

WARM-UP COMPANY

A Business Simulation

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## Simulation Games and Experiential Exercises in Action, Volume 2, 1975

### ORGANIZING THE WARM-UP COMPANY

In order to operate the Warm-up Company, it is necessary in the beginning to make eight basic decisions for each month. Four of these decisions pertain to the low-priced model gas furnace which the company manufactures and sells, and four pertain to the high-priced model.

These decisions include (1) the price of the product for the current month, (2) the amount of money to be spent for promotional work during the current month, (3) the number of units to be produced during the current month, and (4) the number of units of raw material to be ordered and received during the current month.

In addition to these basic decisions which are made each month, it is necessary at the start to review standard costs of raw materials and dividend policy to recommend any changes which may be desirable. These decisions may change from time to time, but it is expected that they will not have to be re-examined in detail each month.

As the simulation progresses certain interim decisions will have to be made. These include (1) the amounts and timing of seasonal borrowing, (2) the amounts of plant and equipment to be purchased, (3) the amount of quality control to obtain, and (4) the types, amounts, and timing of long-term funds to be obtained.

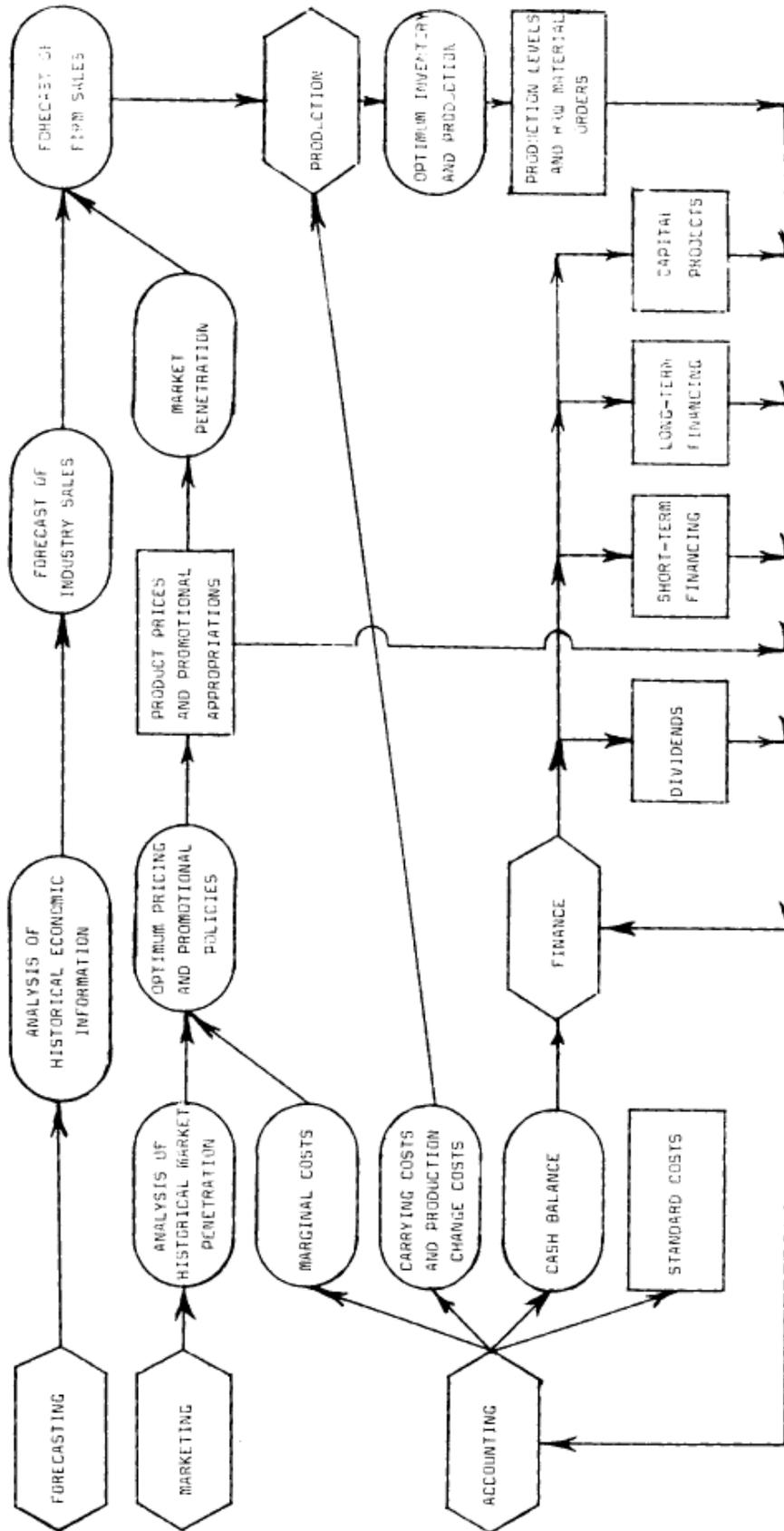
While you are free to organize your company in any way you believe will be successful, the approach to organization outlined below can be used as a general guide in organization. The outline is based on functional responsibility and emphasizes the importance and approach of analysis.

With 117 months history available, you have ample information to determine the impact of various policies on the operations of the company. It should be kept in mind, however, that the previous decisions do not in any way represent optimization.

Optimum decisions can be developed only if each member of the group provides certain information for which he is responsible. A logical information flow system for the Warm-up Company is shown in Diagram I. The diagram indicates not only what functional areas are involved in certain final decisions, but also the intermediate information which is generated and is necessary to make good decisions.

The approach described below outlines the duties and responsibilities of the various functional areas and their importance to the operation of the Warm-up Company. These descriptions tend to follow the information system presented in Diagram I.

DIAGRAM 1  
WARR-UP COMPANY INFORMATION FLOWS



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### President

The president is responsible for organizing the company in such a way that a smooth, decision-making process can be achieved. This requires not only organizing the people but also the information system. He must then make sure that each member is doing the job for which he is responsible. Furthermore, he acts as the final arbitrator in cases where disagreement on policy occur which cannot be resolved by the various functional areas. He acts as the coordinator of the group.

### Forecasting

The first formal step in preparing the decisions is to forecast month by month sales of both low-priced and high-priced products for at least the next three months and preferably over the coming season which involves twelve months. The forecast is prepared from historical sales data along with background economic information and the reports on the outlook prepared by the economics and marketing departments. These reports and the general economic information are presented in Appendix A.

It is recommended that one prepare an industry forecast first and then proceed to the firm forecast recognizing that sales of the firm will depend on price and advertising appropriation decisions. The forecast itself is not a final decision. However, all planning and decisions made in the Warm-up Company stem from the forecasts of sales. Therefore, it is desirable for the forecasts to be as accurate as possible.

### Accounting

The accounting function in the Warm-up Company breaks into two general categories. The first is record keeping in the sense of preparing income statements, position statements and particularly bank balance figures. Because of the structure of the decisions and the feed back of results, the accountant can complete these records with a minimum of effort. While financial statements may be provided by the computer, these should be viewed as an audit of what the accountant has already completed and not a substitute for the statements provided by the accountant. This traditional accounting function provides a means of measuring the success of the company and of what the company has to work with in the future.

The second area of accounting is the origination and preparation of reports, work papers, and schedules which can be utilized by the other departments to make better decisions. As a part of his responsibility in this area, the accountant must prepare cost and revenue data, particularly marginal cost data, which the marketing department must have in order to evaluate the impact of pricing and pro-

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motional policies. As a part of this, the accountant must make the decision on standard costs of raw materials. In addition, must provide the production department with cost information relating to carrying costs and production change costs so that the production department can establish optimum inventory, production, and ordering policies.

The systems and operations of the company have been simplified as much as possible to minimize the time required to keep the records up-to-date and to provide the most accurate data for the preparation of decision-making schedules.

### Marketing

The interest and responsibility of the marketing department is primarily in establishing product prices and promotional appropriations for the two products which the company sells. In addition, they assist the forecasting department in preparing the firm sales forecast based on the pricing and appropriations policies.

The price to be charged should take into account the general price established by competitors and the objectives established by the Warm-up Company management. The competitors' price for the coming month is available at the time the Company pricing decision is made. The prices charged will influence the market penetration of the Warm-up Company.

The promotional appropriation makes no distinction as to how the money is to be spent, i.e., television advertising and salesmen's salaries are considered equal in dollar effectiveness. While promotional appropriations for the industry are not available, it is known that a seasonal pattern exists which leads industry sales by one month. The firm promotional appropriation becomes effective in generating sales the month it is made, and has some carry-over for the next few months.

