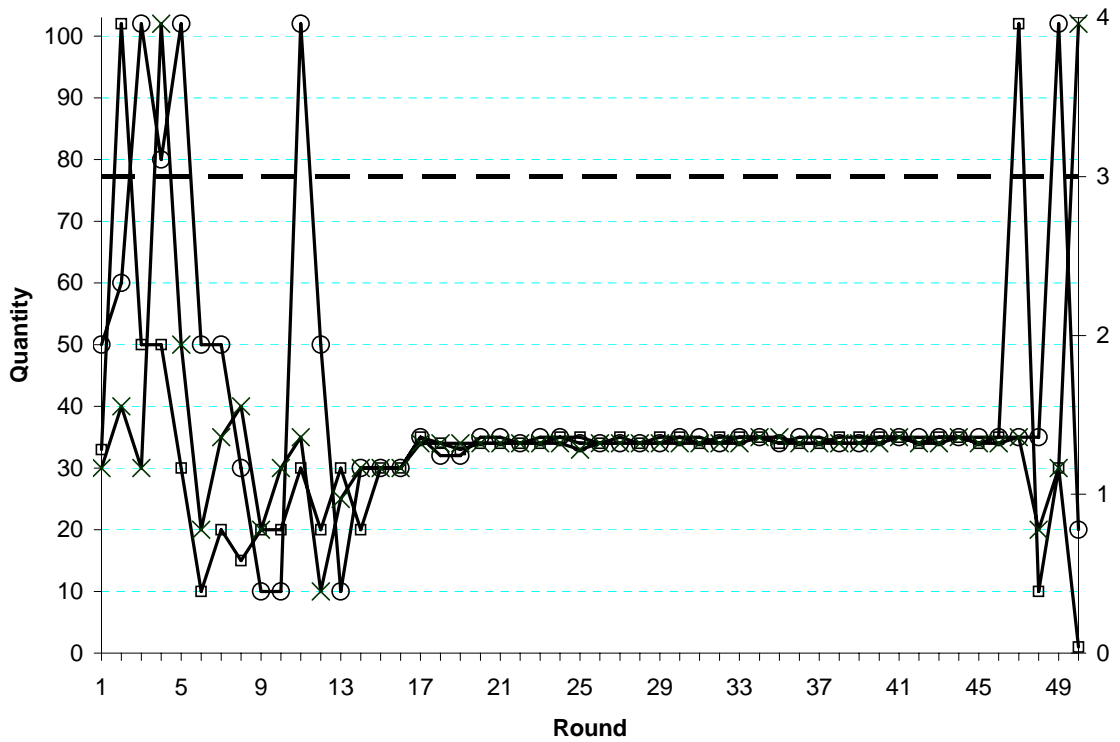
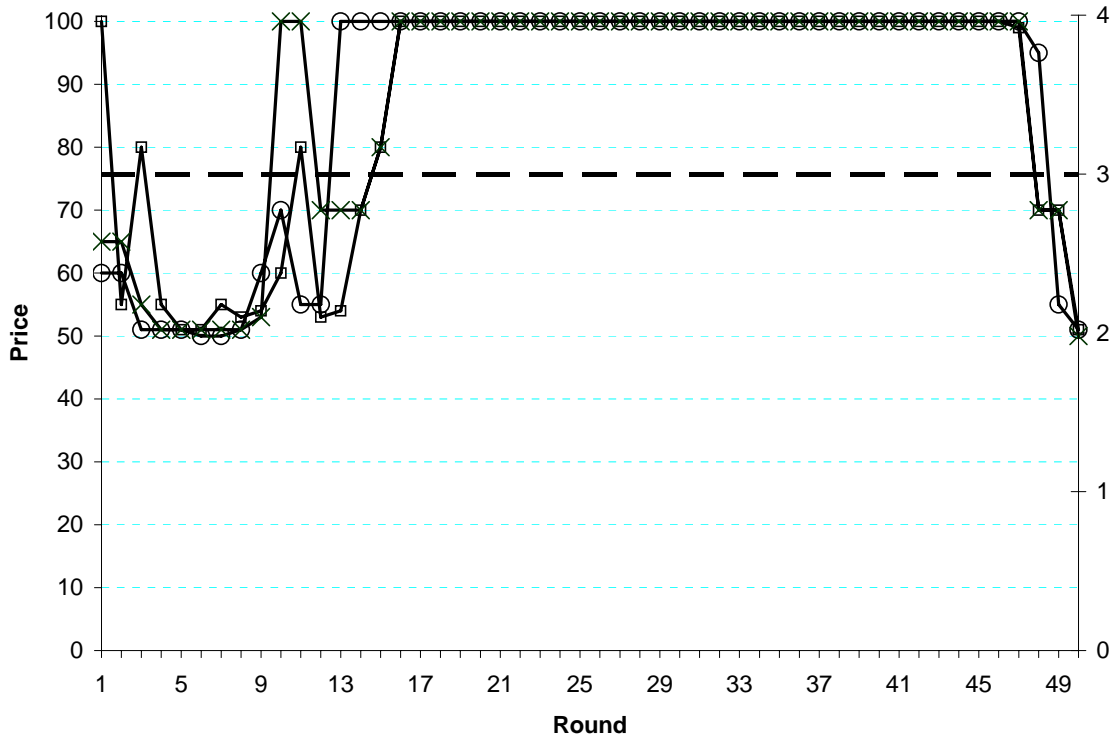
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