

**FINAL**

**PRE/H LOAN BID ANALYSIS MODEL**

**USER'S MANUAL**

**Prepared for**

**U.S. Agency for International Development  
Bureau for Private Enterprise  
Office of Housing and Urban Programs**

**April 1994**

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**Prepared for  
United States Agency for International Development  
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Washington, DC**

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## Part I: The Loan Auction Process

### What is the PRE/H Loan Bid Analysis Model?

The loan bid analysis model developed at PRE/H employs two separate Lotus 1-2-3 spreadsheets that perform a series of calculations for either fixed or variable interest rate loan bids submitted under a housing guarantee loan auction organized by PRE/H. PRE/H uses the figures the spreadsheets arrive at (such as the *borrower's effective cost* and the *lender's effective yield*) to evaluate and compare the offers and, finally, in consultation with the borrower, award the loan to a lender.

Investors generally submit bids for financing housing guarantee loans by fax. Part I of the manual outlines how to interpret and extract information from the bids and carry out the calculations using the spreadsheets, as well as produce a set of printouts for use in evaluating the bids in committee.

This manual is based on Lotus version 2.4, which is the version in use at PRE/H at the time of this writing. A basic knowledge of Lotus 1-2-3 is helpful in operating the spreadsheets, but not necessary with the aid of this manual. Advanced modifications in the structure of the spreadsheet, as may be necessary for anomalous amortization schedules and terms, should be carried out by an experienced Lotus 1-2-3 user, using as a guide Part II of this manual, **Model Structure and Underlying Logic**, which describes in more detail the formulae on which the calculations are based, and the layout and options built into the spreadsheet model.

### General Overview of the Master Spreadsheet Files

The diskette included with this manual contains the two master spreadsheet files, **FIXED-1.WK1** and **VARI-1.WK1**. Each file contains four pairs of tables that apply to four individual bids of the same type, as well as a summary table that gathers information from each of the individual bids for comparison.

Figure 1 shows the overall layout of the entire **FIXED-1.WK1** spreadsheet. The four smaller rectangular regions positioned vertically down the left edge of the spreadsheet contain itemized data on each of the four bids the spreadsheet represents. Figure 2 is a printout of one of these regions, called an *Individual Bid Table* (sample data have been used). In the fixed rate spreadsheet the upper

lefthand corners of these four regions are located at cells B2, B108, B208 and B308. In the variable rate spreadsheet the upper lefthand corners are located at cells B2, B102, B202 and B302 (cells in the spreadsheet grid are identified by column letter and row number).

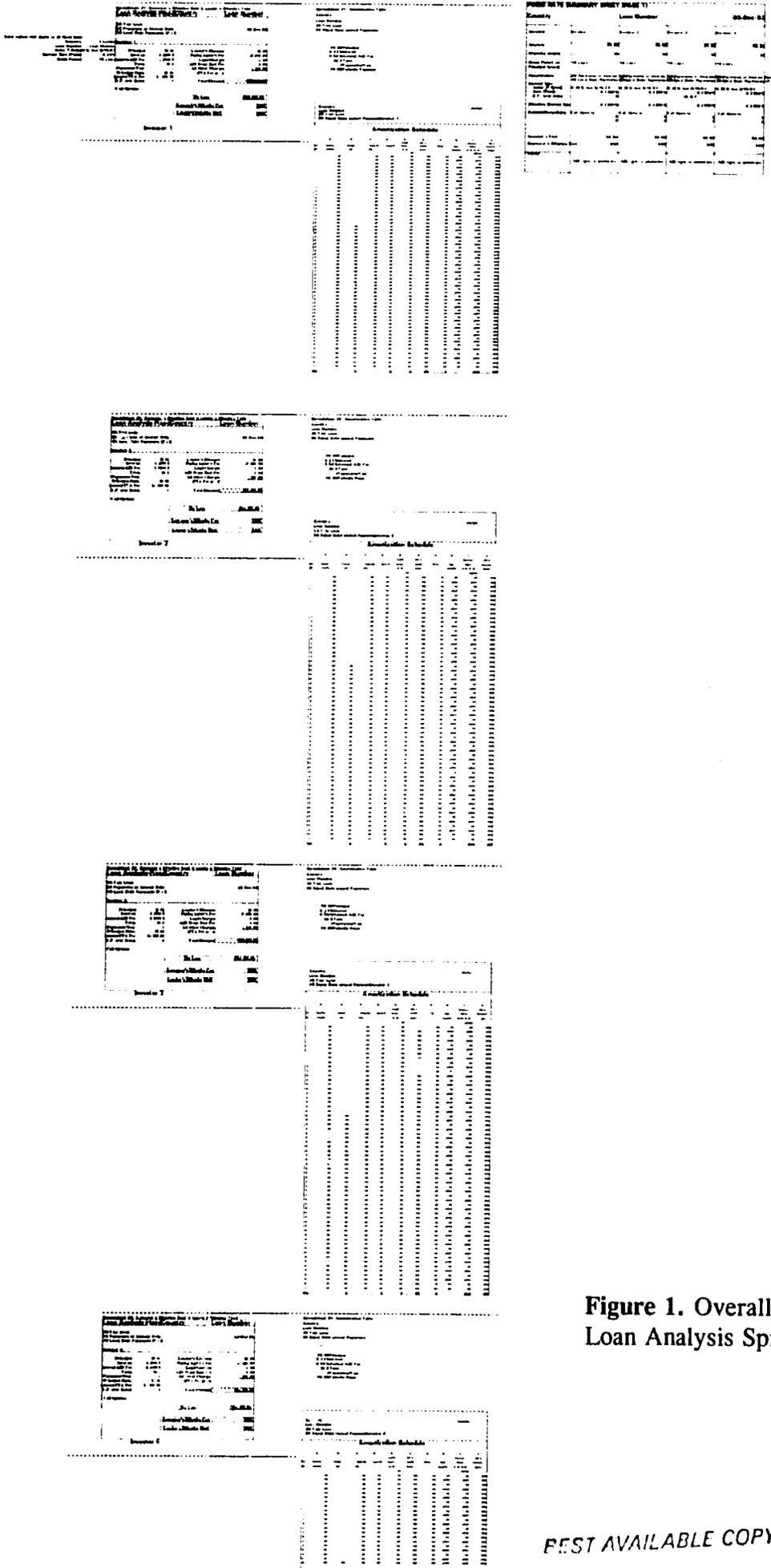
The taller rectangular regions that run down the middle of the spreadsheet to the left of each individual bid table are corresponding *Amortization Tables 1-4*, calculated on the basis of the figures itemized in the individual bid tables. Figure 3 is a sample printout of one of these regions.