The marketing department should consider using multiple regression to establish market penetration and, as a result, optimum pricing and appropriations policies. For the multiple regression, one might consider the dependent variable as market penetration (per cent of industry sales), and in this way eliminate the seasonal problem. The independent variables might be considered as firm price relative to industry price or the difference between the two prices, promotional expenditures relative to estimated industry expenditures lagged one period (this should not be considered linear), and possibly a time trend of some sort. The regression may be carried out in a rigorous mathematical formulation or estimated graphically.

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### Production

After the firm sales forecast has been completed, it is possible to estimate the minimum finished goods inventory that is desired. This should include some estimate of safety stocks. This inventory level automatically determines the latest possible time of production of product but does not necessarily represent the most economical production plan. To improve the cost picture, the production department must weigh cost increases incurred by carrying greater inventories against the cost savings accruing by stabilizing production. The production level established by this procedure represents the production decision for the month.

Once the production decision has been made, the minimum raw material requirement is established. This amount plus a safety stock determines the minimum desired raw material inventory. This constraint along with the cost of carrying inventory, the cost of transportation and handling, and the quantity discounts offered by the supplier determine the optimum order decision.

### Finance

The financial manager is responsible for maintaining an adequate cash balance to carry out the decisions made by management. During the peak of the season this requires borrowing outside funds. The financial manager must determine the amounts to be borrowed and when the money is needed. He must be aware of the decisions and planning in other areas to see what impact the decisions may have on future cash flows. In addition, the financial manager must determine the long-run financial position of the Warm-up Company. This includes evaluating capital projects with recommendations of which ones should be approved and providing plans for the money required. The financial manager must also make recommendations on dividend policy.

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### **THE RESIDENTIAL GAS FURNACE INDUSTRY**

The residential gas furnace industry is made up of about 150 manufactures. The size of the firms in the industry varies from small companies which specialize in the manufacture of gas furnaces, to large producers which specialize in other products and produce gas furnaces only as a side-line operation. Among the large companies in the industry are General Electric, General Motors, American Standard, and Chrysler Corporation.

In spite of the presence of these industrial giants, the gas furnace business is not dominated by any one company or group of companies. However, because of the potential competition of these firms the industry remains quite stable with respect to both the price and market shares of the individual firms. While this kind of stability exists, the overall sales volume of the industry varies a great deal from one month to the next.

Part of the monthly variation in sales is due to the seasonal pattern of new home construction from which the gas-furnace business derives part of its demand. In addition to these fluctuations, changes occur over the business cycle due to the "construction cycle" and to the relative ease of postponing the purchase of a gas furnace. These variations occur around a secular trend which depends, among other things, on the number of households in existence, average family income in the economy, the total stock of furnaces in existence, the age distribution of furnaces in existence, the overall reserves and availability of gas from the fields, and the general desire and feasibility of households to replace coal and oil furnaces with gas. These factors influence replacement demand.

While residential gas furnaces range in size from small 50,000 BTU units to large 350,000 BTU units, the market for gas furnaces can be broken into two segments for convenience of analysis. One segment is described as the low-priced market and consists of installations made in inexpensive homes and housing projects. The demand for these units comes from customers of lower income and unstable employment who tend to be laid off during recessions. The second segment is the so-called high-priced market which consists of installations made in larger, more expensive homes and custom housing developments. The demand for these units comes from customers of higher and more stable income patterns who are somewhat more immune to the business cycle than customers in the low-priced market. The unit shipments of the industry by segment are shown on a monthly basis in Table I.

Just as the total shipments can be broken into two segments, a price series for the industry can be attached to each of the two segments. These series are presented in Table II. The figures shown in the table suggest that industry prices do not fluctuate to any great extent in the very short run, but have tended to move up over the long pull.

Table I  
Industry Shipments of Gas Furnaces  
(Units)  
Low-priced Market

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
Jan.	8,331	6,379	16,347	30,172	19,381	23,986	22,788	39,577	43,626	35,681
Feb.	7,021	6,125	20,177	29,836	19,331	22,635	22,488	36,848	38,658	31,042
Mar.	7,346	9,029	30,413	34,096	20,286	24,635	29,969	41,256	42,490	36,274
Apr.	9,528	9,071	32,720	23,790	21,344	28,417	33,021	44,850	42,932	35,221
May	10,413	13,153	42,635	20,652	25,583	28,426	37,851	48,349	47,775	34,559
June	13,312	19,347	49,421	21,178	28,488	37,606	43,352	57,052	51,832	38,348
July	11,395	15,452	45,825	17,283	30,286	35,875	40,141	49,112	53,866	39,907
Aug.	15,886	29,304	64,676	21,723	39,732	40,184	57,156	77,231	74,920	48,738
Sept.	18,195	39,406	61,805	24,328	41,756	44,385	62,326	78,050	69,309	
Oct.	19,233	36,172	55,341	30,606	45,923	43,253	59,817	71,541	57,841	
Nov.	13,266	31,579	41,479	28,444	35,069	31,721	49,140	59,280	44,799	
Dec.	9,900	21,320	38,595	20,441	25,853	24,648	38,583	39,577	33,656	

High-priced Market

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
Jan.	2,941	2,515	4,364	6,454	6,092	7,440	8,139	11,346	13,156	13,547
Feb.	2,292	2,440	4,757	6,357	6,031	7,180	8,017	10,892	12,367	12,666
Mar.	2,544	3,148	6,255	7,311	6,594	8,113	9,901	12,417	14,037	14,756
Apr.	2,926	3,227	6,599	6,470	6,995	8,843	10,545	13,162	14,458	14,904
May	3,204	4,034	7,853	6,471	8,009	9,329	11,810	14,347	15,975	15,649
June	3,957	5,305	9,267	7,280	9,290	11,708	13,877	17,073	18,372	18,231
July	3,581	4,668	8,665	6,443	9,244	11,064	12,975	15,451	18,096	17,866
Aug.	4,906	7,399	11,958	8,440	12,341	13,830	17,906	22,327	24,792	23,136
Sept.	5,519	8,990	12,436	9,411	13,390	15,351	19,697	23,778	25,536	
Oct.	5,629	8,630	11,752	10,399	13,926	15,121	19,205	22,827	23,621	
Nov.	4,137	7,033	8,932	8,735	10,653	11,416	15,172	18,147	18,188	
Dec.	3,144	5,134	7,548	6,551	8,043	8,847	11,758	13,157	13,823	

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Table II  
Industry Prices of Gas Furnaces  
(Dollars)

	Low-priced Market										High-priced Market									
	19X1	19X2	19X3	19X4	19X5	19X6	19X7	19X8	19X9	19Y0	19X1	19X2	19X3	19X4	19X5	19X6	19X7	19X8	19X9	19Y0
Jan.	230	250	240	270	270	270	270	270	275	290	350	380	365	410	410	410	410	405	420	440
Feb.	230	250	240	270	270	270	270	270	275	290	350	380	365	410	410	410	410	405	420	440
Mar.	230	250	240	270	270	270	270	270	275	290	350	380	365	410	410	410	410	405	420	440
Apr.	235	245	240	270	270	270	270	270	275	285	355	375	365	410	405	410	410	405	420	435
May	235	245	240	270	270	270	270	270	275	285	355	375	365	410	405	410	410	405	420	435
June	235	245	240	270	270	270	270	270	275	285	355	375	365	410	405	410	410	405	420	435
July	240	240	250	270	270	270	270	270	280	290	365	365	410	415	415	415	410	425	440	440
Aug.	240	240	250	270	270	270	270	270	280	290	365	365	410	415	415	415	410	425	440	440
Sept.	240	240	250	270	270	270	270	270	280	290	365	375	410	415	415	415	410	425	440	440
Oct.	250	240	260	270	270	270	270	275	285	285	380	365	410	415	415	415	410	435	435	435
Nov.	250	240	260	270	270	270	270	275	285	285	380	365	410	415	415	415	410	435	435	435
Dec.	250	240	260	270	270	270	270	275	285	285	380	365	410	415	415	415	410	435	435	435

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### THE WARM-UP COMPANY

The Warm-up Company manufactures gas furnaces for residential installation. The Company was incorporated under the laws of the State of Delaware on December 31, 19X0. It was created through the consolidation of The Standard Furnace Company and The American Furnace Company.

The Standard Furnace Company had produced a line of inexpensive gas furnaces. In contrast, The American Furnace Company manufactured a more expensive line of gas furnaces. Because of the complementary nature of the products of the two firms, it was felt that the consolidation into The Warm-up Company would strengthen the two products by rounding out the price lines offered. In addition, some cost saving was anticipated in the consolidation through the use of common distribution facilities and decentralized production.

