4 INTRODUCTION TO THE *CALC* SPREADSHEET
Preparing a Grade book

LEARNING OUTCOMES

This tutorial will help you understand what a spreadsheet is and where a spreadsheet might come in useful for classroom management. Specifically you will learn about the following topics.

- Helpful hints for understanding the basic concepts of a spreadsheet, including:
  - cells, rows and columns
  - cell coordinates
  - entering data into a spreadsheet cell
- Setting up labels, including:
  - setting column widths
  - aligning data in cells
  - entering column and row labels
- Creating and copying formulas
- Making changes in a spreadsheet
  - inserting rows and columns
  - deleting rows and columns
- Producing a printed copy of the contents of a spreadsheet document
- Saving a backup copy of your work
- Appreciating the power of spreadsheet templates

> **A caveat before you begin:** You'll find it easiest to use the tutorial if you follow the directions carefully. On computers there are always other ways of doing things, but if you wander off on your own be sure you know your way back!

4.1 GETTING STARTED

Before we begin

For this lesson it will be good to have a separate folder inside your Data Files folder for the spreadsheets you're going to create.

> Insert your **USB drive** (Removable disk) containing the **Work Files for LibreOffice** in a **USB port** on your computer

> Navigate to **your USB drive** > **Work Files for LibreOffice folder** > **Data Files folder**, and create a new folder called **Spreadsheet Documents**

Some background about spreadsheets

Fig. 4.1 illustrates a typical spreadsheet for keeping track of student grades.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2	GRADE REPORT												
3													
4	Class:	Grade 4											
5	Semester:	1											
6	Year:	2010											
7													
8				A1	A2	A3	A4	A5		TOTAL	PCNT		
9													
10			MAX	20	20	30	100	20		190			
11													
12	LAST NAME	FIRST NAME											
13													
14	Urchick	Pamela		12	14	28	97	3		154	81%		
15	Gasdick	Barbara		10	15	23	65	16		129	68%		
16	Giorgio	Marilyn		13	18	25	74	17		147	77%		
17	Mitnick	Teresa		16	15	20	32	15		98	52%		
18	Bond	Patrick		14	13	20	78	18		143	75%		
19	Dane	Stephanie		18	19	19	65	19		140	74%		
20	Bond	Andrew		15	16	21	85	16		153	81%		
21	Fraher	Brigid		18	17	26	95	20		176	93%		
22	Brown	Lyn		20	15	19	73	15		142	75%		
23	Potochar	Charlene		16	20	20	91	13		160	84%		
24													
25		Average		15.2	16.2	22.1	75.5	15.2		144.2	76%		
26		Max		20	20	28	97	20		176	93%		
27		Min		10	13	19	32	3		98	52%		

Sheet1

Fig. 4.1 Typical spreadsheet (Grade book) for a 4th Grade class

As illustrated in Fig. 4.1, a spreadsheet is a grid divided into rows that run across the spreadsheet from left to right, and columns that run from top to bottom. The leftmost column (Column A in Fig. 4.1) is often used for *descriptive labels* that identify the name of the information that is stored in each of the cells in any particular row in the spreadsheet. The rightmost columns of data (Column J and M in Fig. 4.1), and the lower rows of a set of figures (Rows 25 thru 27 in Fig. 4.1) are often set aside for row and column *totals and summaries* respectively.

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The *Calc* screen is thus a window onto a large grid of rows and columns (Fig. 4.1) into each cell of which data are entered, usually from the keyboard. You can build formulas into selected cells which automatically carry out calculations on designated sets of data. You'll learn how to do this in this lesson and the next.

Historically, spreadsheets were maintained in large format books called accounting journals or ledgers. They date back to the 14th and 15th centuries and were famously first documented by a Franciscan monk named Brother Luca Pagioli (Fig. 4.2), who published, in 1494, the first known book about accounting practices.

Fig. 4.2 Fra Luca Pagioli

Nearly 500 years later, in 1978, Dan Bricklin, a young graduate student at the Harvard School of Business, came up with the idea for an interactive spreadsheet and, together with Robert Frankston, developed a program for an early PC—the Apple II.