The primary difference between the fixed and variable rate models is in the amortization method: the fixed model truly amortizes the repayment for level payments of principal and interest, while the variable model uses a sinking payment schedule, with a fixed principal payment amount. The standard grace period of 10 years over a 30-year loan term has been built into the amortization table. As noted in the introduction, the model can be manually restructured to accommodate anomalous payment schedules, such as refinancings and different loan terms and grace periods. Refer to **Section II: Model Structure and Underlying Logic** for detailed information on the calculation methods used in the spreadsheets and the location of formulae.

Last, the single rectangular region on the far right is the *Summary Table* that copies information from certain cells of the individual bid tables for comparison. Figure 7 on page 13 is a printout of the fixed rate Summary Table.

Only a small portion of the spreadsheet can be viewed on screen or printed legibly at one time. Figure 4, for example, shows only the upper lefthand corner of the spreadsheet, as it appears on the computer screen when the spreadsheet is first retrieved.

The screen displays several cells in blue or another contrasting color, depending on the monitor used. For a



**Figure 1. Overall Layout of the Loan Analysis Spreadsheets.**

Figure 2. Printout of the Fixed Rate Individual Bid Table.

Loan Analysis-Fixed		Country	Loan Number
30-Year Loan			
20 Payments of Interest Only			12-Jan-94
40 Level Debt Payments (P + I)			
<b>Investor 1</b>			
Principal	\$10,000,000.00	Lender's Discount	\$40,000.00
Interest	6.7500%	Paying Agent's Fee	25,000.00
Annual AID Fee	0.5000%	Legal Charges	0.00
Term	30.0	AID Front End Fee	100,000.00
Payments/Year	2	All Other Charges (PTA Fee yr. 1)	1,500.00
Principal Pmts.	\$459,234.47		
Annual PTA Fee	\$1,500.00		
B.P. over Index	25	<b>Total Discount</b>	<b>\$166,500.00</b>
<b>Call Options</b>			
		<b>Net Loan</b>	<b>\$9,833,500.00</b>
		<b>Borrower's Effective Cost</b>	<b>7.4236%</b>
		<b>Lender's Effective Yield</b>	<b>6.7858%</b>

**Investor 1**

Figure 3. Printout of the Fixed Rate Amortization Table.