Products. The Company produces two (2) models of gas furnaces. One model, the so-called low-priced model, has a low BTU output and is sold in the low-priced market of the industry. The second model, the so-called high-priced model, competes in the high-priced market of the industry. Both models have received favorable ratings in Consumer Reports and are considered highly dependable products by the general public. As a result, the Company has been able to maintain its competitive position in the industry.

Raw Materials. The Company obtains its raw materials from one supplier and orders on the first of the month. Delivery takes about ten days, so that orders placed the first of the month are received about the tenth. However, the raw materials received are not available for production until the following month. For example, raw materials ordered the first of November are received on the tenth of November but are not available for November production. They are available for December production.

Raw materials Prices and Terms of Trade. The price of raw materials used in the manufacture of gas furnaces has increased on January 1 of each year. Table III shows the prices in effect during the years 19X1 through 19Y0. These prices are incremental prices and indicate the quantity discount that the supplier offers. The prices are quoted f.o.b. the supplier. Freight and handling costs amount to \$1,000 per order.

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**Table III**  
**Raw Material Price Per Unit**  
**(Dollars)**

<u>Quantity</u>	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
<b>Low-priced</b>										
0-500	28	29	31	33	33	35	36	38	41	44
501-1000	27	28	30	32	32	34	35	37	40	43
1001-1500	26	27	29	31	31	33	34	36	39	42
1501-2000	25	26	28	30	30	32	33	35	38	41
2001-2500	24	25	27	29	29	31	32	34	37	40
over 2500	23	24	26	28	28	30	31	33	36	39
<b>High-priced</b>										
0-200	47	48	51	55	56	59	59	63	69	74
201-400	46	47	50	54	55	58	58	62	68	73
401-600	45	46	49	53	54	57	57	61	67	72
601-800	44	45	48	52	53	56	56	60	66	71
801-1000	43	44	47	51	52	55	55	59	65	70
over 1000	42	43	46	50	51	54	54	58	64	69

A sample calculation of determining the dollar amount of a raw material order is given below, using September 19Y0 as the example.

	<u>Units</u>	<u>Cost per Unit</u>	<u>Cost in Dollars</u>
<b>Low-priced</b>			
	500	44	22,000
	500	43	21,500
	500	42	21,000
	500	41	20,500
	500	40	20,000
	7100	39	276,900
<b>Total . . .</b>	9600		381,900
<b>High-priced</b>			
	200	74	14,800
	200	73	14,600
	200	72	14,400
	200	71	14,200
	200	70	14,000
	3000	69	207,000
<b>Total . . .</b>	4000		279,000
<b>Freight and handling</b>			1,000
<b>TOTAL.....</b>			661,900

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To make the accounting easier, standard prices of raw materials have been established. They were set at \$26 for low-priced raw materials and \$45 for high-priced raw materials when the Company started. No changes in standards were made until January 19X8 when new personnel took over the accounting and finance functions. Among the changes they made was the change in the standard price of low-priced raw materials to \$39 per unit and \$67 for high-priced units. These standard prices are still in effect as shown in Table IV.

Table IV  
Standard Prices of Raw Materials  
(Dollars)

	<u>19X1 - 19X7</u>	<u>19X8 - 19Y0</u>
Low-priced	26	39
High-priced	45	67

As shown in the income statements of Table XII the standard prices originally established resulted in increases of price variances through 19X7. The change instituted in 19X8 caused the price variances to be negative in 19X8 and 19X9 but the first nine months of 19Y0 suggest that the variances will be positive in 19Y0. The standard prices may be changed at any time.

An example calculation showing how the price variances are derived is shown below using the orders placed in September, 19Y0.

### Low-priced raw material price variance -

Standard:	9,600 units at \$39 per unit	\$ 374,400
Actual:		381,900
Variance:		7,500

### High-priced raw material price variance -

Standard:	4,000 units at \$67 per unit	\$ 268,000
Actual:		279,000
Variance:		11,000

These variances appear in the monthly income statement for September, 19Y0 as presented in Table XIII. As indicated by the data shown in Table V no policy of raw material ordering has been established.

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Table V  
Warm-up Company Orders of Raw Materials

		(Units)											
		Low-priced Model											
		<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>		
Jan.		2,400	-0-	2,600	-0-	-0-	3,600	-0-	8,000	3,200	3,600		
Feb.		-0-	1,200	-0-	2,000	1,500	-0-	7,000	-0-	8,000	4,000		
Mar.		2,400	-0-	9,000	-0-	-0-	4,000	-0-	6,000	-0-	4,000		
Apr.		-0-	2,200	-0-	4,000	6,000	-0-	-0-	6,000	8,000	4,000		
May		3,000	-0-	5,000	-0-	-0-	4,400	6,400	6,400	-0-	4,800		
June		-0-	3,600	2,500	3,000	5,700	-0-	-0-	4,200	6,000	2,400		
July		-0-	-0-	5,000	-0-	-0-	6,000	9,600	8,400	-0-	4,800		
Aug.		-0-	4,100	5,000	4,000	7,700	-0-	-0-	8,400	7,000	4,800		
Sept.		700	-0-	3,500	-0-	-0-	5,400	4,200	7,400	-0-	9,600		
Oct.		700	2,800	7,000	4,000	7,200	-0-	3,200	5,000	6,000	6,000		
Nov.		700	-0-	-0-	-0-	-0-	-0-	6,400	9,600	-0-	-0-		
Dec.		1,400	2,800	7,000	4,000	-0-	3,200	-0-	-0-	-0-	-0-		

		High-priced Model											
		<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>		
Jan.		800	-0-	700	-0-	-0-	1,400	-0-	1,800	800	2,000		
Feb.		-0-	-0-	-0-	1,000	750	-0-	3,200	-0-	2,000	2,000		
Mar.		800	-0-	1,400	-0-	-0-	1,900	-0-	1,000	-0-	2,000		
Apr.		-0-	500	-0-	1,000	1,200	-0-	-0-	1,000	3,600	2,000		
May		800	-0-	800	-0-	-0-	2,100	2,100	1,000	-0-	2,000		
June		-0-	800	400	700	1,900	-0-	-0-	1,000	2,700	1,000		
July		-0-	-0-	900	-0-	-0-	2,800	3,200	2,000	-0-	2,000		
Aug.		-0-	1,000	900	1,600	2,100	-0-	-0-	2,000	3,400	2,000		
Sept.		300	-0-	700	-0-	-0-	2,600	1,400	1,500	-0-	4,000		
Oct.		300	600	1,400	1,200	2,100	-0-	1,200	1,200	3,600	3,600		
Nov.		300	-0-	-0-	-0-	-0-	-0-	2,400	2,400	-0-	-0-		
Dec.		400	600	1,400	1,200	-0-	1,600	-0-	-0-	-0-	-0-		

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The terms of trade extended by our supplier are 2/10, n/30. This means that raw materials ordered the first of October and received the tenth of October must be paid for on the twentieth of October in order to obtain the cash discount. Furthermore, the whole amount of the order must be paid to get the discount; no partial payment is allowed. If payment cannot be made on the twentieth, then the gross amount must be paid on the tenth of the following month.

For the month of September, 19Y0 the total raw material order was \$661,900 as calculated above. Since the Company did not have sufficient cash to cover the payment on the twentieth of September the discount was lapsed. The accounts payable shown on the balance sheet for September, 19Y0 in Table XI reflect this. Since the prices of raw materials quoted above are net of the cash discount the accounts payable is calculated as follows:

$$\$661,900 / .98 = \$675,408$$

which establishes the lapsed discount at \$13,508 as shown in Table XIII.

Labor and Overhead. Each low-priced unit requires fifty (50) hours of labor in manufacture, while each high-priced unit requires one hundred (100) hours of labor. The hourly labor rate has changed each year on January 1 according to the following schedule.

<u>Year</u>	<u>Hourly Rate</u>
19X1	\$ 1.40
19X2	1.46
19X3	1.52
19X4	1.64
19X5	1.74
19X6	1.86
19X7	1.88
19X8	1.96
19X9	2.06
19Y0	2.16

Overhead costs per unit amount to one-half (1/2) the total labor cost per unit. The labor and overhead costs incurred during the month of production are paid half on the 15th of the month and the other half on the last day of the month. As a result of these prices and its present level of productivity, the Company has the following per unit standard cost of goods sold.