Fig. 4.3 Dan Bricklin and Robert Frankston, c. 1980

They called their program *Visicalc*. It simulated a traditional accounting worksheet, though they saw its potential for use outside the accounting field. It was, in fact, the very first electronic spreadsheet, a prototype of the many varieties of spreadsheets available today.

The *Calc* spreadsheet which you are about to learn to use is considerably more powerful than *Visicalc*, if only because the computers of today are many times faster than anything available in 1978. *Calc* is able to handle much larger sets of numerical data at much greater speeds and has a richer set of functions and general calculating and data visualization tools. Like *Visicalc*, however, it goes beyond the hand-written worksheet used in traditional accounting in that it is *programmable*—you can program it to do the math for you! And this was Dan Bricklin's stroke of genius.

We have a multitude of challenges in our everyday lives, so why do math if we can design a machine to do it for us? This doesn't mean we shouldn't teach math in schools, of course. What it means is that we should teach math in schools so that our students can *understand* what the computers can do for them, as well as *know how* to program the computer do it.

You can build instructions into an electronic spreadsheet to do relatively complex mathematical calculation and analysis. You also can build instructions into the spreadsheet to carry out humdrum, repetitive calculations—the kind of calculations which could take hours, even days, to complete manually but which, when done electronically, take a matter of seconds.

The spreadsheet is most used for business accounting and data analysis. In K-12 schools, however, the spreadsheet comes in handy as a tool for keeping grades. It also is useful for creating charts and graphs of all kinds, as well as for data analysis related to class projects where numbers need to be organized, managed, and analyzed. It also is an excellent tool for helping students learn math concepts and has many other applications with students across the curriculum. The Skills Consolidation section at the end of the chapter will give you the opportunity to brainstorm with your classmates in order to come up with a list of such applications.

But first you need to learn more about spreadsheets and how they work.

Practice makes perfect

As with the word processor, the best way to learn about the spreadsheet is to build a spreadsheet document and work with it. So here goes.

Open the **LibreOffice program**, then open a **new *Calc* spreadsheet**

You should now see on your screen a new *Calc* spreadsheet document titled *Untitled 1*.

Templates

A template is an outline or form which can be used over and over when carrying out other projects that require the same basic document format. Here you are going to build a spreadsheet template to simulate an empty Grade book. Once you have created the template, you will keep it as on your disk for future use. You will be able to use this template from semester to semester to build the electronic Grade books for all your future classes.

The default *LibreOffice* name for documents (such as *Untitled 1*) is always nondescript. So it always is a good idea to immediately name any new document with a recognizable name of your choice. After all, you want to be able to tell what each document contains when you look at a list of the many document names on your disk. Shakespeare asked: "What's in a name?" Well, when it comes to file names on a computer disk, names matter a great deal! You are about to create a template for a Grade book, so let's call a spade a spade: a good name for the document might be something like "Gradebook Template."

From the **File** menu select **Save As** and navigate to your **USB Drive** > **Work Files for LibreOffice** > **Data Files**) to your **Spreadsheet Documents folder**

Type **Gradebook Template** as the document name for the new spreadsheet and click on the **Save** button

You should now be looking at a screen with the name of your document (*Gradebook Template*) at the top of a blank worksheet ready for you to insert your data.

4.2 HELPFUL HINTS WHILE USING THE SPREADSHEET

Let's start by examining some of the nuts and bolts of spreadsheets.

