local computer community, which has worked very well. As an extra credit project we have allowed the students access to some very sophisticated game software or mouse driven graphics packages. Our English Department has recently installed a "Writing Across the Curriculum," program, and in support of this we now require a short paper on some article involving a recent application of the computer in a field related to the subject's major. Even though they initially wince at the mention of a writing assignment, this has proven to be one of the most valuable parts of the course. Not only does this assignment require them to utilize their newly acquired wordprocessing skills, but it also is the basis of a round table discussion during which everyone summarizes his paper with the class. Feedback at the end of the course now shows us that it is at the point of this discussion that the students start to understand and believe the message about how computers are, and will be, affecting their lives.

After using this new course format with over 700 hundred students for two years now, we have witnessed several dramatic results. First of all we now have a very busy computer center with a growing percentage of students returning from previous sections to use the equipment in other class projects. Our student course critiques have also evidenced a positive swing toward acceptance of the computer as an important tool in their lives. The students now acknowledge that "even I can use a computer!" Because of this increased student acceptance we are now seeing other departments in the school pressing harder for their own microcomputer systems. We are even getting feedback from local vendors about the number of our students who are starting to purchase their own systems, and in most cases it is a student who has taken this new course format. Our conclusion has been that even though we may not have completely defined what computer literacy is, we seem to be moving in the right direction by replacing programming with applications in our introductory course. To date this format has been successful enough at meeting our original goals of a "user friendly" computer learning environment that we intend on continuing with this outline for the next several years.

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AN INSTRUCTION AID

A Microcomputer-Assisted Futures Trading Game

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Abstract

A spreadsheet is being used to maintain the accounts of simulated futures trading of students in the Department of Agriculture at Western Illinois University. This simulated trading activity is being supported by three commodity price quotation services that provide tick-by-tick quotations.

Introduction

The intermediate futures trading course taught in the Department of Agriculture at Western Illinois University has two primary goals: 1) to familiarize the students with the jargon and institutions unique to the futures industry, and 2) to instruct them in the characteristics of several popular technical tools — including bar chart, point-and-figure chart, volume and open interest, moving averages, momentum, percent R, stochastics, relative strength index, and directional movement index — as well as in the use of these technical tools for the identification of trading signals by multiple hedgers and speculators. Because of this approach to teaching the course, there is insufficient time in the semester to incorporate a trading game as an instructional aid.

The WIU Trading Association — a student club — was formed primarily to provide students with the experience of real-time paper trading. Since the objective of this club is not only to allow the students to simulate position trading — but also to simulate day trading and arbitrage trading — it is necessary for them to have access to tick-by-tick price quotations.

The purpose of this article is to describe the spreadsheet utilized to maintain the accounts of simulated trades. Sample output is provided.

The Trading Game Template

The spreadsheet described in this paper was prepared with Apple Works on an Apple IIe; the microcomputer is equipped with an expander card to increase the RAM to 349K. Although this spreadsheet was set up with Apple Works, almost any spreadsheet program could be used.

Figure 1 displays the spreadsheet fields, while Figure 2 describes the column width and input of each field. Field A designates whether the trade results in an open futures position, or is an offsetting trade. An open position is coded as "1", and an offset position is coded as "0".

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Figure 1. Spreadsheet Fields

Field-Content	
A	Designates open or offset position
B	Futures lookup number
C	FUTURES CODE; long or short
D	# of contracts
E	DATE BOUGHT
F	PRICE BOUGHT
G	DATE SOLD
H	PRICE SOLD
I	POINTS +/-
J	TRADE $ P/L
K	NET $ P/L
L	ACCOUNT BALANCE
M	Brokerage fee

Figure 2. Spreadsheet Input Specification

Field	Column	Input Description
A	02	Type "1" for open position, or "0" for offset position
B	03	Type futures lookup number
C	06	Type standard futures designation; and, type "L" for long position or "S" for short position
D	03	Type number of contracts traded
E	09	Type date bought as "DD/MM/YY"
F	09	Type price bought as displayed on price quotation service
G	09	Type date sold as "DD/MM/YY"
H	09	Type price sold as displayed on price quotation service
I	09	Formula: +H6-F6
J	11	Formula: @IF(+B6=0,0,@LOOKUP(+B6,P951...P973) *@LOOKUP(+B6,V951...V973)**D6**16)
K	13	Formula: @IF(+A6=1,-(@LOOKUP(+B6,R857...R879))+J6, @IF(+J6)0,+J6-M6,+J6+(-M6)))
L	13	Formula: +L5+K6
M	05	Formula: @LOOKUP(+B6,T951...T973)**D6

Figure 3. Lookup Table.