	<u>Low-priced</u>	<u>High-priced</u>
Raw Material	\$ 39.00	\$ 67.00
Labor (50 hr. at 2.16)	108.00	(100 hr. at 2.16) 216.00
Overhead (1/2 labor)	54.00	108.00
	<b>\$201.00</b>	<b>\$391.00</b>

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The plant and equipment has a capacity of producing 4,800 units of low-priced furnaces per month and 2,000 high-priced units per month. Whenever these capacities are exceeded the labor and overhead rate increases by 20%, i.e., labor and overhead for a low-priced unit on overtime amounts to \$194.40 per unit. For high-priced units it is \$388.80. This overtime premium is paid along with labor and overhead charges on the 15th and end of each month and appears as part of the cost of goods sold during that month.

The Warm-up Company has a standard vacation period which occurs during the last half of July. The impact of this vacation policy on production levels and production change costs is discussed under these topics later in this report.

This vacation policy results in the Company paying for vacations during the month of July. The basic volume used in calculating the vacation pay is the June level of production. The vacation pay calculation for 19Y0 which appears as part of cost of goods sold for July is calculated as follows.

Low-priced:	4800 units at \$162.00 per unit	\$ 777,600
High-priced:	2000 units at \$324.00 per unit	648,000
Total		\$ 1,425,600

The total cost of goods sold for July, 19Y0 is calculated as follows:

Low-priced:	3713 units at \$201.00 per unit	\$ 746,313
High-priced:	1648 units at \$391.00 per unit	644,368
Vacation pay:		1,425,600
Total		\$ 2,816,281

It is apparent that the vacation pay amounts to more than the total loss of the Company for the first nine months of 19Y0.

Product Prices and Sales Terms. The historical price pattern of the Warm-up Company is presented in Table UI. While product prices have not varied a great deal from the industry prices shown in Table II, some differences do appear. The sales volume and penetration of the Warm-up Company depend on the prices charged by the Company relative to industry prices.

The Company's sales terms are n/30, e.o.m. so that the Company collects its receivables the last day of the month after the shipment has been made. In other words, September 19Y0 sales which appear as the accounts receivable on the position statement will be collected on October 31. This means that the cash balance on hand at the end of the month must cover disbursements during the month, for no cash will be coming in until the last day of the month. The proceeds from the collection of the accounts receivable are available to make payments on the day that the accounts receivable are collected.

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Table VI  
Warm-up Company Product Prices  
(Dollars)

	Low-priced Model										High-priced Model										
	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>	
Jan.	230	255	250	255	278	268	286	270	255	270	268	286	270	255	278	268	286	270	255	270	268
Feb.	230	255	240	260	276	270	288	268	260	276	270	288	268	260	276	270	288	268	260	276	270
Mar.	230	255	240	262	274	270	290	266	262	274	270	290	266	262	274	270	290	266	262	274	270
Apr.	235	254	240	264	272	270	288	264	264	272	270	288	264	264	272	270	288	264	264	272	270
May	235	254	240	266	270	270	286	262	266	270	270	286	262	266	270	270	286	262	266	270	270
June	235	253	240	268	268	272	284	260	268	268	272	284	260	268	268	272	284	260	268	268	272
July	240	253	245	270	266	274	282	258	270	266	274	282	258	270	266	274	282	258	270	266	274
Aug.	240	252	245	272	264	276	280	256	272	264	276	280	256	272	264	276	280	256	272	264	276
Sept.	240	252	245	274	262	278	278	254	274	262	278	278	254	274	262	278	278	254	274	262	278
Oct.	250	251	250	276	260	280	276	252	276	260	280	276	252	276	260	280	276	252	276	260	280
Nov.	250	250	250	278	262	282	274	250	278	262	282	274	250	278	262	282	274	250	278	262	282
Dec.	250	250	250	280	264	284	272	250	280	264	284	272	250	280	264	284	272	250	280	264	284
Jan.	350	385	380	395	415	396	408	420	395	415	396	408	420	395	415	396	408	420	395	415	396
Feb.	350	385	365	400	410	396	408	420	400	410	396	408	420	400	410	396	408	420	400	410	396
Mar.	350	385	365	402	410	398	410	422	402	410	398	410	422	402	410	398	410	422	402	410	398
Apr.	355	384	365	404	410	398	410	422	404	410	398	410	422	404	410	398	410	422	404	410	398
May	355	384	365	406	410	400	412	424	406	410	400	412	424	406	410	400	412	424	406	410	400
June	355	383	365	408	408	400	412	424	408	408	400	412	424	408	408	400	412	424	408	408	400
July	365	383	370	410	406	402	414	426	410	406	402	414	426	410	406	402	414	426	410	406	402
Aug.	365	382	370	412	404	402	414	426	412	404	402	414	426	412	404	402	414	426	412	404	402
Sept.	365	382	370	414	402	404	416	428	414	402	404	416	428	414	402	404	416	428	414	402	404
Oct.	380	381	390	416	400	404	416	428	416	400	404	416	428	416	400	404	416	428	416	400	404
Nov.	380	380	390	418	398	406	418	430	418	398	406	418	430	418	398	406	418	430	418	398	406
Dec.	380	380	390	420	396	406	418	430	420	396	406	418	430	420	396	406	418	430	420	396	406

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Advertising and Sales Promotion Appropriations. The Warm-up Company has not established any definite pattern of advertising appropriations, although some amount has been spent each month in the past. The historical pattern of these appropriations is presented in Table VII. The effectiveness of the advertising appropriation has a seasonal pattern since it depends on the volume of industry advertising. The volume of total industry advertising is related directly to industry sales and leads sales volume by one month.

The initial impact of the advertising appropriation of the Warm-up Company occurs in the month the appropriation is made and has some carryover into the months after the initial impact. The impact of advertising appears in the sales of the model for which the advertising was made. In other words, advertising for the low-priced model influences low-priced unit sales but has no impact on high-priced model sales and vice versa. The advertising appropriations are paid on the 15th of the month in which they occur.

Sales. The pricing policies and advertising appropriations have resulted in the volume of sales shown in Table VIII. Sales volume is limited to the number of units in finished goods at the beginning of the month. None of the units produced during the month can be sold that month. These units are available for sale the following month.

Inventory Carrying Costs. The Company incurs costs of carrying inventory which are calculated and accrued at the end of the month. These costs represent insurance, taxes, etc. They are paid on the 15th of the month following accrual. The schedule of inventory carrying costs in effect is as follows:

<u>Type of Inventory</u>	<u>Low-priced</u>	<u>High-priced</u>
Raw materials	\$1.60 per unit per month	\$2.00 per unit per month
Work in process	2.40 per unit per month	3.00 per unit per month
Finished goods	3.20 per unit per month	4.00 per unit per month

The accrual on September 30, 19Y0, which appears on the balance sheet, is calculated as follows:

<u>Inventory Item</u>	<u>Units</u>	<u>Carrying Cost per Unit</u>	<u>Carrying Costs</u>
Low-priced Raw material	9,600	1.60	\$ 15,360.00
Work in process	800	2.40	1,920.00
Finished goods	6,121	3.20	19,587.20
High-priced Raw material	4,000	2.00	8,000.00
Work in process	400	3.00	1,200.00
Finished goods	3,228	4.00	12,912.00
TOTAL . . . . .			\$ 58,979.20

This accrual of inventory carrying charges is to be paid on October 15, 19Y0.

