Guided Project 2-3

Sierra Pacific Community College District (SPCCD) consists of four individual community colleges. The workbook for this project includes an amortization schedule for student loans and a fee and credit hour summary for several departments.

Skills Covered in This Project

- Name cell ranges.
- Create and copy formulas.
- Set mathematical order of operations.
- Use absolute references in formulas.
- Insert the current date as a function.
- Use the PMT function.
- Audit formulas.
- Use SUMIF and SUMPRODUCT.

1. Open the SierraPacific-02.xlsx start file. If the workbook opens in Protected View, click the Enable Editing button so you can modify it. The file will be renamed automatically to include your name. Change the project file name if directed to do so by your instructor, and save it.

2. Set range names for the workbook.
   a. On the Student Loan sheet, select cells B5:C8.
   b. Click the Create from Selection button [Formulas tab, Defined Names group].
   c. Verify that the Left column box in the Create Names from Selection dialog box is selected.
   d. Deselect the Top row box if it is checked and click OK.
   e. Select cells E5:F7. Repeat steps a–d to create range names.
   f. Click the Name Manager button [Formulas tab, Defined Names group] to view the names in the Name Manager dialog box (Figure 2-90).
   g. Click Close.

3. Enter a PMT function.
   a. Select C8.
   b. Click the Financial button [Formulas tab, Function Library group] and select PMT.
   c. Click the Rate box and click cell C7. The range name Rate is substituted.
   d. Type /12 immediately after Rate to divide by 12 for monthly payments.
   e. Click the Nper box and click cell C6. The substituted range name is Loan_Term.
   f. Type *12 after Loan_Term to multiply by 12.
   g. Click the Pv box and type a minus sign (−) to set the argument as a negative amount.
   h. Click cell C5 (Loan_Amount) for the pv argument. A negative loan amount reflects the lender’s perspective, since the money is paid out now (Figure2-91)
   i. Leave the Fv and Type boxes empty.
   j. Click OK. The payment for a loan at this rate is $186.43, shown as a positive value.
4. Create a total interest formula.
   a. Click cell **F5** (`Total_Interest`). This value is calculated by multiplying the monthly payment by the total number of payments to determine total outlay. From this amount, you subtract the loan amount.
   b. Type `=`, click cell **C8** (the `Payment`).
   c. Type `*` to multiply and click cell **C6** (`Loan_Term`).
   d. Type `*12` to multiply by 12 for monthly payments.
   e. Type `−` immediately after `*12` to subtract.
   f. Click cell **C5** (the `Loan_Amount`). The formula is `Payment*Loan_Term*12−Loan_Amount`. Parentheses are not required, because the multiplications are done from left to right, followed by the subtraction (Figure 2-92).
   g. Press `Enter`. The result is $1,185.81.

5. Create the total principal formula and the total loan cost.
   a. Select cell **F6** (`Total_Principal`). This value is calculated by multiplying the monthly payment by the total number of payments. From this amount, subtract the total interest.
   b. Type `=`, click cell **C5** (the `Payment`).
   c. Type `*` to multiply and click cell **C6** (`Loan_Term`).
   d. Type `*12` to multiply by 12 for monthly payments.
   e. Type `−` immediately after `*12` to subtract.
   f. Click cell **F5** (the `Total_Interest`). The formula is `Payment*Loan_Term*12−Total_Interest`.
   g. Press `Enter`. Total principal is the amount of the loan.
   h. Click cell **F7**, the `Total_Cost` of the loan. This is the total principal plus the total interest.
   i. Type `=`, click cell **F5**, type `+`, click cell **F6**, and then press `Enter`.

6. Build an amortization schedule.
   a. Click cell **B13**. The beginning balance is the loan amount.
   b. Type `=`, click cell **C5**, and press `Enter`.
   c. Format the value as **Accounting Number Format**.
   d. Select cell **C13**. The interest for each payment is calculated by multiplying the balance in column B by the rate divided by 12.
e. Type = and click cell B13.
f. Type *( and click cell C7.
g. Type /12. Parentheses are necessary so that the division is done first (Figure 2-93).
h. Press Enter and format the results as Accounting Number Format.
i. Select cell D13. The portion of the payment that is applied to the principal is calculated by subtracting the interest portion from the payment.
j. Type =, click cell C8 (the Payment).
k. Type -, click cell C13, and press Enter.
l. Click cell E13. The total payment is the interest portion plus the principal portion.
m. Type =, click cell C13, type +, click cell D13, and then press Enter. The value matches the amount in cell C8.
n. Select cell F13. The ending balance is the beginning balance minus the principal payment.
o. Type =, click cell B13, type -, click cell D13, and then press Enter. The ending balance is $9,851.07.