	FUTURES		SIZE		INT MAR		BKR FEES		CONVERSION
1	BEANS	1	5000	1	1750	1	25	1	.0001
2	CORN	2	5000	2	600	2	25	2	.0001
3	WHEAT	3	5000	3	800	3	25	3	.0001
4	S&P 500	4	500	4	6000	4	25	4	.01
5	L CATTLE	5	40000	5	900	5	25	5	.0001
6	F CATTLE	6	44000	6	900	6	25	6	.0001
7	L HOGS	7	30000	7	800	7	25	7	.0001
8	P BELL	8	38000	8	1050	8	25	8	.0001
9	GOLD	9	100	9	3250	9	25	9	.1
10	YEN	10	12500000	10	900	10	25	10	.000001
11	T BOND	11	100000	11	2500	11	25	11	.01
12	BEAN M	12	100	12	850	12	25	12	.1
13	BEAN O	13	60000	13	1200	13	25	13	.0001
14	T BILLS	14	1000000	14	1000	14	25	14	.0001
15	CRUDE O	15	1000	15	400	15	25	15	.01
16	SILVER	16	5000	16	3250	16	25	16	.001
17	LUMBER	17	130	17	1050	17	25	17	.1
18	GNMA	18	0	18	0	18	0	18	0
19	SW FRANC	19	125000	19	2250	19	25	19	.0001
20	GER MARK	20	125000	20	2250	20	25	20	.0001
21	HEAT OIL	21	42000	21	4000	21	25	21	.0001
22	O JUICE	22	15000	22	3250	22	25	22	.0001
23	COTTON	23	50000	23	1250	23	25	23	.0001

Each futures instrument incorporated in the program is assigned a lookup number. These numbers are entered in Field B, and are utilized in a lookup table that is described below.

Futures traded on organized exchanges are assigned standard codes that designate the futures name, expiration month, and expiration year, respectively. For example, "CK88" denotes corn futures that expire in May of 1988. Field C contains the standard commodity code with a suffix designating the position as long or short: for example, "CK88L" represents a purchase of May 1988 corn futures resulting in a long position.

Field D indicates the number of contracts traded. Field E and G indicate the dates when futures are brought and sold, respectively. Dates are entered as " "DD/MM/YY", and are preceded by one " symbol in order to specify them as labels, thereby allowing the / symbol to be used to separate day from month from year.

Fields F and H indicate the prices at which trades are made. For offset positions, these fields contain the prices at which both trades were executed. For open positions which are marked-to-market, one field contains the price at which the market was entered long or short, while the other field contains the settlement price of the latest trading day. Prices are quoted by our price quotation services without a decimal point, and — with the exception of grains and certain financial instruments — are entered into Fields F and H in the same format as they are quoted. Grain prices are quoted in 1/8ths of a cent: for example, a grain price quoted as 2316 represents $2.31 3/4 per bushel. Similarly, for example, the price of U.S. long-term Treasury bonds quoted as 9424 represents 94-and-24/32-of-100%, or 94-and-75%. When such prices are entered in Fields F and H, they must be entered as decimal equivalents; thus, the grain price would be entered as "23175," while the bond price would be entered as "94.75."

The last five fields of the spreadsheet are calculated from the formulas shown in Figure 2. Field I shows the gain or loss per contract in points both for offset positions, and for open positions that are marked-to-market. For offset positions, POINTS +/- is calculated as the price sold minus the price bought. For open positions, POINTS +/- is calculated by comparing the price at which the position was taken, with the settlement price of the latest trading day.