Table VII  
Warm-up Company Advertising and Sales Promotion Appropriations  
(Dollars)

	Low-priced Model										High-priced Model									
	19X1	19X2	19X3	19X4	19X5	19X6	19X7	19X8	19X9	19Y0	19X1	19X2	19X3	19X4	19X5	19X6	19X7	19X8	19X9	19Y0
Jan.	3,000	4,000	1,000	1,000	13,000	3,000	3,000	4,500	10,000	3,000	1,000	1,000	1,000	1,000	7,000	13,000	11,000	5,000	2,000	3,000
Feb.	3,000	4,000	1,000	2,000	14,000	3,000	5,000	8,000	8,000	3,000	2,000	1,000	1,500	7,500	13,500	10,500	4,500	2,000	2,000	3,000
Mar.	3,600	4,000	2,000	3,000	15,000	3,000	5,500	8,000	10,000	3,000	2,000	1,000	2,000	8,000	14,000	10,000	4,000	4,000	4,000	4,000
Apr.	3,600	4,000	2,000	4,000	20,000	3,000	6,000	12,000	12,000	3,000	3,000	1,000	2,500	8,500	14,500	9,500	5,000	6,000	6,000	5,000
May	4,500	4,000	20,000	5,000	25,000	3,000	6,500	16,000	10,500	3,000	4,000	1,000	3,000	9,000	15,000	9,000	7,000	8,000	8,000	6,000
June	4,500	4,000	20,000	6,000	30,000	3,000	7,000	20,000	12,500	3,000	4,000	1,000	3,500	9,500	14,500	8,500	9,000	10,000	10,000	7,000
July	6,000	4,000	20,000	7,000	25,000	3,000	7,500	240,000	14,500	3,000	4,000	1,000	4,000	10,000	14,000	80,000	9,000	10,000	7,000	8,000
Aug.	6,600	4,000	10,000	8,000	20,000	3,000	8,000	28,000	16,500	3,000	8,000	1,000	4,500	10,000	13,000	11,000	8,000	12,000	8,000	8,000
Sept.	6,600	4,000	30,000	9,000	10,000	3,000	8,500	24,000	18,000	3,000	9,000	1,000	5,000	12,500	13,500	7,500	6,000	14,000	4,000	4,000
Oct.	4,500	4,000	4,000	10,000	5,000	3,000	9,000	20,000	20,000	3,000	10,000	1,000	11,000	6,000	12,500	6,500	6,000	16,000	5,000	1,000
Nov.	3,000	4,000	3,000	11,000	4,000	3,000	9,500	6,000	5,000	3,000	11,000	1,000	12,000	4,000	12,000	6,000	4,000	18,000	5,000	5,000
Dec.	3,000	4,000	1,000	12,000	3,000	3,000	10,000	4,000	4,000	3,000	12,000	1,000	12,500	12,500	11,500	5,500	2,000	4,000	4,000	1,000

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Table VIII  
Warm-up Company Shipments of Gas Furnaces  
(Units)

	Low-priced Model												High-priced Model											
	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>			<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>		
Jan.	591	419	935	2,381	1,322	1,884	1,329	3,125	4,953	2,692			164	162	265	518	444	662	675	824	987	1,187		
Feb.	498	407	1,362	2,300	1,372	1,731	1,279	3,036	4,093	2,543			151	159	332	496	461	643	668	795	932	1,115		
Mar.	523	602	2,042	2,681	1,495	1,889	1,661	3,530	3,836	3,037			169	208	435	565	515	713	810	887	1,052	1,311		
Apr.	674	555	2,194	1,901	1,634	2,172	1,933	3,667	1,106	3,953			193	204	460	497	518	781	866	945	665	1,476		
May	740	803	3,065	1,643	2,032	2,173	2,326	4,093	3,699	2,844			212	258	547	492	596	810	952	1,014	1,203	1,364		
June	947	1,194	3,671	1,656	2,346	2,721	2,785	4,979	3,701	3,234			263	342	644	547	699	1,021	1,122	1,216	1,395	1,599		
July	812	858	3,750	1,322	2,578	2,501	2,717	4,811	3,881	3,713			238	273	624	479	710	987	1,038	1,191	1,415	1,648		
Aug.	1,136	1,635	5,200	1,613	3,483	2,683	4,005	7,702	4,921	4,399			328	437	855	618	965	1,239	1,429	1,729	1,948	2,109		
Sept.	1,304	2,163	5,053	1,751	3,733	2,836	4,514	8,000	4,149	4,481			371	533	888	679	1,068	1,351	1,535	1,798	1,974	2,003		
Oct.	1,363	2,015	4,628	2,126	4,110	2,660	4,471	8,104	3,514				375	515	869	739	1,132	1,337	1,498	1,800	2,003			
Nov.	941	1,809	3,408	1,913	3,011	1,920	3,705	7,008	2,659				277	425	673	613	885	994	1,164	1,397	1,534			
Dec.	708	1,248	2,871	1,336	2,150	1,471	2,957	4,786	2,174				212	312	578	455	683	776	910	1,009	1,167			

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Production Change Costs. The Company also incurs costs when there is a change in the level of operations. This change amounts to \$8.00 per unit and occurs whether production increases or decreases. The production change costs are paid on the 15th of the month when the change occurs. For example, the level of production during September 19Y0 was:

Low-priced model	4,800 units
High-priced model	2,000 units

Any change from these figures for October production incurs a cost of \$8.00 per unit change which is paid on October 15th.

Because of the vacation period in July the production rate for July is twice the amount produced during the month and the production change cost is calculated on that basis. For July 19Y0 the rates of production are:

Low-priced:	2,400 units
High-priced:	1,000 units

Since the production levels in June were twice these levels no production change cost occurs in July and since August rates are twice July rates no production change costs occurs in August either.

Production Levels. The maximum number of units which can be produced in any month is the number of units of raw material on hand at the beginning of the month. None of the material ordered on the first of the month can be used. The historical record of production is presented in Table IX.

The data represent the amount of production scheduled and include the number of defective units produced.

Defective Units. The Company encounters some difficulties in production which result in some production being lost as defectives. The loss is expressed in terms of the equivalent number of defectives. These units are charged in the income statement as defective losses and are expressed in standard cost terms at full cost. The number of units lost in the past is shown in Table X.

Product Flow. As a result of the above relationships the following product flow occurs in the Company. Production levels are determined. The maximum amount available is the number of units in raw material at the beginning of the month. The number of units put into production is deducted from the raw material inventory at the beginning of the month. The raw material inventory is then replenished, if necessary, through orders placed with the supplier. This set of operations determines the raw material inventory at the end of the month which is the same as the raw material inventory at the beginning of the next month.

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Table IX  
Warm-up Company Production Levels  
(Units)

	Low-priced Model										High-priced Model									
	19X1	19X2	19X3	19X4	19X5	19X6	19X7	19X8	19X9	19Y0	19X1	19X2	19X3	19X4	19X5	19X6	19X7	19X8	19X9	19Y0
Jan.	700	600	1,400	2,500	1,500	2,000	1,600	3,200	4,000	2,000	800	200	300	700	500	700	600	1,000	1,000	1,200
Feb.	800	600	1,600	2,000	1,500	2,000	1,600	4,000	4,000	2,000	800	200	400	500	500	700	800	1,000	1,000	2,000
Mar.	800	600	2,400	2,000	1,700	2,000	1,600	4,000	4,000	2,000	800	200	600	500	700	700	800	1,000	1,000	2,000
Apr.	1,200	600	4,000	2,000	1,300	2,000	2,400	6,000	4,000	2,000	1,200	200	600	500	700	700	1,200	1,000	1,000	2,000
May	1,200	1,200	5,000	2,000	3,000	2,000	3,000	6,000	4,000	2,000	900	300	800	500	800	1,200	1,200	1,800	1,800	2,000
June	1,200	1,200	5,000	2,000	3,000	2,800	4,000	6,400	4,000	2,800	1,600	500	900	500	700	900	1,600	1,800	1,800	2,000
July	1,000	1,400	2,500	1,000	1,500	1,600	2,400	4,200	2,000	1,600	1,600	1,400	800	800	1,400	1,400	1,500	1,800	1,800	2,000
Aug.	1,000	2,200	5,000	2,000	4,200	3,000	4,800	8,400	4,000	3,000	3,000	2,200	2,000	500	900	2,000	2,000	4,000	4,000	4,800
Sept.	700	2,100	5,000	2,000	4,200	3,000	4,800	8,400	4,000	3,000	3,000	2,100	2,000	700	700	2,000	7,400	3,000	3,000	4,800
Oct.	700	2,000	3,500	2,000	3,500	2,200	4,200	7,400	3,000	2,200	2,200	2,000	2,000	700	1,200	2,000	5,000	2,000	2,000	2,000
Nov.	700	1,400	3,500	2,000	2,400	1,600	3,200	5,000	2,000	1,600	1,600	1,400	2,000	700	800	1,500	4,800	2,000	2,000	2,000
Dec.	700	1,400	3,500	2,000	2,400	1,600	3,200	4,800	2,000	1,600	1,600	1,400	2,000	700	800	1,500	4,800	2,000	2,000	2,000

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Table X  
Warm-up Company Equivalent Defective Furnaces Produced  
(Units)

Low-priced Model

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
Jan.	39	9	39	0	2	22	45	91	39	56
Feb.	36	16	64	0	35	51	47	187	101	243
Mar.	26	17	144	46	65	58	47	135	115	185
Apr.	70	17	273	56	8	59	140	354	119	135
May	44	87	270	59	228	59	157	220	119	123
June	38	47	177	59	122	152	221	235	119	213
July	105	191	98	36	62	109	180	335	73	104
Aug.	47	168	138	54	222	223	374	659	109	134
Sept.	0	78	147	58	148	120	197	346	117	141
Oct.	16	55	0	59	50	4	87	158	4	
Nov.	20	0	80	59	0	0	1	0	0	
Dec.	20	32	99	59	55	37	74	92	46	

