

# **Simulations, Games and Experiential Learning Techniques:, Volume 1, 1974**

## **A DESCRIPTION OF INSTRAT: A GAME OF INVESTMENT STRATEGY**

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### **INTRODUCTION**

INSTRAT\* is a game designed to provide players with experience in the development and implementation of investment strategy. Players are provided with an uncertain environment in which to make strategic decisions aimed at maximizing their wealth. Initially each player is given an equal amount of money (from six to one hundred thousand dollars) which he or she is free to invest in any combination of the game's ten listed securities. The securities differ as to risk of principal and associated income. The general description of INSTRAT, which follows, is presented in four major sections which discuss general features, player input, player output and conclusions, respectively.

### **GENERAL FEATURES**

A number of general features have been incorporated into this game in order to provide the players with a realistic investment environment. Each of these features is discussed separately below.

#### **Execution Price**

The execution prices will be a function of the supply and demand for each security in that period. The actual deviation of the execution price from the opening price depends upon the absolute difference between the number of shares supplied and the number of shares demanded in each security, the number of participants in the game, and the initial amount of wealth given each player. The marketplace can be looked upon as a closed system with the computer acting as the specialist in all securities. This guarantees that all purchase or sale orders will be processed. The closing prices are generated through a random function. The difference between execution and closing prices represents market activity that has occurred subsequent to processing all orders.

#### **Stock Splits**

Each of the common stocks (all of the game's securities except for National Telephone Bonds) will automatically split (two-for-one) when the securities price reaches \$150.

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\* Gitman, Lawrence J., INSTRAT: A Game of Investment Strategy, (Morristown: General Learning Press, 1974).

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### Margin Call Loans

Each player is permitted to borrow in order to make purchases. The charge on borrowing is initially set by the game administrator; 8 percent per period on the outstanding loan balance is recommended. The margin requirement is set by the game administrator. If the margin requirement is initially set at 60 percent, this means that each player is permitted to have borrowed up to 40 percent of his gross wealth, where gross wealth is defined as current value of security portfolio plus cash. If the player has insufficient margin collateral, a portion of his portfolio is liquidated.

### Commission Charges

Brokerage commissions on purchases and sales of securities are charged according to the portion of the New York Stock Exchange schedule on October 1, 1972, which is given in Table 1.

TABLE 1  
New York Stock Exchange Commission Schedule

Dollar Value of Transaction	Round Lot Fee (100 sh)	Odd Lot Fee* (less than 100 sh)
less than \$800	\$ 6.40 + 2%	\$ 4.40 + 2%
\$ 800 to \$2499	\$12.00+ 1.3%	\$10.00+ 1.3%
\$2500 and up	\$22.00 + 0.9%	\$20.00 + 0.9%

\*1/8 of a point (12 1/2c) is added to the price per share in all odd-lot transactions. This is the fee charged by the odd-lot specialist

### Dividends and Interest

Dividends and interest are paid on some of the securities. The dividends and interest are calculated on the basis of the opening--not execution--price for each security. The yields on each of the ten listed securities are given in Table 2.

Table 2  
Securities, Ticker Symbols, and Yields

NAME	TICKER SYMBOL	YIELD
National Telephone Bonds	NTB	Coupon 6%
Technological Innovators. Inc.	TII	1%
Beizer Land Investments	BLI	0%
Ball Mutual Fund	BMF	4%
Clifton Power and Light	CPL	7%
Tundra Oil and Gas	TOG	0%
Inter-City Transport	ICT	0%
Nader Motor Company	NMC	2%
Uranium Expeditions, Inc.	UEI	6%
Crank-Cam Auto Parts	CAP	3%

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### Short Sales

A player may take a short position in any of the nine (9) common stocks. The number of shares shorted is not limited. A player may have both a long and a short position in the same stock.

### Interest on Idle Cash

Interest is paid on idle cash. The interest rate is initially set at 4 percent per period (this may be changed by the game administrator) on the idle cash balance held from one period to the next. A player can have idle cash only when he has no margin loans. This results since all idle cash is applied to reduce any existing margin loans. This is performed automatically by the computer.

### Purchasing Information

Each player has an opportunity to purchase information concerning the random price effects in the coming period. Two plans are available.

The "INFO-1" plan provides dollar changes for each security in the coming period with 90% accuracy. The "INFO-2" plan provides a "+" or a "-" indicator which is 70% accurate. INFO-1 is twice as expensive as INFO-2.