Country Loan Number 30-Year Loan 20 Payments of Interest Only 40 Level Debt Payments (P + I)										12-Jun-94
										Investor 1
<b>Amortization Schedule</b>										
Pmt. No.	(A) Beginning Loan Bal	(B) Principal Paid	(C) Ending Bal (A - B)	(D) Interest Pd	(E) Total Pd Investor (B + D)	(F) NPV of Total Pd Investor	(G) AID Fee	(H) Riggs Annual Fee	(I) Borrower's Outflows (E + D + G + H)	(J) NPV of Borrower's Outflows
1	10,000,000.00		10,000,000.00	337,500.00	337,500.00	326,424.81	25,000.00	0.00	362,500.00	349,526.27
2	10,000,000.00		10,000,000.00	337,500.00	337,500.00	315,713.05	25,000.00	1,500.00	364,000.00	338,411.41
3	10,000,000.00		10,000,000.00	337,500.00	337,500.00	305,352.81	25,000.00	0.00	362,500.00	324,955.16
4	10,000,000.00		10,000,000.00	337,500.00	337,500.00	295,332.54	25,000.00	1,500.00	364,000.00	314,621.66
5	10,000,000.00		10,000,000.00	337,500.00	337,500.00	285,641.09	25,000.00	0.00	362,500.00	302,111.36
6	10,000,000.00		10,000,000.00	337,500.00	337,500.00	276,267.67	25,000.00	1,500.00	364,000.00	292,504.29
7	10,000,000.00		10,000,000.00	337,500.00	337,500.00	267,201.84	25,000.00	0.00	362,500.00	280,873.44
8	10,000,000.00		10,000,000.00	337,500.00	337,500.00	258,433.51	25,000.00	1,500.00	364,000.00	271,941.73
9	10,000,000.00		10,000,000.00	337,500.00	337,500.00	249,952.92	25,000.00	0.00	362,500.00	261,128.51
10	10,000,000.00		10,000,000.00	337,500.00	337,500.00	241,750.61	25,000.00	1,500.00	364,000.00	252,824.68
11	10,000,000.00		10,000,000.00	337,500.00	337,500.00	233,817.48	25,000.00	0.00	362,500.00	242,771.62
12	10,000,000.00		10,000,000.00	337,500.00	337,500.00	226,144.67	25,000.00	1,500.00	364,000.00	235,051.54
13	10,000,000.00		10,000,000.00	337,500.00	337,500.00	218,723.64	25,000.00	0.00	362,500.00	225,705.18
14	10,000,000.00		10,000,000.00	337,500.00	337,500.00	211,546.14	25,000.00	1,500.00	364,000.00	218,527.81
15	10,000,000.00		10,000,000.00	337,500.00	337,500.00	204,604.18	25,000.00	0.00	362,500.00	209,838.49
16	10,000,000.00		10,000,000.00	337,500.00	337,500.00	197,890.01	25,000.00	1,500.00	364,000.00	201,165.67
17	10,000,000.00		10,000,000.00	337,500.00	337,500.00	191,396.18	25,000.00	0.00	362,500.00	195,087.20
18	10,000,000.00		10,000,000.00	337,500.00	337,500.00	185,115.44	25,000.00	1,500.00	364,000.00	188,883.47
19	10,000,000.00		10,000,000.00	337,500.00	337,500.00	179,040.80	25,000.00	0.00	362,500.00	181,372.89
20	10,000,000.00		10,000,000.00	337,500.00	337,500.00	173,165.51	25,000.00	1,500.00	364,000.00	175,605.28
21	10,000,000.00	121,734.47	9,878,265.53	337,500.00	459,234.47	227,893.26	25,000.00	0.00	484,234.47	225,249.43
22	9,878,265.53	125,843.01	9,752,422.52	333,391.46	459,234.47	220,414.86	24,695.66	1,500.00	485,430.13	217,724.11
23	9,752,422.52	130,090.21	9,622,332.31	329,144.26	459,234.47	213,181.86	24,381.06	0.00	483,615.53	209,147.10
24	9,622,332.31	134,480.75	9,487,851.56	324,753.72	459,234.47	206,186.21	24,055.83	1,500.00	484,790.30	201,151.67
25	9,487,851.56	139,019.48	9,348,832.08	320,214.99	459,234.47	199,420.13	23,719.63	0.00	482,954.10	194,178.47
26	9,348,832.08	143,711.39	9,205,120.69	315,523.08	459,234.47	192,875.09	23,372.08	1,500.00	484,106.55	187,675.68
27	9,205,120.69	148,561.65	9,056,559.04	310,672.82	459,234.47	186,546.78	23,012.80	0.00	482,267.27	180,263.84
28	9,056,559.04	153,575.60	8,902,983.44	305,658.87	459,234.47	180,425.18	22,641.40	1,500.00	483,375.87	174,219.04
29	8,902,983.44	158,758.78	8,744,224.66	300,475.69	459,234.47	174,504.46	22,257.46	0.00	481,491.93	167,329.10
30	8,744,224.66	164,116.89	8,580,107.77	295,117.58	459,234.47	168,778.01	21,860.56	1,500.00	482,595.03	161,710.09
31	8,580,107.77	169,655.83	8,410,451.94	289,578.64	459,234.47	163,239.51	21,450.27	0.00	480,684.74	155,305.35
32	8,410,451.94	175,381.72	8,235,070.22	283,852.75	459,234.47	157,882.75	21,026.13	1,500.00	481,760.60	150,062.19
33	8,235,070.22	181,300.85	8,053,769.37	277,933.62	459,234.47	152,701.76	20,587.68	0.00	479,822.15	144,128.54
34	8,053,769.37	187,419.75	7,866,349.62	271,814.72	459,234.47	147,690.80	20,134.42	1,500.00	480,868.89	139,273.40
35	7,866,349.62	193,745.17	7,672,604.45	265,489.36	459,234.47	142,844.27	19,665.87	0.00	478,900.44	133,739.12
36	7,672,604.45	200,284.07	7,472,320.38	258,950.40	459,234.47	138,156.78	19,181.51	1,500.00	479,915.98	129,226.13
37	7,472,320.38	207,043.66	7,265,276.72	252,190.81	459,234.47	133,623.11	18,680.80	0.00	477,915.27	124,081.73
38	7,265,276.72	214,031.38	7,051,245.34	245,203.09	459,234.47	129,238.22	18,163.19	1,500.00	478,897.66	119,886.83
39	7,051,245.34	221,254.94	6,829,990.40	237,979.53	459,234.47	124,997.22	17,628.11	0.00	476,862.58	115,504.90
40	6,829,990.40	228,722.29	6,601,268.11	230,512.18	459,234.47	120,895.38	17,074.98	1,500.00	477,809.45	111,205.71
41	6,601,268.11	236,441.67	6,364,826.44	222,792.80	459,234.47	116,928.16	16,503.17	0.00	475,737.64	106,760.77
42	6,364,826.44	244,421.58	6,120,404.86	214,812.89	459,234.47	113,091.11	15,912.07	1,500.00	476,656.54	103,136.51
43	6,120,404.86	252,670.81	5,867,734.06	206,563.66	459,234.47	109,379.99	15,301.01	0.00	474,535.48	99,004.85
44	5,867,734.06	261,198.45	5,606,535.61	198,036.02	459,234.47	105,790.64	14,669.34	1,500.00	475,401.81	95,636.19
45	5,606,535.61	270,013.89	5,336,521.72	189,220.58	459,234.47	102,319.08	14,016.14	0.00	473,250.81	91,795.79
46	5,336,521.72	279,126.86	5,057,394.85	180,107.61	459,234.47	98,961.44	13,341.30	1,500.00	474,075.77	88,664.75
47	5,057,394.85	268,547.39	4,768,847.46	170,687.08	459,234.47	95,713.98	12,643.49	0.00	471,877.96	85,095.13
48	4,768,847.46	298,285.87	4,470,561.59	160,948.66	459,234.47	92,573.09	11,922.12	1,500.00	472,656.59	82,185.00
49	4,470,561.59	308,353.02	4,162,208.57	150,881.45	459,234.47	89,535.27	11,176.40	0.00	470,410.87	78,867.12
50	4,162,208.57	318,759.93	3,843,448.65	140,474.54	459,234.47	86,597.14	10,405.52	1,500.00	471,139.99	76,162.37
51	3,843,448.65	329,518.08	3,513,930.57	129,716.39	459,234.47	83,755.42	9,608.62	0.00	468,841.09	73,078.53
52	3,513,930.57	340,619.11	3,173,311.45	118,595.16	459,234.47	81,006.95	8,784.83	1,500.00	469,519.30	70,564.70
53	3,173,311.45	352,115.89	2,821,195.56	107,098.56	459,234.47	78,348.68	7,933.23	0.00	467,167.70	67,698.44
54	2,821,195.56	364,020.48	2,457,175.08	95,213.99	459,234.47	75,777.64	7,052.89	1,500.00	467,787.36	65,162.13
55	2,457,175.08	376,306.17	2,080,868.92	82,928.30	459,234.47	73,290.96	6,142.84	0.00	465,377.11	62,698.15
56	2,080,868.92	389,006.50	1,691,862.42	70,227.97	459,234.47	70,885.89	5,202.07	1,500.00	465,916.54	60,526.85
57	1,691,862.42	402,135.47	1,289,726.95	57,099.00	459,234.47	67,559.75	4,229.56	0.00	463,464.03	58,050.91
58	1,289,726.95	415,707.54	874,019.41	43,526.93	459,234.47	64,309.93	3,224.22	1,500.00	463,958.69	56,033.05
59	874,019.41	429,717.67	444,241.74	29,496.80	459,234.47	64,133.95	2,184.95	0.00	461,419.42	53,731.95
60	444,241.74	444,241.53	0.00	14,993.15	459,234.69	62,029.40	1,110.60	1,500.00	461,845.29	51,856.72
<b>Total</b>		<b>\$10,000,000</b>		<b>\$15,119,379</b>	<b>\$25,119,379</b>	<b>\$9,960,000</b>	<b>\$1,119,954</b>		<b>\$26,284,333</b>	<b>\$9,833,500</b>

typical loan auction, these are the only cells in which new information must be entered. The spreadsheet automatically calculates all other values based on these.