High-priced Model

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
Jan.	0	0	0	0	0	0	0	1	1	7
Feb.	0	0	0	0	0	0	0	0	0	99
Mar.	0	0	4	0	0	0	0	0	0	53
Apr.	0	0	0	0	0	0	39	0	0	42
May	0	0	10	0	0	48	14	0	91	40
June	0	0	0	0	18	16	8	0	45	39
July	3	3	0	0	45	50	49	84	6	8
Aug.	0	1	4	0	16	65	88	134	25	32
Sept.	0	0	0	18	9	26	38	61	29	37
Oct.	0	0	0	0	0	5	20	29	24	
Nov.	0	0	0	0	0	0	10	12	11	
Dec.	0	0	0	0	0	0	8	8	8	

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Sales are deducted from the finished goods inventory at the beginning of the month and are limited to the number of units on hand at the beginning of the month. The finished goods inventory is then replenished by the amount of production less the number of defective units occurring during the month. This set of operations determines the finished goods inventory at the end of the month which is the same as the finished goods inventory at the beginning of the following month. Example calculations for the month of September 19Y0 are presented below with references to the tables where the numbers appear.

	<u>Low-priced</u>	<u>High-priced</u>
Raw material beg. inventory	4,800	2,000
Production (Table IX)	4,800	2,000
Orders (Table V)	9,600	4,000
Raw material ending inventory	9,600	4,000
Finished goods beg. inventory	5,943	3,550
Sales (Table VIII)	4,481	2,285
Production (Table IX)	4,800	2,000
Defectives (Table X)	141	37
Finished goods ending inventory	6,121	3,228

Work in process remains constant at 800 units of low-priced models and 400 units of high-priced models.

Financial Statements. The condition of the Warm-up Company at the time of consolidation, the productivity of the firm, and the decisions made in the past with respect to product prices, advertising appropriations, production levels, and orders of raw materials result in the position statements shown in Table XI and the income statements shown in Table XII. The income statements for 19Y0 are shown on a monthly basis in Table XIII. Some of the items appearing in these statements deserve further explanation which is given below.

Inventory. The inventory valuation is on a standard production cost basis. Raw materials are valued at the standard material purchase price. Work in process includes the standard raw material and half of the standard labor and overhead. Finished goods includes the standard raw material and the standard labor and overhead. The current inventory value is calculated as follows:

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Table XI  
Warm-up Company Position Statements  
(Dollars)

	12-31 19X0	12-31 19X1	12-31 19X2	12-31 19X3	12-31 19X4	12-31 19X5	12-31 19X6	12-31 19X7	12-31 19X8	12-31 19X9	9-30 19Y0
Cash	2,623,780	3,119,903	2,922,576	3,052,173	2,989,597	3,253,381	3,509,995	2,707,557	2,128,046	3,481,677	1,528,205
Accounts Receivable	236,340	257,560	430,560	943,170	565,180	838,068	732,820	1,184,684	1,630,370	1,165,680	2,271,060
Inventory	246,300	346,881	499,001	1,233,711	1,323,276	1,255,971	1,091,861	1,662,899	2,354,521	1,660,621	3,322,455
Current assets	3,106,420	3,804,344	3,852,137	5,229,054	4,878,053	5,347,420	5,334,676	5,555,140	6,112,937	6,307,978	7,121,731
Plant and equipment	1,200,000	1,200,000	2,400,000	3,600,000	4,800,000	4,800,000	4,800,000	4,800,000	4,800,000	4,800,000	4,800,000
Allowance for deprec.	- 0 -	60,000	180,000	360,000	600,000	840,000	1,080,000	1,320,000	1,560,000	1,800,000	1,980,000
Net plant	1,200,000	1,140,000	2,220,000	3,240,000	4,200,000	3,960,000	3,720,000	3,480,000	3,240,000	3,000,000	2,820,000
Total assets	4,306,420	4,944,344	6,072,137	8,469,054	9,078,053	9,307,420	9,054,676	9,035,140	9,352,937	9,307,978	9,941,731
Accrued carrying costs	6,420	9,362	14,254	34,416	32,295	27,177	24,609	32,599	41,653	27,279	58,979
Taxes payable		317,491	415,696	1,091,727	596,926	465,707	157,768	115,123	261,114	165,735	559,120
Accounts Payable			9,000	18,000	27,000	27,000	27,000	27,000	27,000	27,000	32,525
Interest accrued											1,500,000
Notes payable											
Bonds payable											
Current liabilities	6,420	326,853	438,950	1,144,143	656,221	519,885	209,377	174,722	330,708	220,015	1,597,691
Bonds payable (series A)			600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000
Bonds payable (series B)			600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000
Bonds payable (series C)											
Bonds payable (series D)											
Common Stock	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Capital surplus	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000	2,300,000
Retained earnings		317,491	733,187	1,824,911	2,321,832	2,687,535	2,745,299	2,760,418	2,922,229	2,987,963	2,243,840
Total liabilities and net worth	4,306,420	4,944,344	6,072,137	8,469,054	9,078,053	9,307,420	9,054,676	9,035,140	9,352,937	9,307,978	9,941,731

# Simulation Games and Experiential Exercises in Action, Volume 2, 1975

Table XII  
Warm-up Company Income Statements  
(Dollars)

	19X1	19X2	19X3	19X4	19X5	19X6	19X7	19XB	19X9	9 Months 19Y0
<b>Sales</b>	3,535,940	4,918,772	12,037,255	8,799,133	11,295,328	11,856,984	14,678,562	22,384,064	19,321,632	14,918,579
<b>Cost of goods sold</b>	2,283,056	3,024,116	8,029,824	5,591,480	7,712,743	8,651,671	10,652,461	18,417,952	15,469,789	13,088,625
<b>Raw material price variance -</b>										
Low-priced	4,000	8,900	67,500	86,500	92,200	151,400	229,000	- 341,400	- 69,600	67,400
High-priced	3,300	5,700	33,200	51,100	63,000	129,600	139,500	- 104,100	- 30,500	65,000
<b>Freight and handling costs</b>	7,000	6,000	9,000	6,000	5,000	6,000	6,000	10,000	6,000	9,000
<b>Inventory carrying costs</b>	154,361	157,652	350,104	335,156	400,777	350,953	411,178	597,582	520,724	400,036
<b>Production change costs</b>	18,880	37,600	47,200	17,600	60,000	52,800	74,400	128,000	35,200	28,800
<b>Defective unit costs-Low-priced</b>	60,390	97,153	214,059	81,204	154,534	146,615	262,189	523,031	185,952	268,133
<b>Defective unit costs-High-priced</b>	765	1,056	4,914	5,237	26,663	67,409	89,597	118,768	90,239	139,586
<b>Quality control costs-Low-priced</b>	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
<b>Quality control costs-High-priced</b>	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
<b>Advertising and sales promotion -</b>										
Low-priced	51,900	48,000	114,000	78,000	184,000	36,000	385,000	87,000	134,000	41,000
High-priced	17,300	65,200	12,000	45,000	117,000	161,000	171,000	78,500	101,000	41,000
<b>Lapsed discounts</b>	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	12,015	- 0 -	13,508
<b>Factoring costs</b>	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	14,471	- 0 -	- 0 -
<b>Depreciation</b>	60,000	120,000	180,000	240,000	240,000	240,000	240,000	240,000	240,000	180,000
<b>General and administrative expenses</b>	240,000	480,000	720,000	960,000	1,200,000	1,440,000	1,680,000	1,920,000	2,160,000	1,600,000
<b>Total expenses</b>	2,900,954	4,051,375	9,781,797	7,497,276	10,255,909	11,433,444	14,340,313	21,701,792	18,842,768	16,142,070
<b>Operating income</b>	634,982	867,393	2,255,453	1,301,852	1,039,414	423,536	338,246	682,254	478,847	-1,223,491
<b>Interest charges</b>	- 0 -	36,000	72,000	108,000	108,000	108,000	108,000	158,625	147,375	114,750
<b>Income before taxes</b>	634,982	831,393	2,183,453	1,193,852	931,414	315,536	230,246	523,629	331,472	-1,338,241
<b>Income taxes</b>	317,491	415,696	1,091,727	596,926	465,707	157,768	115,123	261,814	165,736	- 669,120
<b>Net income</b>	317,491	415,696	1,091,727	596,926	465,707	157,768	115,123	261,814	165,736	- 669,120
<b>Dividends</b>	- 0 -	- 0 -	- 0 -	100,000	100,000	100,000	100,000	100,000	100,000	75,000
<b>Change in retained earnings</b>	317,491	415,696	1,091,727	496,926	365,707	57,768	15,123	161,814	65,736	- 744,120