### Penalties

There are a number of penalties built into this game. The penalties are intended to simulate certain intangible costs expected to result from the associated actions, when attempted in a real-world situation. The penalties are for: selling more shares than owned, attempting to purchase beyond financial capacity, insufficient margin collateral, decreasing a short position incorrectly, failure to liquidate a short position, and taking multiple short positions in the same stock.

### PLAYER INPUT

Players make transactions each period in an attempt to increase their overall wealth position. Initially all players are given equal wealth positions and all ten securities have \$100.00 opening market prices. Based upon this information, the player's expectations of the execution price, and his investment strategy, each player decides what transactions he will make. The decisions are (1) the number of shares of stock to purchase or sell; (2) the number of shares of stock to sell short or purchase to satisfy a short position; and (3) which one of the two available information plans to buy. A sample of a completed Player Decision Form is included in Table 3.

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TABLE 3 Sample Player Decision Form										
INSTRAT PLAYER DECISION FORM										
Period 7					Player John Q. Player Transactions					
Security	Normal No. of Shares				Short No. of Shares					
	Sell (-)		Purch. (+)		Sell (-)		Liquid. (+)			
NTB	5	6	7	8			5	6	7	8
TII	13	14	15	16			13	14	15	16
BLI	21	n	23	24			21	22	23	24
BMF	29		31	37			39	30	31	32
CPL	37	38	39	40			37	39	30	40
TOG			2 47	5 48			45	-46	147	043
ICT	53	+54	4 55	056			53	54	55	56
NMC	61	62	63	64			61	62	63	64
UEI	69	-70	1 71	0 72			69	-70	2 71	0 72
CAP			79	80			77	78	79	80

A player is only required to fill in nonzero values Blanks .re assumed to mean no change

Information			
Costs			
\$00.*Z	None	_____	1
\$500.*Z	INFO-1	_____	1
\$250.*Z	INFO-2	_____X	1

Initial wealth  
\*Z= \_\_\_\_\_ rounded to the lowest integer  
\$6000.

**PLAYER OUTPUT**

At the end of each period all players receive output, a sample of which is exhibited in Tables 4 and 5. The output includes the following pieces of information:

**Heading**

The output will be headed by the player’s name, period, number, and market condition indicator for the present period.

**Portfolio of Securities Holdings**

This statement provides each player with a list of his current purchases of each security in shares, current market price per share, market value of holdings of each security in dollars, and the total value of the portfolio at the current (closing) market prices. The current purchases in

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Table 4  
Sample Statement of Accounts

INSTRAT  
John Q. Player  
Statement of Accounts  
End of Period 7  
Bull Market Condition

Security	Portfolio of Securities Holdings			MKT Value		No. Shares	Short Positions		
	Purchase	Balance	MKT Price				Period	Price	
TII	0	20	84.50	1690.00	short	20	6	75.00	Liquidate Next
CPL	0	20	144.00	2880.00		0	0	.00	
TOG	-25	0	123.50	.00	Short	10	7	126.00	
ICT	40	40	100.00	4000.00		0	0	.00	
NMC	0	55	107.25	5898.75		0	0	.00	
UEI	.10	0	131.00	.00	Short	20	7	134.50	
NET				14468.75					

Cash Statement

Beginning Balance	.00
+Dividends and Interest	380.22
+Margin Cost	434.76
+Net Purchases	-1014.99
+Penalty Charge	200.00
+Comm. Charges	240.25
+Change in Loan Bal.	-255.21
Information Cost	250.00
+Short Profits	-15.00
Ending Balance	.00

Statement of Change in Wealth

Ending Cash Balance	.00
+Portfolio at Market	14468.75
+Margin Call Loan	5179.28
Ending Wealth	9289.47
+Beginning Wealth	8146.76
Change in Wealth	1142.71

Statement of Margin Account

Maximum Line of Credit	6192.98
Beginning Loan Balance	5434.49
+Change in Loan Bal.	-255.21
+Current Borrowing Capacity	5179.28
Unused Borrowing Capacity	1013.70

General Information

Interest on Margin	8.00%
Interest on Cash	4.00%
Margin Requirement	60.00%
Market Expectation	Bull

## Messages

You have been penalized 200.00 dollars for not liquidating a short position  
After a 2 year holding period. The position was automatically liquidated.  
Congratulations for increasing your wealth by more than 400.00 dollars  
Good luck next period