Field J translates POINTS +/- per contract, to gain or loss in dollars for the total number of contracts traded. This calculation requires data stored in the lookup table: namely, the contract size, and a conversion factor. TRADE $ P/L is calculated by multiplying the size of the contract by the conversion factor by the number of contracts traded by POINTS +/-. The conversion factors are determined by the format used to enter prices. For example, if the price of a grain moves from "23175" to "23275," POINTS +/- would equal 100; this 100 points represents a one-cent move per bushel. To calculate the profit or loss per contract, POINTS +/- would be multiplied by the factor "0.0001" in order to convert 100 points to $0.01 per bushel; then, TRADE $ P/L is calculated as the price per bushel times 5,000 bushels per contract times the number of contracts traded.

Field K displays the trade's net gain or loss: that is, the gain or loss adjusted for initial margin or brokerage fee. This calculation distinguishes whether the trade,

Figure 4. Sample Output.

	FUTR CODE	#	DATE BOUGHT	PRICE BOUGHT	DATE SOLD	PRICE SOLD	PTS. +/-	TRADE $ P/L	NET $ P/L	ACCOUNT BALANCE
STUDENT NAME									BEGINNING BAL	$20,000
1	2 CZ86L	1	10/10/86	15500		15800	300	150	-450	19550
1	7LHZ86S	2		5800	10/12/86	5825	25	150	-1450	18100
0	8PBG87L	1	10/21/86	5900	10/25/86	5895	-5	-19	-44	18056
0	1 SX86L	5	10/22/86	48400	10/25/86	49300	900	2250	2125	20181
0	0	0					0	0	NA	NA
0	0	0					0	0	NA	NA
0	0	0					0	0	NA	NA
0	0	0					0	0	NA	NA
0	0	0					0	0	NA	NA
0	0	0					0	0	NA	NA
			YTD P/L.....$	2531						

on the one hand, is open and marked-to-market or, on the other hand, is offset. If the trade is open, NET $ P/L equals TRADE $ P/L minus initial margin and, thus, represents the amount of funds committed to the trade. If the trade is offset, NET $ P/L equals TRADE $ P/L minus brokerage fee and, thus, represents the actual profit or loss from the trade.

Field L shows ACCOUNT BALANCE. For the first trade entered into a student's account, ACCOUNT BALANCE equals the BEGINNING BALANCE plus NET $ P/L. For the second and subsequent trades, ACCOUNT BALANCE equals the ACCOUNT BALANCE of the previous trade plus NET $ P/L. Thus, this field displays the account's equity, taking into consideration closed as well as open positions.

Setting Up the Spreadsheet

Figure 3 displays the lookup table, which occupies Fields N through W. Fields N, P, R, T, and V contain the commodity lookup numbers that appear in Field B. Fields O, Q, S, U, and W contain, respectively, futures names, contract size, initial margin in dollars per contract, brokerage fee in dollars per contract per turn, and conversion factor. The initial margins and brokerage fees in the lookup table are those of a discount broker currently conducting business in the Board of Trade building in Chicago. The lookup table is able to be augmented to allow the trading of futures options.

Figure 4 displays sample output from the spreadsheet. The steps required to set up the spreadsheet are as follows.

Step 1..... set column widths as shown in Figure 2.

Step 2..... type column headings as shown in Figure 4.

Step 3..... set the spreadsheet to manual calculate.

Step 4..... using the formulas of Figure 2 and the sample output of Figure 4, prepare the first row of the spreadsheet: namely, row 6 fields A through M. Columns A, B, and D are to be occupied by zeroes. Enter the name of the first student in cell C5, and enter a BEGINNING BALANCE of $20,000 in cell L5.

Step 5..... using Figure 3 as a guide, prepare the lookup table; position the lookup table in columns N through W.

Step 6..... using Figure 4 as a guide, enter sample data to verify that the spreadsheet is calculating properly. To duplicate the output of Figure 4, the calculation function must be done two times.

Step 7..... after debugging is complete, copy row 6 columns A-M through the rest of the spreadsheet. With 349K of RAM, a total of 600 rows can be utilized. When copying, specify the lookup numbers as "fixed" and the other numbers as "relative."