Five of these blue cells as shown in Figure 4, cells B9, B10, B11, B12, and B13, contain entries that apply to all the individual bids of a given type: the **Country/Borrower**, the **Loan Number**, the **Interest Rate Basis Index**, and the **Current Rate** of that index. Information entered in these cells is copied automatically into each of the 4 individual templates.

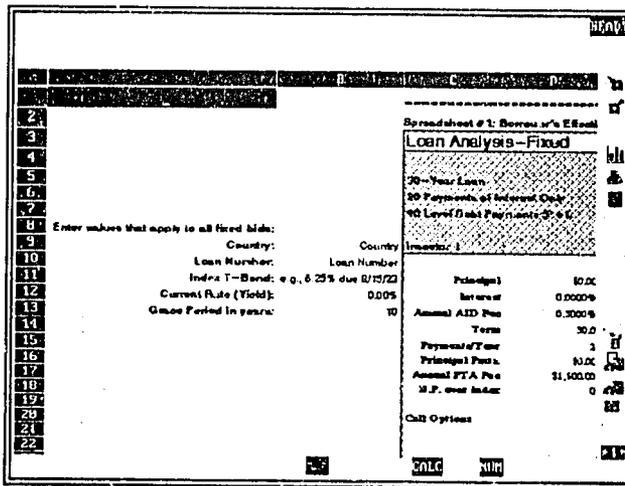


Figure 4. Initial screen view of the FIXED-1 spreadsheet, showing part of the first *Individual Bid Table*.

## Step 1 Retrieve a Blank Spreadsheet File

The next 6 sections describe the steps to follow in using the spreadsheets, with an emphasis on the mechanical side of entering data and producing the calculations sheets.

Sign onto the network (in the PRE/H Washington office) and enter the Lotus 1-2-3 program: choose **L Lotus 1-2-3** from the *Office of PRE/H* menu and **1-2-3** from the Access System menu.

Insert the master diskette containing the 2 spreadsheet templates into the diskette drive. The master spreadsheet files have been designated read-only, so they cannot be deleted or saved over. However, it is a good idea to use a blank diskette to store the new files created in the course of the loan auction, so they can be saved easily for reference.

From the Lotus 1-2-3 functions menu, to **change the default directory in Lotus 1-2-3 to the diskette drive that contains the master diskette**: press **F10**, File, Directory, and type the drive letter for the files. Suppose the diskette is in diskette drive A: type **A:\**.

To create the first individual bid spreadsheet, **retrieve the first master spreadsheet file into Lotus 1-2-3**. Press **F10**, File, Retrieve. The names of the 2 master files are displayed at the top of the screen. Use the arrow keys to move the cursor onto the **FIXED-1.WK1** (for fixed rate bids) or **VARI-1.WK1** (for variable rate bids) filename, and press **ENTER**. The red "wait" light in the upper lefthand corner signals that the machine is processing.

Suppose the first set of bids you work on are fixed rate bids: choose **FIXED-1.WK1**. The manual gives special instructions where the variable rate spreadsheet must be handled differently.

As noted in the **General Overview** section, Figure 4 gives a view of the blank spreadsheet file **FIXED-1.WK1** as it appears on the screen when first retrieved. Most of the spreadsheet is hidden off-screen.

## Step 2 Fill in the General Information

The computer screen displays several words on the spreadsheet in blue or another contrasting color. This is the only place in the spreadsheet where information must be entered manually during a normal auction. All other values are calculated automatically based on the data entered in these cells.

Replace the sample data in the blue cells B9, B10, B11, B12 and B13 with the **Country/Borrower, Loan Number, Interest Rate Basis Index** and the **Current Rate** common to all the fixed rate bids in the current loan auction. These values will be automatically copied into the appropriate cells of the four *individual bid tables* and the summary table when calculations are updated. (See **Appendix A: Entering Data into the Spreadsheet** for a description of the keystrokes used to enter data in Lotus 1-2-3).

**For fixed rate bids**, the interest rate is usually expressed in the bid as a certain number of percentage basis points

(hundredths of a percent) above the rate quoted on the bid date for a Treasury bond due in a certain year (e.g., the 30-year bond due 2/15/2023).

**For variable rate bids**, the interest rate is usually given as a certain number of basis points above the LIBOR (London Inter-Bank Offering Rate).

Current values for both the long bond and the LIBOR can be found in the Washington Post Business section, the Financial Times or the Wall Street Journal. **Enter the current rate for the bond or LIBOR into the *Current Rate* cell as a decimal;** i.e., 8.2% should be entered as 0.082. The correct percentage will appear in the cell when you press .

### Step 3 Fill in the Individual Bid Tables

Next, **enter the specific values for the first individual loan bid;** these are the *Lender Name*, the *Basis Points above Index*, *Lender's Discount*, and the *Call Options*.

The *Lender's Discount* is expressed in the bid either as a hard dollar amount or as a percentage of the loan amount. In either case enter the correct dollar amount in cell F11 (the currency symbol and commas will be inserted automatically). Check the bid to ensure that any *Legal Charges* are included in the *Lender's Discount*. The PRE/H Notice of Investment Opportunity usually specifies this. If so, leave the *Legal Charges* amount at zero.

Press  to recalculate the values. The spreadsheet will update all cells based on the entered information. The Lender's name will be copied to the bottom of the page, the *Total Discount* and *Net Loan* cells will show dollar amounts, and the *Borrower's Effective Cost* and *Lender's Effective Yield* cells will show percentages; typical values are around 7 or 8 percent for fixed rate loans and 3 or 4 percent for variable rate loans.