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

Table XIII  
Monthly Warm-up Company Income Statements for 1970

	January 1970	February 1970	March 1970	April 1970	May 1970	June 1970	July 1970	August 1970	September 1970
Sales	1,315,233	1,226,955	1,451,911	1,667,465	1,412,296	1,623,687	1,776,733	2,173,239	2,271,060
Cost of goods sold	947,390	947,109	1,123,038	1,371,668	1,104,967	1,275,243	2,816,278	1,708,817	1,794,115
Raw material price variance - Low-priced	7,500	7,500	7,500	7,500	7,500	7,400	7,500	7,500	7,500
Raw material price variance - High-priced	7,000	7,000	7,000	7,000	7,000	5,000	7,000	7,000	11,000
Freight and handling costs	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Inventory carrying costs	29,069	35,458	40,491	42,138	49,107	49,045	47,727	48,017	58,979
Production change costs	- 0 -	19,200	3,200	- 0 -	- 0 -	6,400	- 0 -	- 0 -	- 0 -
Defective unit costs - Low-priced	11,255	48,842	37,184	27,134	24,722	42,812	20,903	26,933	28,340
Defective unit costs - High-priced	2,736	38,708	20,722	16,421	15,639	15,248	3,127	12,511	14,466
Quality control costs - Low-priced	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Quality control costs - High-priced	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Advertising and sales promotion - Low-priced	3,000	3,000	4,000	5,000	6,000	7,000	8,000	4,000	1,000
Advertising and sales promotion - High-priced	3,000	3,000	4,000	5,000	6,000	7,000	8,000	4,000	1,000
Lapsed discounts	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	13,508
Factoring costs	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Depreciation	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
General and administrative expenses	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Total expenses	1,231,952	1,330,818	1,468,135	1,702,861	1,441,935	1,636,148	3,139,535	2,039,778	2,150,908
Operating income	83,281	- 103,863	- 16,224	- 35,396	- 29,639	- 12,461	- 1,362,802	133,461	120,152
Interest charges	9,000	9,000	9,000	14,625	14,625	14,625	14,625	14,525	14,625
Income before taxes	74,281	- 112,863	- 25,224	- 50,021	- 44,264	- 27,086	- 1,377,427	118,836	105,527
Income taxes	37,140	- 56,431	- 12,612	- 25,010	- 22,132	- 13,543	- 688,713	59,418	52,763
Net income	37,140	- 56,431	- 12,612	- 25,010	- 22,132	- 13,543	- 688,713	59,418	52,763
Dividends	25,000	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Change in retained earnings	12,140	- 56,431	- 12,612	- 50,010	- 22,132	- 13,543	- 713,713	59,418	52,763

## Simulation Games and Experiential Exercises in Action, Volume 2, 1975

	Units	Value per Unit	Amount
<b>Low-priced</b>			
Raw materials	9,600	39.00	\$ 374,400.00
Work in process	800	120.00	96,000.00
Finished goods	6,121	201.00	1,230,321.00
<b>High-priced</b>			
Raw materials	4,000	67.00	268,000.00
Work in process	400	229.00	91,600.00
Finished goods	3,228	391.00	1,262,148.00
TOTAL . . . . .			\$ 3,322,469.00

Plant and Equipment. At the time of consolidation the plant and equipment had a capacity of producing 1200 units of low-priced models per month and 500 high-priced models per month and was recorded on the books at a value of \$1,200,000. On January 1, 19X2, the Company placed in operation a second set of parallel assembly lines with the same capacity and cost as the line originally in operation. On January 1, 19X3, another set of lines was added; and the fourth and final line was added January 1, 19X4. The plant and equipment account is made up of the four equal assembly lines which have a total capacity of producing 4,800 units of low-priced model gas furnaces per month and 2,000 units of high-priced model gas furnaces per month. The total cost was \$4,800,000 which appears on the position statement. It is expected that no increase in capacity will be available in the foreseeable future.

Depreciation. The plant and equipment is depreciated on a straight-line basis at a rate of 5% per year. This amounts to \$20,000 per month. As of September 30, 19Y0, the total accrued depreciation was as follows:

<u>Date of Plant and Equipment</u>	<u>Depreciation Accrued</u>
December 31, 19X0	\$ 585,000
January 1, 19X2	525,000
January 1, 19X3	465,000
January 1, 19X4	405,000
TOTAL . . . . .	\$ 1,980,000

Notes Payable. The \$1,500,000 notes payable outstanding on September 30, 19Y0, represent short-term seasonal loans from the Tenth National Bank. They carry an interest rate of 4 1/2% and are payable on October 1, 19Y0. As of September 30, 19Y0, \$5,625 interest had accrued on these loans. It is apparent that the Company cannot pay off the note due on October first, cover the accounts payable due the tenth and meet expenses the rest of the month without considerable hardship to the Company. As a result, the bank agreed with the Company to increase the loan for October to \$1,800,000 and to renew that amount for November. The amount they will loan in December is \$900,000 and it must be cleaned up on January 1, 19Y1.

## Simulation Games and Experiential Exercises in Action, Volume 2, 1975

Bonds Payable. Bonds payable represent mortgage borrowing to build plant and equipment. The detail on the various series of bonds which have been issued is given in the schedule below:

<u>Series</u>	<u>Date of Issue</u>	<u>Amount</u>	<u>Interest Rate</u>	<u>Due Date</u>	<u>Interest Dates</u>
A	Jan. 1, 19X2	\$ 600,000	6%	Jan. 1, 19Y2	January 1 April 1 July 1 October 1
B	Jan. 1, 19X3	\$ 600,000	6%	Jan. 1, 19Y3	January 1 April 1 July 1 October 1
C	Jan. 1, 19X4	\$ 600,000	6%	Jan. 1, 19Y4	January 1 April 1 July 1 October 1

On September 30, 19Y0, \$27,000 interest had accrued on the bonds payable. (This \$27,000 together with the \$5,625 interest accrued on the notes payable account for the total of \$32,625 interest accrued which appears on the position statement.)

Cost of Goods Sold. The cost of goods sold is calculated by adding materials purchased which are costed at standard prices and labor and overhead payments made during the period to the beginning inventory and deducting the final inventory at standard cost. If the standard cost remains constant during the period covered the cost of goods sold will be at standard cost. If there is an increase in labor rates or material costs then the ending inventory will be at the new standards and the cost of goods sold will reflect the change and not be at standard.

Inventory is not carried on a FIFO or LIFO basis but on a standard basis. All variation from standard occurs in the month the change in price occurs.

Factor Charge. In the event that the Warm-up Company has insufficient funds to pay expenses when due, other than the order for raw materials, the Company automatically factors the accounts receivable for the amount of cash required. The payment for this service is 3% of the amount required and is paid back the end of the month when receivables are collected. As a result it never appears on the balance sheet as a payable.

The Company has only once required the factor service. This was in September and October 19X8 when the Company ran short and paid a charge of 3%.

## **Simulation Games and Experiential Exercises in Action, Volume 2, 1975**

General and Administrative Expenses. In 19Y0 general and administrative expenses have been running at a rate of \$200,000 per month. These expenses are paid half on the 15th of the month and the other half on the last day of the month.

Common Stock. The Company has 100,000 shares of common stock outstanding with a par value of \$20 per share. The management in the aggregate owns 20% of the outstanding shares which gives it little control. The other 80% is distributed widely in small lots. The shares are non-cumulative and carry no preemptive rights. The stock is traded on the over-the-counter exchange. The closing bid price of the stock on September 30, 19Y0, was 33 1/4.

Dividends. The Company began paying dividends on January 15, 19X4, and has declared a regular quarterly dividend of \$.25 per share since that time. The dividend is paid on January 15, April 15, July 15 and October 15.

Income Taxes. Income taxes are accrued for the full year and are paid on April 15 of the following year. The income tax rate is 50% of net income before taxes. If income taxes for the year are negative the Company receives a rebate on April 15 of the following year.

**WARM-UP COMPANY**

Report of the economics department.

Consumer buying and the level of total business activity continued high through the early fall weeks with gains in many sectors. Genuinely gloomy prophecies were rare, but many a dark reference to a “sideways movement”, “plateau”, and “leveling off” was heard--and the gains, in consequence, were somewhat obscured. Back of the worries were such tangibles as declines in factory employment, higher prices and interest rates, and perhaps a feeling that inflation couldn’t keep on forever.