A spreadsheet is a grid divided into rows and columns
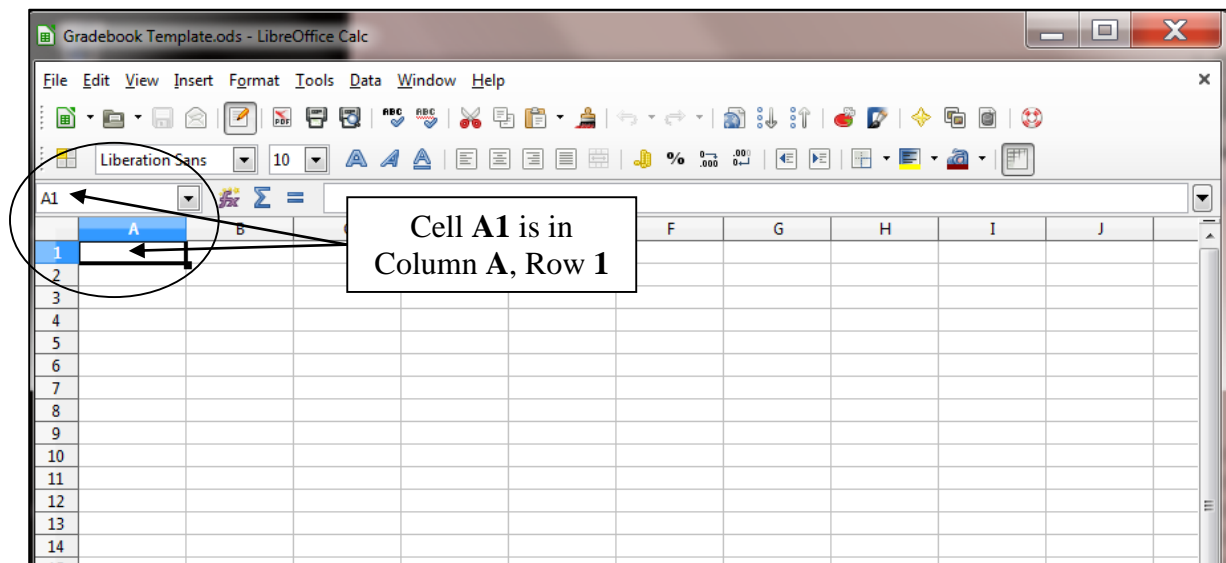The intersection of a column and row is referred to as a cell (Fig. 4.4).

Fig. 4.4 Think of the spreadsheet as a grid divided into rows and columns

Right now, cell A1 is selected in the top left-hand corner of the spreadsheet.

With **cell A1** selected, type the number **2014** in cell **A1** and hit **Enter** so you have at least one item of data in the spreadsheet for what follows

A cell is where information, in the form of either a label, or a number, or a formula for calculation, will be entered.

- *Labels* are where you use text to describe the data in the columns and rows.

- *Numbers* are just that—numbers, as in mathematics. Numbers are what spreadsheets are all about.

- *Formulas* (and *Functions*) are mathematical expressions built into certain cells that instruct the spreadsheet to carry out calculations on specified sets of numbers in the rows and columns.

As you go on with the tutorial, these concepts will become clearer to you.

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Moving around in the spreadsheet

There are tens of thousands of rows and columns in the *Calc* spreadsheet! That should be enough for any spreadsheet applications you might have in mind.

Usually you will use the mouse to select the cell you want to work in by clicking on the cell. Once you have entered data into a particular cell, you can use the commands in Table 4.1 to proceed to other related cells.

Key Pressed	Effect
Tab	Moves selection to the right, to the next cell in the same row
Shift-Tab	Moves selection to the left, to the previous cell in the same row
Arrow keys	Move selection one cell in any direction
Enter	Moves selection down to the next cell in the same column
Shift-Enter	Moves selection up to the previous cell in the same column
Scroll bars	Scroll vertically and horizontally through the spreadsheet
Accept button ↵	Accepts data in a cell but does <u>not</u> move to another cell
Cancel button ✖	Cancels data in a cell but does <u>not</u> move to another cell

Table 4.1 Cell selection commands

Try out each option now before proceeding—this will help you follow later directions.

> Practice by moving around the spreadsheet—after you have visited several cells, end up by clicking on cell **A1** to make it the current or active cell.

Identifying the active cell's coordinates

Look in the top left hand corner of the *Calc* screen (Fig. 4.4 on the previous page) to see which cell (the active cell) you are in at any point in time.