**Repeat this process** for each of the three remaining individual bid tables, located down the left edge of the spreadsheet at rows 108, 208 and 308. It is important to remember to recalculate the values in the spreadsheet whenever changes are made to the data in the blue cells.

Each set of four *Individual Bid Tables* is represented in one *Summary Table* page, which is located at the upper right of the spreadsheet. The spreadsheet automatically generates the Summary Table (see Step 6). For each additional group of four or fewer bids of the same type retrieve a new copy of the master spreadsheet file. Print out the individual bid tables and save each copy of the spreadsheet in the series on your own blank diskette before retrieving a new blank master (see step 4).

#### **Step 4 Save the File**

**Before printing** the individual bid tables or amortization schedules save the file under a name that identifies the bids as fixed or variable rate, and the file's order in the series if there are more than one, e.g., **FIXED-2.WK1** for the second set of four fixed rate bids (the **.WK1** extension is mandatory for Lotus version 2.4 files and will be inserted automatically).

**To save the file under a new name**, remove the master diskette from the drive, insert your blank diskette and press **[F2]**, **File, Save**. Since you designated the diskette drive as the default in step 1, the complete filename will appear at the prompt: **A:\FIXED-1.WK1**. Pressing **[ESC]** once lists the contents of the default directory, allowing you to choose a filename from there to replace, if you wish. Pressing **[ESC]** twice clears the suggested filename, leaving the default directory stem. Type in the new filename, e.g., **FIXED-2.WK1**, and press **[ENTER]**.

However, if you later revise the spreadsheet, **replace the file on disk**: press **[F2]**, **File, Save**. Since the new subdirectory or diskette drive was designated as the default, the complete filename, **A:\FIXED-2.WK1** will appear as the suggested filename. In this case, you do want to save the file over the earlier version of itself, so press **[ENTER]** to accept the name and answer **Replace** to the query. Lotus returns you to the spreadsheet editing screen when finished.

#### **Step 5 Print Out the Individual Bid Tables**

Print sections of spreadsheets by marking off a range of cells, which Lotus sends to the printer as a page. Each of the rectangular regions listed in the **General Description**—the individual bid tables, the amortization tables, and the summary table—are designed to fill one page.

To mark off the range to be printed, position the cell pointer in one corner of the page to be printed, and press **Print, Range, Clear, Range, Set**. Use **Print**, rather than **Print**, to invoke formatting commands. Define the range using the arrow keys to move the cell pointer to the opposite corner of the region to be printed, and press Enter. A dotted line appears that defines the range of cells to be printed.

To send the print job to the printer, press **Print, Go**. In the PRE/H office, the network will return a message to your screen stating that the print job has been sent to a printer.

Repeat this process to print each of the four individual bid tables; it is only necessary to print out the amortization tables if the information is required to compare bids.

**Step 6  
Summary  
Spreadsheets**

After all revisions have been made to the individual bid tables, format and print the summary tables, one for each set of four bids in the fixed or variable rate spreadsheet.

Figure 5 shows the summary table as it appears on screen before being formatted. The values in the lighter shaded information columns have been copied automatically from elsewhere in the spreadsheet. Since Lotus 1-2-3 cannot center justify currency and percentage values, the columns appear jagged. All information is present and accurate, but some formatting is necessary before print-out.

Country	Loan Number	Investor 1	Investor 2	Investor 3
Amort		\$10,000,000.00	\$10,000,000.00	
Maturity (years)		30	30	
Grace Period on Principal (years)		10	10	
Amortization		20 Payments of Interest Only 40 Level Debt Payments (P+I)	20 Payments of Interest Only 40 Level Debt Payments (P+I)	20 Payment 40 Level De
Interest Rate		6.25% due 8/15/22	6.25% due 8/15/22	6.25% due
B.P. over Index		0.5000%	0.5000%	

Figure 5. Screen view of the Summary Table before formatting.

To center justify the information columns (columns AB, AC, AD, and AE) change the contents of the cells from formulae that reference other cells in the spreadsheet to text characters. In the interests of accuracy and efficiency it is important that the individual bid tables be finalized before the formulae are stripped. No changes made to the individual bid tables after the formulae are stripped will be transferred automatically to the summary tables; any changes made at that point must be entered into the summary table manually.

**To strip the formulae from the cells** in the information columns position the cell pointer in cell AB5, that is, at the top left of the box containing the name of the first lender. Press  Range, Value. Move the cell pointer using the arrow keys to block the entire information range (from AB5 to AE39) and press .

**To center justify the text in the cells** position the cell pointer at the top left of the unshaded area again (cell AB5) and press  Range, Label, Center. Use the arrow keys to block the same area (from AB5 to AE39) and press .

Some editing of the numbers will be necessary, since the currency symbols and commas will not have carried over, and the percentages will appear as decimal values. Refer to **Appendix A: Entering Data into the Spreadsheet** for instructions on editing text in cells. Figure 6 shows the screen containing formatted text.

If more than one summary table is used, edit the title cell to add the notation *Page 2*, etc., and save the files under different names, as described in Step 4.

FIXED RATE SUMMARY SHEET (PAGE 1)			
COUNTRY	LOAN NUMBER		
Investor	Investor 1	Investor 2	
Amount	\$10,000,000	\$10,000,000	
Maturity (years)	30	30	
Loan Period on Principal (years)	10	10	
Amortization	20 Payments of Interest Only 40 Level Debt Payments (P+I)	20 Payments of Interest Only 40 Level Debt Payments (P+I)	20 Payments of Interest Only 40 Level Debt Payments (P+I)
Interest Rate	6.25% due 9/15/73	6.25% due 9/15/73	6.25%
Index (T-Bond)	5%	5%	
Rate (Yield)	5%	5%	
B.T. over Index	25		

Figure 6. Screen view of the formatted *Summary Table*.

To print the *Summary Table* refer to the instructions for defining a range and printing under Step 5. Figure 7 is a printout of the *Summary Table* for the fixed bid spreadsheet containing sample data.

Before printing, save a copy of this altered spreadsheet onto the diskette being used to save files for the current bid auction. To save the file, press , File, Save. Since the new subdirectory or diskette drive was designated as the default, the complete filename, for example A:\FIXED-1.WK1, will appear as the suggested filename. Change the name to differentiate this file from the spreadsheet that contains the automatically referenced summary table.