On a seasonally adjusted basis, privately financed housing starts declined slightly in August. Builders do not share the view of FHA officials that liberalized home loan terms will result in a considerable upturn in home building. The FHA expects that lower down- payments and longer terms will stimulate new housing starts in four or five months. Members of the National Association of Home Builders believe that while lenders remain highly selective in picking risks, building will improve only slightly.

Business will climb sluggishly at best after the first quarter of 19Y1, even with the help of sluggish inflation. Prospects are that next summer total outlays for goods and services will be below last summer’s level by 4%. Consumer income continues to rise and should provide a stimulus for early recovery.

We feel that the outlook for our industry and firm remains good. In spite of a slowing down in the rate of growth of gross national product, we should recover in the coming year. Our best estimate is that sales volume for our industry should be up 15 to 20 per cent.

Index of Housing Starts

19X1 = 100

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
Jan.	68.9	64.4	101.4	110.6	83.6	92.9	85.6	112.8	96.7	82.7
Feb.	64.6	64.9	106.8	103.9	100.2	102.1	96.9	115.7	101.0	84.7
Mar.	98.4	89.5	151.1	120.9	133.8	136.3	122.9	146.6	127.0	112.0
Apr.	128.3	113.9	171.7	124.0	136.9	143.5	138.7	170.0	143.5	120.7
May	129.0	123.0	192.2	130.2	141.2	139.5	140.0	177.2	146.4	132.6
June	125.9	123.1	186.0	170.7	133.3	134.7	150.2	173.2	138.3	128.7
July	122.4	123.9	186.1	116.6	132.2	124.6	149.5	158.0	130.2	125.9
Aug.	111.6	127.6	182.7	114.9	127.8	120.2	147.2	160.6	133.8	128.8
Sept.	106.0	132.7	155.2	124.3	129.8	122.5	149.0	147.9	120.9	
Oct.	94.6	134.5	132.1	116.0	130.2	116.2	142.5	136.3	120.6	
Nov.	82.1	123.1	112.4	96.0	111.0	105.0	133.4	114.9	99.7	
Dec.	63.1	101.0	120.7	78.2	92.1	84.7	116.6	98.1	81.9	

Index of Value of Private Nonfarm Residential Construction

19X1 = 100

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
Jan.	81.8	78.2	104.0	126.2	100.6	114.2	114.2	155.7	150.3	145.9
Feb.	68.6	67.4	99.9	115.7	94.6	106.1	106.0	145.9	140.6	134.0
Mar.	80.4	70.2	105.4	120.6	111.7	120.7	120.7	165.4	158.1	150.4
Apr.	92.1	76.5	123.2	125.2	118.8	134.8	137.2	187.8	177.5	166.5
May	105.5	89.1	144.8	128.3	129.7	141.7	154.8	207.4	193.3	180.3
June	114.1	99.5	164.6	134.0	139.0	157.2	166.9	221.9	207.7	194.0
July	117.9	105.8	177.2	135.0	143.7	157.7	177.2	226.2	210.2	199.2
Aug.	119.2	109.2	184.9	133.8	146.5	156.0	183.7	224.1	209.9	202.3
Sept.	114.7	113.3	184.9	134.0	146.3	153.1	185.7	220.9	205.9	
Oct.	110.5	116.7	174.2	134.8	147.2	150.7	184.8	213.7	198.4	
Nov.	101.7	117.5	158.2	130.2	143.5	144.8	180.9	200.5	191.0	
Dec.	90.7	112.8	140.3	117.5	131.7	133.2	176.0	179.1	171.0	

Simulation Games and Experiential Exercises in Action, Volume 2, 1975

Index of Personal Income, Seasonally Adjusted

19X1 = 100

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
Jan.	95.9	99.5	102.9	116.9	125.3	134.8	136.6	141.0	152.6	161.6
Feb.	95.6	99.2	104.2	118.0	127.0	135.5	136.8	141.7	153.1	162.9
Mar.	97.5	99.6	106.9	118.9	127.0	136.7	136.4	143.0	153.9	163.6
Apr.	98.5	99.8	104.7	120.4	127.2	136.6	136.4	145.0	155.6	164.4
May	99.1	99.4	105.2	121.3	128.2	137.1	136.6	146.4	156.2	165.8
June	101.2	98.6	106.0	122.2	129.0	137.9	137.0	147.1	156.9	166.7
July	101.4	97.6	107.6	122.0	128.6	137.9	137.0	148.7	156.5	167.2
Aug.	102.4	98.6	109.9	123.4	131.6	137.6	137.6	148.8	158.4	167.4
Sept.	102.6	99.3	111.6	123.4	132.8	137.8	138.5	150.0	158.8	
Oct.	102.7	97.4	112.5	125.2	133.3	138.1	138.5	150.5	160.4	
Nov.	101.9	98.8	113.5	125.6	132.9	137.4	140.0	151.9	160.6	
Dec.	101.2	100.3	118.0	126.0	133.8	137.4	141.0	153.4	161.1	

Index of New Dwelling Units Authorized

19X1 = 100

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
Jan.	75.8	61.4	114.0	119.6	85.5	87.6	127.9	175.6	142.0	116.7
Feb.	75.3	65.9	120.4	99.8	104.6	101.3	150.3	178.6	160.7	126.4
Mar.	114.4	104.9	181.5	123.9	135.8	147.8	215.5	260.7	215.0	166.6
Apr.	146.1	122.0	187.4	124.3	148.1	136.2	226.3	270.0	223.0	185.2
May	120.0	130.5	208.0	132.1	135.7	124.7	208.4	272.2	221.6	195.4
June	123.8	133.4	189.0	185.0	126.3	122.1	244.2	260.3	199.1	181.6
July	110.0	116.7	190.1	104.2	120.0	106.8	221.5	222.1	184.7	172.2
Aug.	107.8	132.6	187.9	110.5	113.9	103.1	225.5	244.4	197.4	181.7
Sept.	93.0	146.3	141.2	118.4	122.5	104.3	219.9	218.6	158.0	
Oct.	90.4	134.7	128.5	97.7	122.9	92.2	213.1	203.1	179.7	
Nov.	78.4	122.9	111.0	79.4	92.1	81.2	198.8	158.5	140.3	
Dec.	65.3	123.6	134.5	63.4	85.9	74.2	174.9	130.5	109.1	

Index of Gross National Product, Seasonally Adjusted

19X1 = 100

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
I	97.7	99.4	103.3	113.9	119.2	125.8	122.9	130.4	136.0	139.7
II	100.0	99.0	106.4	116.0	119.1	127.3	122.6	132.9	136.1	139.9
III	100.8	100.8	111.1	118.1	120.3	126.3	123.5	135.6	136.5	
IV	101.4	99.9	113.1	118.3	123.6	124.1	126.2	136.8	138.2	

Index of Federal Reserve Industrial Production, Seasonally Adjusted

19X1 = 100

	<u>19X1</u>	<u>19X2</u>	<u>19X3</u>	<u>19X4</u>	<u>19X5</u>	<u>19X6</u>	<u>19X7</u>	<u>19X8</u>	<u>19X9</u>	<u>19Y0</u>
Jan.	99.3	97.7	97.1	119.1	120.0	132.9	124.4	132.7	145.7	148.8
Feb.	99.4	96.9	97.4	119.4	120.7	133.4	124.2	134.2	144.8	149.7
Mar.	98.4	95.2	100.7	120.2	121.0	134.8	123.4	136.5	144.2	149.5
Apr.	98.4	94.5	104.0	120.5	120.0	135.5	123.4	138.7	146.3	148.2
May	100.4	93.4	106.4	120.0	118.8	136.2	124.5	140.3	145.4	148.6
June	101.3	93.1	109.6	119.4	117.8	135.5	125.1	141.3	145.0	149.1
July	101.5	93.0	113.2	117.7	115.5	137.1	124.7	142.5	138.8	149.2
Aug.	101.2	93.9	116.8	116.8	123.2	136.1	124.7	143.1	145.6	149.4
Sept.	100.3	94.8	115.9	117.2	127.6	133.3	125.6	144.5	147.8	
Oct.	101.0	91.4	116.8	116.9	128.9	131.3	126.0	146.0	148.3	
Nov.	99.9	93.6	116.5	118.1	131.7	128.0	127.6	145.9	148.2	
Dec.	99.1	95.5	118.6	118.8	132.4	125.3	129.8	146.1	149.2	