> Click on any cell now and look at the **cell's coordinates** in the **top left corner** of the spreadsheet window

Each cell (a location in the spreadsheet) has an *address* which begins with a *letter* to indicate the *column*, followed by a *number* to indicate the *row*. For example, G6 identifies the cell at the intersection of column G, row 6.

> Click on **cell G6** now and look at the **cell's coordinates** in the **top left corner** of the spreadsheet window

Selecting a range (group) of cells

Table 4.2 lists the methods for selecting a group or range of cells.

Task	Method
To select a **block of cells**	Drag from the **first cell** to the **last cell** in the block
To select an entire **row** of cells (horizontally from left to right)	Click on the **number** (the **row label**) on the left edge of the spreadsheet
To select an entire **column** of cells (vertically, from top to bottom)	Click in the **letter(s)** of the alphabet (the **column label**) at the top of the column
To select **several rows**	Drag the **row numbers** on the left edge of the spreadsheet
To select **several columns**	Drag across the **column labels** at the top of the columns

Table 4.2 Selecting a group (range) of cells

Once again, take a moment now to try each of these methods for selecting groups of cells

Location of the active (selected) cell after entering data into a cell
When you type the data for a cell, the data appear both in the *cell* you have selected AND in the *Entry bar* at the top of the spreadsheet (Fig. 4.5).
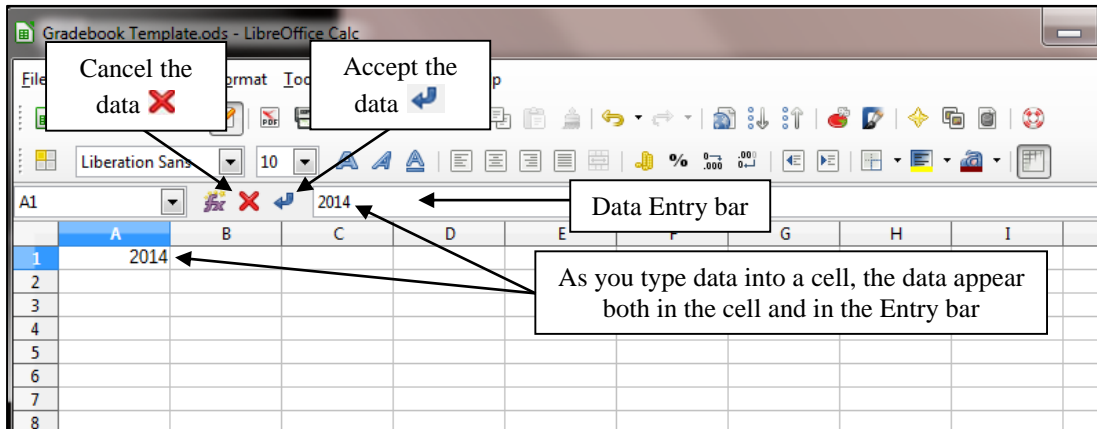

Fig. 4.5 The spreadsheet Data Entry bar

See how this works for yourself now.

Click on **cell B1** and type the number **2014** but **don't** hit **Enter**, then look at the **Entry bar** above the spreadsheet cells

The data are again in both places at once, but they are not yet *permanently* accepted into the cell. The number *2014* awaits your acceptance of it into the spreadsheet. The data are displayed in the cell to give you the opportunity to:

1. check that what you typed is correct before accepting the data into the active (selected) cell;

2. make up your mind whether the data should be entered into the spreadsheet at all;

3. decide which cell you would like to be the active cell next after the data have been copied to the currently active cell.

You accept the data by either:

- moving to another cell in the spreadsheet (by clicking on the Enter key or Tab key on the keyboard or by using the mouse to click on some other cell);

or,

- clicking on the Accept ( ) icon to the left of the Entry bar.