Formulas in cells B13:F13

<table>
<thead>
<tr>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>B13</td>
</tr>
<tr>
<td>C13</td>
</tr>
<tr>
<td>D13</td>
</tr>
<tr>
<td>E13</td>
</tr>
<tr>
<td>F13</td>
</tr>
</tbody>
</table>

7. Fill data and copy formulas.
   a. Select cells A13:A14. This is a series with an increment of 1.
   b. Drag the Fill pointer to reach cell A72. This sets 60 payments for a five-year loan term.
   c. Select cell B14. The beginning balance for the second payment is the ending balance for the first payment.
   d. Type =, click cell F13, and press Enter.
   e. Double-click the Fill pointer for cell B14 to fill the formula down to row 72. The results are zero until the rest of the schedule is complete.
g. Double-click the Fill pointer at cell F13. All of the formulas are filled (copied) to row 72 (Figure 2-94).

h. Scroll to see the values in row 72. The loan balance reaches 0.

i. Press Ctrl+Home.

8. Build a multiplication formula and set order of mathematical operations.

   a. Click the Fees & Credit sheet tab and select cell F7. Credit hours times number of sections times the fee calculates the total fees from a course.

   b. Type =, click cell C7, type *, click cell D7, type *, click cell E7, and then press Enter. No parentheses are necessary because multiplication is done in left to right order.

   c. Select cell G7. Fee collected per credit hour is determined by dividing the value in cell F7 by the number of sections times credit hours times average enrollment.

   d. Type =, click cell F7, and type / (. Parentheses are necessary so that left to right order is overridden.

   e. Click cell C7, type *, and click cell D7.

   f. Type *, click cell C20, and press F4 (FN+F4) to make the reference absolute (Figure 2-95).

   g. Press Enter. A message box notes that the closing parenthesis is missing.

   h. Click Yes in the message box.

   i. Select cells F7:G7 and double-click the Fill pointer to copy the formulas.

   j. Format cells F7:G18 as Currency and set a bottom border for cells F18:G18.

9. Use SUMIF.

   a. Select cell D26. Fees by department can be calculated.

   b. Click the Math & Trig button [Formulas tab, Function Library group] and select SUMIF.
c. Click the Range box and select cells A7:A18. This range will be matched against the criteria.

d. Press F4 (FN+F4) to make the reference absolute.

e. Click the Criteria box and type BIO.

f. Click the Sum_range box, select cells F7:F18, and press F4 (FN+F4).

g. Click OK. Total fees for the Biology department are 13350.

h. Format the results as Currency.

10. Copy a SUMIF function and check formula errors.

a. Click cell D26 and drag its Fill pointer to copy the formula to cells D27:D29 without formatting.

b. Double-click cell D27. You need to change the criteria.

c. Edit the criteria argument in the Formula bar or in the cell to display FRL. Do not change the quotation marks or any other punctuation (Figure 2-96).

d. Press Enter or click the Enter button in the Formula bar. An error triangle appears in the top left corner of cell D27.

e. Click cell D27 and point to its Trace Error button to see the ScreenTip (Figure 2-97). The formula has different criteria than the immediately preceding formula, but this is correct.

f. Click the Trace Error button and choose Ignore Error.

g. Double-click cell D28 and edit the criteria argument to display IMS.

h. Edit the argument in cell D29 to show the department initials.

i. Format cells D27:D29 as Currency.