**FIXED RATE SUMMARY SHEET (PAGE 1)**

**Country**

**Loan Number**

**12-Jan-94**

<b>Investor</b>	<b>Investor 1</b>	<b>Investor 2</b>	<b>Investor 3</b>	<b>Investor 4</b>
<b>Amount</b>	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000
<b>Maturity (years)</b>	30	30	30	30
<b>Grace Period on Principal (years)</b>	10	10	10	10
<b>Amortization</b>	20 Payments of Interest Only 40 Level Debt Payments (P + I)	20 Payments of Interest Only 40 Level Debt Payments (P + I)	20 Payments of Interest Only 40 Level Debt Payments (P + I)	20 Payments of Interest Only 40 Level Debt Payments (P + I)
<b>Interest Rate</b>				
--Index (T-Bond)	6.25% due 8/15/23	6.25% due 8/15/23	6.25% due 8/15/23	6.25% due 8/15/23
--Rate (Yield)	6.5%	6.5%	6.5%	6.5%
--B.P. over Index	25		45 B.P.	
<b>Effective Current Rate</b>	6.75%	6.85%	6.95%	6.65%
<b>Callable/Noncallable</b>	Call Options	Call Options	Call Options	Call Options
<b>Investor's Fees</b>	\$40,000	\$55,000	\$35,000	\$65,000
<b>Borrower's Effective Cost</b>	7.4236%	7.5391%	7.6210%	7.3468%
<b>Notes:</b>	AID right to accelerate			

Figure 7. Printout of the Fixed Rate Summary Table.

## Part II: Model Structure and Underlying Logic

The PRE/H Loan Bid Analysis Model is designed to calculate the **Borrower's Effective Cost** and the **Lender's Effective Yield**, and so make it possible to compare financing offers for loans to be guaranteed by AID. These annual interest rates quantify the overall effect of cash discounts (purchase price) taken by the lender, Payment and Transfer Agent fees, AID's fee, and other expenses that make it impossible to directly compare proposed interest rates.

The **Borrower's Effective Cost** is the annual percentage rate equivalent of the internal rate of return of the borrower's outflows over the life of the loan, based on semi-annual payments at the annual interest rate. The formula that calculates it for the first individual bid table in the fixed rate spreadsheet is located in cell F24 and is expressed as:

**@SUM(2\*@IRR(D12/2,W35..W95))**

This formula totals the annual equivalent of the series of semi-annual internal rates of return, based on half the annual percentage rate expressed in cell D12 (the interest rate for the loan) and the semi-annual borrower's outflows, beginning with the net loan amount as a negative number in cell W35 and ending with the final outflow in cell W95 of the amortization schedule.

The formulae that calculate the Borrower's Effective Cost for *Individual Bid Tables 2 to 4* are located in cells F129, F229 and F329. Cell locations are slightly different in the variable rate model.

The **Lender's Effective Yield** is the annual percentage rate equivalent of the internal rate of return of the investor's inflows over the life of the loan based on semi-annual payments at the annual interest rate. The formula that calculates it for the first individual bid table in the fixed rate spreadsheet is located in cell F26 and is expressed as:

**@SUM(2\*@IRR(D12/2,S35..S95))**

This formula totals the annual equivalent of the series of semi-annual internal rates of return based on half the annual percentage rate expressed in cell D12 (the interest rate for the loan) and the semi-annual lender's inflows, beginning with the principal minus the lender's discount as a negative number in cell S35 and ending with the final outflow in cell S95 of the amortization schedule.

The formulae that calculate the Lender's Effective Yield for individual bid tables 2 to 4 are located in cells F131, F231 and F331.

The following 4 matrices list the model's calculation formulae with their cell locations for the first individual bid table and amortization table in both the fixed rate and the

variable rate spreadsheets. The precise formulae that appear in *Individual Bid Tables* and *Amortization Tables 2 to 4* are not represented in the matrices, but differ only in that they reflect values relevant to the table in which they are located. Use these matrices with the spreadsheet open on-screen as a reference to understand the model's underlying logic.

In the formulae the leading + sign of a cell location indicates that the cell contains a formula, rather than text or numbers. The \$ signs are used in manipulating formulae, and designate absolute, rather than relative cell locations. They have no effect on calculations in the normal use of the model.

FIXED-1.WK1 Fixed Rate Individual Bid Table No. 1			
Label	Cell	Formula	Explanation
Principal	D11	Number entered by user	
Interest	D12	+B12+(D18*0.0001)	The effective current interest rate of the bid, expressed as the Basis Index Rate from cell B12 plus the Basis Points over Index from cell D18 (multiplied by 0.0001 to express it as a percentage value).
Annual AID Fee	D13	0.005	AID's annual fee is 0.5%.
Term	D14	30	The typical term of a fixed rate loan is 30 years.
Payments/Year	D15	2	Payments are typically semi-annual.
Principal Payments	D16	+O15	Copies the value calculated in cell O15.
Annual PTA Fee	D17	1500	The annual Paying and Transfer Agent's Fee is \$1,500 for fixed rate loans.
B.P. over Index	D18	Number entered by user	The number of basis points above the index bond rate that the investor has bid, expressed as a whole number, rather than a percentage value.
Lender's Discount	F11	Number entered by user	The number entered is automatically formatted as a dollar value, with \$ and commas.
Paying Agent's Fee	F12	25000	The Paying Agent's front-end fee for fixed rate bids is \$25,000.
Legal Charges	F13	0	All Legal Charges are generally specified as to the lender in the Notice of Investment Opportunity in the Federal Register.

FIXED-1.WK1 Fixed Rate Individual Bid Table No. 1			
Label	Cell	Formula	Explanation
AID Front End Fee	F14	+D11*0.01	The Principal amount from cell D11 times 0.01, or 1% of the principal amount.
All Other Charges (PTA Fee year 1)	F15	1500	The first annual PTA fee is deducted from the loan proceeds at closing.
Total Discount	F18	@SUM(F11..F15)	The total front end deductions from the loan proceeds, expressed as the total of the values in cells F11 (Lender's Discount), F12 (Paying Agent's Fee), F13 (Legal Charges, if any are to the borrower), F14 (AID Front End Fee), and F15 (All Other Charges, i.e., the PTA fee for the first year).
Net Loan	F22	+D11-F18	The Principal amount from cell D11 minus the total discount from cell F18.