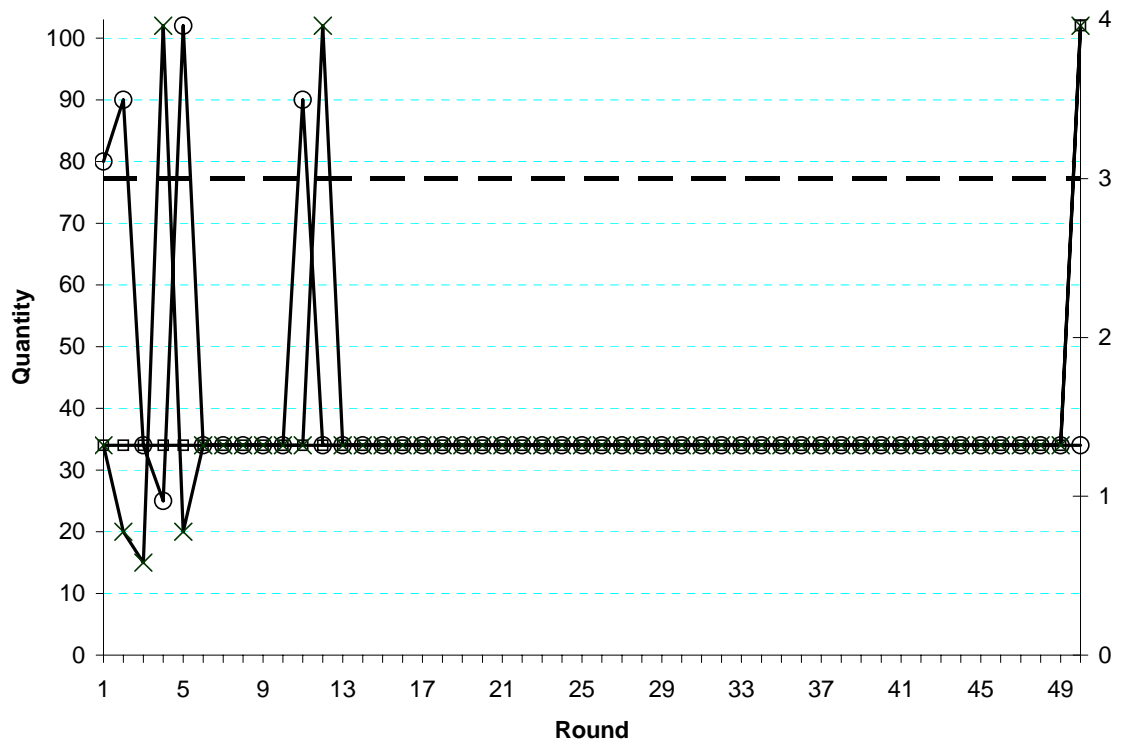
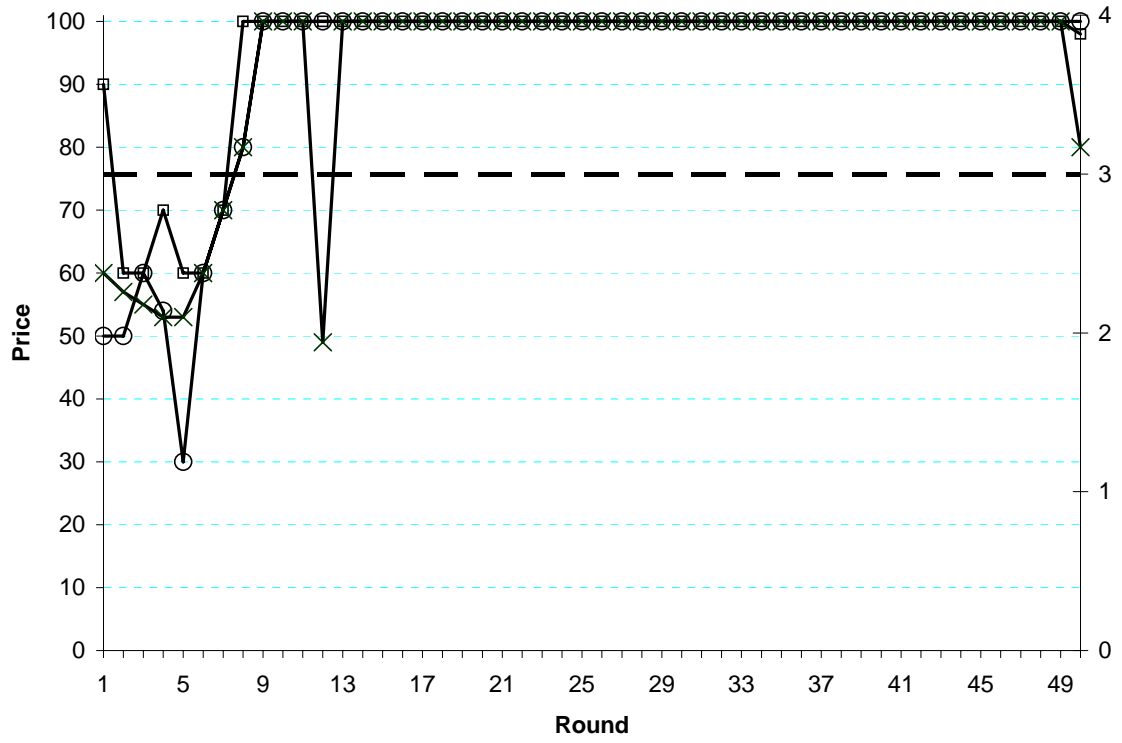
3F6



3F7



3F8



3F9