11. Use SUMPRODUCT and trace an error.

a. Select cell E26 and click the Formulas tab.

b. Click the Math & Trig button in the Function Library group and select SUMPRODUCT.

c. Click the Array1 box and select cells C7:C9, credit hours for courses in the Biology Department.

d. Click the Array2 box and select cells D7:D9, the number of sections for the Biology Department.

e. Click OK. The Biology Department has 98 total credit hour offerings.

f. Click cell E26 and point to its Trace Error button. The formula omits adjacent cells in columns C and D, which is correct.

g. Click the Trace Error button and select Ignore Error.
12. Copy and edit `SUMPRODUCT`.
   a. Click cell E26 and drag its Fill pointer to copy the formula to cells E27:E29 without formatting.
   b. Click cell E27 and click the Insert Function button in the Formula bar.
   c. Select and highlight the range in the Array1 box and select cells C10:C12. The range you select replaces the range in the dialog box (Figure 2-98).
   d. Select the range in the Array2 box and select cells D10:D12.
   e. Click OK.
   f. Edit and complete the formulas in cells E28:E29 and ignore errors.

13. Insert the current date as a function.
   a. Select cell G30.
   b. Type `=` to and press Tab to select the function.
   c. Press Enter.
   d. Press Ctrl+Home.

14. Paste range names.
   a. Click the New sheet button in the sheet tab area.
   c. Press F3 (FN+F3) to open the Paste Name dialog box. Or click Use in Formula arrow [Formulas tab, Defined Names group] and select Paste Names…
   d. Click the Paste List button.
   e. AutoFit each column.

15. Save and close the workbook (Figure 2-99).

16. Upload and save your project file.

17. Submit project for grading.
### Sierra Pacific Community College District
#### Credit Hours and Fees by Department

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
<th>Total Credit Hours</th>
<th>Total Fees</th>
<th>Per Credit Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>3</td>
<td>6</td>
<td>9,995.00</td>
<td>3,332.67</td>
</tr>
<tr>
<td>Business Studies</td>
<td>4</td>
<td>8</td>
<td>10,390.00</td>
<td>2,597.50</td>
</tr>
<tr>
<td>Computer Science</td>
<td>5</td>
<td>25</td>
<td>19,395.00</td>
<td>775.80</td>
</tr>
<tr>
<td>English</td>
<td>2</td>
<td>4</td>
<td>4,995.00</td>
<td>2,497.50</td>
</tr>
<tr>
<td>History</td>
<td>4</td>
<td>16</td>
<td>10,390.00</td>
<td>649.37</td>
</tr>
<tr>
<td>Mathematics</td>
<td>3</td>
<td>6</td>
<td>8,995.00</td>
<td>2,998.33</td>
</tr>
<tr>
<td>Physical Education</td>
<td>5</td>
<td>25</td>
<td>19,395.00</td>
<td>775.80</td>
</tr>
</tbody>
</table>

### Sierra Pacific Community College District
#### Student Loan Amortization

<table>
<thead>
<tr>
<th>Loan Amount</th>
<th>$10,000.00</th>
<th>Total Interest</th>
<th>$1,585.43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment</td>
<td>$450.00</td>
<td>Total Cost</td>
<td>$11,585.43</td>
</tr>
</tbody>
</table>

### Average Enrollments

<table>
<thead>
<tr>
<th>Department</th>
<th>Total Enrollments</th>
<th>Total Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Administration</td>
<td>10</td>
<td>1,500</td>
</tr>
<tr>
<td>Foreign Languages</td>
<td>1</td>
<td>1,200</td>
</tr>
<tr>
<td>Information Technology</td>
<td>5</td>
<td>7,000</td>
</tr>
<tr>
<td>Physical Education</td>
<td>5</td>
<td>1,700</td>
</tr>
</tbody>
</table>

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**Guided Project 2-3**

1. **Loan Amount**
   - Formula: `=Student Loan!$C$5`

2. **Loan Term**
   - Formula: `=Student Loan!$C$6`

3. **Payment**
   - Formula: `=Loan Amount / Loan Term`

4. **Rate**
   - Formula: `=PERCENTAGE` (using a rate of 5%)

5. **Total Cost**
   - Formula: `=Loan Amount + Total Interest`

6. **Total Interest**
   - Formula: `=Loan Amount * Rate`

7. **Total Principal**
   - Formula: `=Loan Amount`

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**2-99 Completed Excel 2-3**