**FIXED-1.WK1 Fixed Rate Amortization Table No. 1**

Label	Cell	Formula	Explanation
Periodic Payment	O15	@ROUND(@PMT(D11,D12/D15,D14*D15),2)	<p>Two embedded expressions. The first formula, @ROUND, rounds the value of the second formula to two decimal places, since it is a dollar value.</p> <p>The formula @PMT calculates the periodic payment based on the three values separated by commas within the parenthesis: (i) the Principal from cell D11; (ii) the periodic interest rate, expressed here as the interest rate from cell D12 divided by the number of payments per year from cell D15; and (iii) the number of periodic payments, expressed as the term from cell D14 times the number of payments per year from cell D15.</p>
Payment Number	N36 N37 N38 etc.	1 1 + N36 1 + N37	Payment number 1 in cell N36 is a hard number, and subsequent payment numbers add 1 to the total in the preceding cell.

**FIXED-1.WK1 Fixed Rate Amortization Table No. 1**

Label	Cell	Formula	Explanation
Beginning Loan Balance	O36 O37 O38 etc.	+D11 +Q36 +Q37	The Beginning Loan Balance in cell O36 is the Principal amount from cell D11. Subsequent entries in cells O37 and higher are the Ending Loan Balance from the previous payment period, drawn from column Q.
Principal Paid	P56 etc.	+S56-R56	Principal payments on fixed rate loans are generally made beginning with payment 21, following the 10-year grace period. The amount deducted from the principal balance is equal to the Total Paid Investor from column S minus the Interest Payment from column R.
Ending Loan Balance	Q36 etc.	@SUM(\$O36-\$P36)	The Beginning Loan Balance from column O minus the principal paid from column P of the same row (row 36 in this example).
Interest Paid	R36 etc.	@SUM(\$O36*\$O\$11/\$O\$14)	The Beginning Loan Balance from column O for the same row multiplied by the periodic interest rate, expressed as the annual interest rate from cell O11 divided by the number of payments per year from cell O14.

**FIXED-1.WK1 Fixed Rate Amortization Table No. 1**

Label	Cell	Formula	Explanation
Total Paid Investor	S35 S36 etc. S56 etc.	-D11 + F11 + R36  + P56 + R56	<p>Cell S35 contains the net loan as a negative number (the lender's first negative cash flow), expressed as the negative of the Principal amount from cell D11 plus the lender's discount from cell F11.</p> <p>During the 10-year grace period (first 20 payments), the Total Paid Investor is equal to the Interest Paid, from column R.</p> <p>After the end of the grace period, the Total Paid Investor is the Payment Amount calculated in cell O15.</p>
NPV of Total Paid Investor	T36 etc.	+ S36 / (1 + (F\$26/2))^ + N36	<p>The present value of the corresponding future dollar amount given in column S, according to the formula.</p> $P = F_n (1/(1+i))^n$ <p>where <math>F_n</math> = future value at the end of n periods; <math>i</math> = nominal interest rate per period, expressed as ½ the value Lender's Effective Yield from cell F26; and <math>n</math> = number of periods from column N.</p>

**FIXED-1.WK1 Fixed Rate Amortization Table No. 1**

Label	Cell	Formula	Explanation
AID Fee	U36 etc.	@SUM(\$O36*0.005/\$O\$14)	The AID fee is ½ of 1 percent of the outstanding Principal from column O per year, expressed as a percentage rate per period by dividing ½% by the number of payments per year from cell O14.
Riggs Annual Fee	V36 V37 etc.	0 +D17 etc.	For fixed rate bids the Riggs fee is assessed at \$1,500 per year, assessed every second payment.
Borrower's Outflows	W35 W36 etc.	-F22 +S36 + U36 + V36 etc.	The first value, in cell W35, is the net loan from cell F22 expressed as a negative number, since it represents a cash inflow. In cell W36 and thereafter, the Total Paid Investor from column S is added to the AID fee from column U and the Riggs Annual Fee from column V for the current period.

**FIXED-1.WK1 Fixed Rate Amortization Table No. 1**

Label	Cell	Formula	Explanation
NPV of Borrower's Outflows	X36 etc.	+W36/(1+(F\$24/2))^ +N36	<p>The present value of the corresponding future dollar amount given in column W, according to the formula</p> $P = F_n (1/(1+i))^n$ <p>where <math>F_n</math> = future value at the end of n periods; i = nominal interest rate per period, expressed as ½ the Borrower's Effective Yield from cell F24; and n = number of periods from column N.</p>

VARI-1.WK1 Variable Rate Individual Bid Table No. 1			
Label	Cell	Formula	Explanation
Principal	D10	Number entered by user	
Interest	D11	+B14+(D17*0.0001)	The effective current interest rate of the bid, expressed as the Basis Index Rate from cell B14 plus the Basis Points over Index from cell D17 (multiplied by 0.0001 to express it as a percentage value).
Annual AID Fee	D12	0.005	AID's annual fee is 0.5%.
Term	D13	30	The typical term of a fixed rate loan is 30 years.
Payments/Year	D14	2	Payments are typically semi-annual.
Principal Payments	D15	+O14	Copies the value calculated in cell O14.
Annual PTA Fee	D16	3000	The annual Paying and Transfer Agent's Fee is \$3,000 for variable rate loans.
B.P. over Index	D17	Number entered by user	The number of basis points above the index bond rate that the investor has bid, expressed as a whole number, rather than a percentage value.
Lender's Discount	F10	Number entered by user	The number entered is automatically formatted as a dollar value, with \$ and commas.
Paying Agent's Fee	F11	25000	The Paying Agent's front-end fee for variable rate bids is \$25,000.
Legal Charges	F12	0	All Legal Charges are generally specified in the Federal Register notice as to the lender.