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Table 5  
Sample History of Securities Price Movements

INSTRAT  
History of Security Price Movements

	Period	NTB	TII	BLI	BMF	CPL	TOG	ICT	NMC	VET	CAP
	End										
	1	100.00	105.50	109.00	107.00	105.50	133.50	107.50	111.00	109.00	106.50
	2	110.00	121.00	125.00	124.00	116.00	87.00	122.00	132.00	128.00	123.00
	3	111.00	130.00	139.50	134.50	124.50	84.00	130.50	145.50	128.00	130.00
	4	112.00	142.50	77.25	133.50	133.00	122.00	141.00	91.25	139.50	138.00
	5	119.00	147.00	75.75	128.00	139.50	138.00	80.50	75.75	125.50	131.00
	6	118.00	74.00	75.75	125.50	132.50	125.00	77.00	90.75	133.50	134.00
Execute	7	115.00	75.00	75.75	124.50	139.50	126.00	87.00	100.00	134.50	135.00
	7	115.00	84.50	87.75	133.00	144.00	123.50	100.00	107.25	131.00	142.50
	Volume	45	45	25	10	75	85	270	155	65	10
	Yield	4.35%	1.00%	.00%	4.00%	7.00%	.00%	.00%	2.00%	6.00%	3.00%
	Info-2	0	-	+	+	+	-	+	+	+	-

Shares, the balances in shares, and the current market price all will have been adjusted for any stock splits. Also included in the statement is a section titled "short Positions." This section indicates the stocks in which short positions are currently held. For each of these stocks, the number of shares held, the period in which the short

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position was established, and the amount of collateral per share currently (at the execution price of the current period) held against each stock, is indicated. Also included, when necessary, is an indicator specifying a short position that must be liquidated in the following period in order to avoid being penalized for not liquidating a short position after the maximum holding time of two periods.

### **Cash Statement**

This statement gives the player's ending cash balance, dividends and interest, margin cost, net purchases, penalty charges, information costs, commission charges, short profits, and any changes in loan balance.

### **Statement of Change in Wealth**

This statement adds the player's ending cash balance to the current market value of his portfolio and subtracts from this total the current loan balance in order to determine the player's ending wealth.

### **Statement of Margin Account**

This statement gives the player's unused borrowing capacity. This value is determined by subtracting the current loan outstanding from the player's maximum line of credit.

### **Messages**

A number of messages may be generated for each player in each period. These messages appear below the statement of Margin Account. The messages generated depend on the player's performance in the period and whether or not any penalties have been levied.

### **General Information**

This section lists the value for the Interest on Margin, Interest on Cash, and the Margin Requirement used in the most recent period. Also included is an indicator of the random market effects expected in the next period. "Bull" signifies a rising market and "Bear" indicates a declining market.

### **History of Security Price Movements**

Each player receives a copy of this statement. The statement provides a summary of the opening prices for all periods including the current period. These opening prices are equivalent to the closing prices of the immediately preceding period. Also included are the execution prices for the period just ended. These prices are noted by the word "EXECUTE" in the left margin. For the most recent period, notation of any splits is indicated by the word "SPLITS" under the appropriate

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security. At the bottom of the statement is a line of value denoted by the word "VOLUME" in the left margin. These values represent the volume of shares traded in each security. The yields for each security along with any purchased information are also included in this statement.

### CONCLUSIONS

The number of periods for which the game is played is up to the game administrator. Eight to ten periods is suggested as a minimum. The player who has accumulated the greatest wealth may be considered the winner. The game administrator (who is given summary data on all player transactions each period) may require the players to submit a statement of their investment strategy and then evaluate each player's ability to implement his stated strategy. This lesson may be as important as the maximization of wealth. The desired emphasis is up to the administrator. A sample of the end of period wealth position rankings, which is posted by the game administrator each period, is given in Table 6.

TABLE 6  
End of  
Period 7 Wealth Positions  
INSTRAT•  
Wealth PositionS  
End of Period 7  
Bull Market Condition

Name	Wealth	Rank
Player 1	9850.14	1
Player 2	9816.86	2
Player 3	9787.76	3
Player 4	9630.36	4
Player 5	9540.56	5
Player 6	9327.36	6
John Q. Player	9289.47	7
Player 8	9092.61	8
Player 9	8904.02	9
Player 10	8857.75	10
Player 11	8672.43	11
Player 12	8650.19	12