Step 8..... after copying the maximum number of rows that the computer will allow, delete the rows that are not needed by using the delete function. This procedure will provide sufficient room to add additional accounts and/or to expand existing accounts at a later time by using the insert and copy functions, without having to move the lookup table. If this procedure is not followed, the lookup table will be pushed off of the spreadsheet.

Step 9..... it is suggested that each student is allocated 10 rows, adding additional space as needed by inserting additional rows and copying

the formulas to them. To set up the account of the second student, blank rows 16 and 17. In row 16, enter the following formula: YTD P/L.....$@SUM(J6...J15). This formula will compute total profit or loss of the first student, and print it at the bottom of that student's account. On row 17, enter the name of the second student in cell C17, and enter the BEGINNING BALANCE in cell L17.

Step 10..... proceed in this manner with the second and subsequent students.

Sample Spreadsheet Output

Four simulated trades are shown in the sample output of Figure 4. Field A (which indicates whether the position is open or offset), Field B (which contains the lookup number), and Field M (which contains the brokerage fee) are not printed on our daily reports; as explained above, however, the information contained in these fields is used by the formulas associated with Fields J, K, and M. Since the user must enter information into Fields A and B, those two fields are shown on Figure 4.

The first trade shown in Figure 4 is an open long position (designated by a "1" in Field A) of December 1986 corn (designated by lookup number "2" in Field B). The trader assumed the position by buying one contract on October 10, 1986, at a price of $1.55 per bushel; since the trade is open, DATE SOLD has not been entered. The position is marked-to-market at $1.58 (the settlement price of the latest trading day); the 300-point gain (i.e., PTS. +/-) is equivalent to a gain of $150 (i.e., TRADE $ P/L). Since this position is open, the account is debted with initial margin of $600; thus, NET $ P/L for the trade is a negative $450, and the ACCOUNT BALANCE is $19,550.

The second position is an open short December 1986 live hog taken on October 12 at $58.25 per hundredweight. This trade has a 25-point gain per contract; since there are two contracts involved, the trade has a profit of $150, and NET $ P/L reflects the account being debted with initial margin for two contracts.

In the third trade, a long positionof one February 1986 pork belly contract was assumed on October 21 at $59.00, and offset on October 25 at $58.95. A five-point loss was sustained; thus, $19 was lost on the trade, $25 paid for commission, and NET $ P/L is a negative $44.

The final trade shown in Figure 4 involves a long position of November 1986 soybeans in which a $0.09-per-bushel gain was enjoyed when the position was offset. Since five contracts were traded, TRADE $ P/L is $2,250; payment of $25 commission per contract results in NET $ P/L of $2,125, and the ACCOUNT BALANCE becomes $20,181.

At the bottom of the report, YTD P/L indicates the total profit or loss of all the trades without deducting for commissions. That is, the sum of TRADE $ P/L is $2,531.

Using the Spreadsheets

Students are able to trade at any time and as often as they wish during trading hours of the futures exchanges. Our price quotation systems are interfaced with a printer, and students simulate trading-orders by printing the page upon which appears the price of the futures to be traded. The student encircles the price of the specific contract to be traded, indicates whether the trade is a buy or sell, signs the order, and submits it to an in-basket. Every evening, a student uses the spreadsheet to enter new trades, to offset existing positions, and to mark-to-market all open positions. The spreadsheet output is then posted, and the day's orders are put in an out-basket for the students to collect the following morning for their record.

At the time of this writing, we have 22 active traders in the WIU Trading Association. The student who keeps the accounts spends an average of 1 1/4 hours per day in this activity, and receives three credit hours per semester as compensation.

It must be emphasized, that the WIU Trading Association is a student club, membership in which is not required. It is considered, however, to be an integral part of the students' learning experience, in that the market simulation is most realistic. By simulating trades, participating students acquire a "feel for the market"... something that must be learned by experience, rather than in a classroom environment.

Additionally, the participants find that they become very familiar with the fundamentals and technicals of the markets that they trade, in order to enhance the profitability of their trades. The trading competition among the students is quite vigorous, and awards are presented to the top traders at the completion of each semester. Furthermore, the WIU Trading Association is a topic that is often discussed during interviews with prospective employers.

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Plan On The 1988 NACTA Conference At Oregon State