VARI-1.WK1 Variable Rate Individual Bid Table No. 1			
Label	Cell	Formula	Explanation
AID Front End Fee	F13	+D10*0.01	The Principal amount from cell D1 i times 0.01, or 1% of the principal amount.
All Other Charges (PTA Fee year 1)	F14	3000	The first annual PTA fee is deducted from the loan proceeds at closing.
Total Discount	F17	@SUM(F10..F14)	The total front end deductions from the loan proceeds, expressed as the total of the values in cells F10 (Lender's Discount), F11 (Paying Agent's Fee), F12 (Legal Charges, if any are to the borrower), F13 (AID Front End Fee), and F14 (All Other Charges, including the PTA fee for the first year).
Net Loan	F21	+D10-F17	The Principal amount from cell D10 minus the total discount from cell F17.

**VARI-1.WK1 Variable Rate Amortization Table No. 1**

Label	Cell	Formula	Explanation
Principal Payment	O15	@ROUND(D10/40),2)	<p>Two embedded expressions. The first formula, @ROUND, rounds the value of the second formula to two decimal places, since it is a dollar value.</p> <p>Equal principal payments begin with payment 21 (after the end of the 10-year grace period). The periodic principal payment is equal to the Principal amount from cell D10 divided over 40 payments.</p>
Payment Number	N35 N36 N37 etc.	1 1 + N35 1 + N36	Payment number 1 in cell N35 is a hard number, and subsequent payment numbers add 1 to the total in the preceding cell.
Beginning Loan Balance	O35 O36 O37 etc.	+ D10 + Q35 + Q36	The Beginning Loan Balance in cell O35 is the Principal amount from cell D10. Subsequent entries in cells O36 and higher are the Ending Loan Balance from the previous payment period, drawn from column Q.
Principal Paid	P55 etc.	+ S55-R55	Principal payments are generally made beginning with payment 21, after the 10-year grace period. The amount deducted from the principal balance is equal to the Total Paid Investor from column S minus the Interest Payment from column R.

VARI-1.WK1 Variable Rate Amortization Table No. 1			
Label	Cell	Formula	Explanation
Ending Loan Balance	Q35 etc.	@SUM(\$O35-\$P35)	The Beginning Loan Balance from column O minus the principal paid from column P of the same row (row 35 in this example).
Interest Paid	R35 etc.	@SUM(\$O35*\$D\$11/\$D\$14)	The Beginning Loan Balance from column O for the same row multiplied by the periodic interest rate, expressed as the annual interest rate from cell D11 divided by the number of payments per year from cell D14.
Total Paid Investor	S34 S35 etc. S55 etc.	-D10 + F10 + R35  + \$O\$14 + R55	<p>Cell S34 contains the net loan as a negative number (the lender's first negative cash flow), expressed as the negative of the Principal amount from cell D10 plus the lender's discount from cell F10.</p> <p>During the 10-year grace period (first 20 payments), the Total Paid Investor is equal to the Interest Paid, from column R.</p> <p>After the end of the grace period, the Total Paid Investor is the Payment Amount calculated in cell O14 plus the Interest Paid from column R.</p>

VARI-1.WK1 Variable Rate Amortization Table No. 1			
Label	Cell	Formula	Explanation
NPV of Total Paid Investor	T35 etc.	$+S35/(1+(F\$25/2))^n + N35$	<p>The present value of the corresponding future dollar amount given in column S, according to the formula.</p> $P = F_n (1/(1+i))^n$ <p>where <math>F_n</math> = future value at the end of n periods; i = nominal interest rate per period, expressed as ½ the value Lender's Effective Yield from cell F25; and n = number of periods from column N.</p>
AID Fee	U35 etc.	@SUM(\$O35*0.005/\$D\$14)	The AID fee is ½ of 1 percent of the outstanding Principal from column G per year, expressed as a percentage rate per period by dividing ½% by the number of payments per year from cell D14.
Riggs Annual Fee	V35 V36 etc.	0 +D16 etc.	For variable rate bids the Riggs fee is assessed at \$3,000 per year, assessed every second payment.

**VARI-1.WK1 Variable Rate Amortization Table No. 1**

Label	Cell	Formula	Explanation
Borrower's Outflows	W34 W35 etc.	-F21 +S35+U35+V35 etc.	The first value, in cell W34, is the net loan expressed from cell F21 as a negative number, since it represents a cash inflow. In cell W35 and thereafter, the Total Paid Investor from column S is added to the AID fee from column U and the Riggs Annual Fee from column V for the current period.
NPV of Borrower's Outflows	X35 etc.	+W35/(1+(F\$23/2))^N35	The present value of the corresponding future dollar amount given in column W, according to the formula  $P = F_n (1/(1+i))^n$ where $F_n$ = future value at the end of n periods; i = nominal interest rate per period, expressed as 1/2 the Borrower's Effective Yield from cell F23; and n = number of periods from column N.

## Appendix A: Entering Data into the Spreadsheet

This appendix is a general reference on entering and editing data in Lotus 1-2-3.

To enter data in a cell:

1. Use the arrow keys to move the cell pointer to the cell in which you want to enter the data.
2. Type the data to be entered in the cell. The characters you type will appear on the edit line at the top of the screen.
3. Press  or an arrow key to complete the entry.

Since the cells of the blank spreadsheets already contain values (sometimes simply zero as a place-holder), you generally will be making changes to existing information. Follow these guidelines:

**To replace the information in a cell**, move the cell pointer to that cell and type the new information. The characters you type will appear on the edit line at the top of the screen. Pressing  or an arrow key replaces the information in the spreadsheet.

**To edit existing information in a cell**, press . The current information will appear on the edit line at the top of the screen. Use the arrow, Home, and End keys to navigate within the entry. Type in the revisions, using the  and backspace keys to erase unwanted characters. Press  to replace the information in the spreadsheet.

**Cell Justification.** Some of the spreadsheet cells, such as the lender's and borrower's names, contain text, rather than values. Lotus only accepts text entries that begin with a character that indicates the cell justification: ' for left alignment, " for right alignment, and ^ for centering. This initial character is optional for value entries. These characters are already present in the spreadsheet template and will remain if you simply edit the cell (by pressing ). However, if you replace the information in the cell, Lotus will insert the default, left alignment; and right or center alignment for the cell may then have to be added manually (i.e., by inserting the character at the beginning of the line).

Once new values have been entered in the cells highlighted with blue, **press  to update the calculations** in the other cells.