You may decide *not* to enter the data into the spreadsheet. In this case you either hit the Del(ete) key in the Entry bar (see Fig. 4.5 above) and start over. If, on the other hand, the data are correct, you would hit the Enter key (which moves the active cell to the next cell down in the column, or click on the Accept button ( ), which keeps the cell you are working in as the active cell.

Click the **Accept** button ( ) now

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Notice that the number *2014* in cell B1, as with the number 2014 in cell A1, is immediately *right justified*, aligned on the right edge of the cell, which is the correct justification for *numbers* in mathematics.

Alternatively, you may want to proceed to the cell immediately to the right of the active cell into which the number you just typed will go. Or you may want to proceed to the cell just below the active cell, or the cell just above the active cell, and so on.

A short while back you practiced moving around the spreadsheet using the commands listed in Table 4.1 on page 113. This table also lists the key(s) to press to tell *Calc* which cell to go to after you accept the data you have typed into the Entry bar. It might be a good idea, if you're new to spreadsheets, to take a few minutes to check out that table again.

The cell in which you just typed **2014 (Cell B1)** is still the active cell.

> Press each of the keys or key combinations in Table 4.1 (on page 113) and check out the result of the action in the spreadsheet each time

Blanking out a cell or cells in the spreadsheet
The quickest way to blank out a selected cell or cells is to hit the Del(ete) key on the keyboard. Let's try this now.

> Click on the first cell holding the data **2014** (**cell A1**) and hit the **Del(ete)** key

Now cell A1 is empty. The Delete key saves you having to use the mouse and menus.

> **Undo** what you just did by pressing **Ctrl+z** (to put back **2014** in cell **A1**)

To delete the data in a group of cells you would drag across the cells to select them—they will become highlighted. Then you'd hit the Del(ete) key as before.

> Practice this now by dragging across Cells **A1** and **B1** and hitting the **Del(ete)** key

Bingo. Remember that you can undo the *Delete* operation (or any other Edit operation) by immediately pressing *Ctrl+z* on the keyboard.

Editing the data in the Entry bar
While you are typing in data, and before you hit Enter or click on the Accept button (↵), you can edit the data as if you are using a word processor.

Editing data after they have been entered into a cell
If you are past the cell where you have an error and want to make a correction or change, move back to the cell in question by selecting (clicking on) it. The data in that cell will be displayed in the Entry bar at the top of the spreadsheet. Click in the Entry bar (the cursor will show where you clicked on the text) and then just go ahead and make any changes you want. Replace the old entry by clicking the Accept button (↵) or by selecting another cell in the spreadsheet.

At this point your Gradebook Template spreadsheet should be empty of data since you just deleted the entries in the first two cells (A1 and B1).

4.3 SETTING UP LABELS FOR YOUR GRADE BOOK TEMPLATE

When you have completed this section and the following section (Sections 4.3 and 4.4) your Grade book should look like Fig. 4.6 on the next page. The steps that follow will help you achieve this goal. Follow them carefully because when you are finished creating the Gradebook Template you

will have a working template to use as the basis for any gradebook you might like to use with your present or future classes.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2	GRADE REPORT													
3														
4	Class:													
5	Semester:													
6	Year:													
7														
8				A1	A2	A3	A4	A5		TOTAL		PCNT		GRADE
9														
10			MAX	0	0	0	0	0		0				
11														
12	LAST NAME	FIRST NAME												
13														
14										0		#DIV/0!		
15										0		#DIV/0!		
16										0		#DIV/0!		
17										0		#DIV/0!		
18										0		#DIV/0!		
19										0		#DIV/0!		
20										0		#DIV/0!		
21										0		#DIV/0!		
22										0		#DIV/0!		
23										0		#DIV/0!		
24														

Fig. 4.6 Gradebook Template

Let's start in Cell A2.

> Select cell **A2** and type **GRADE REPORT**

> Check the data in the **Entry bar** to make sure you typed the label correctly; correct any errors

> Click the **Accept** button (⏎) when you are sure all is well (or press one of the other keys—arrow keys, Enter/Enter key, Tab key—which accept data into the spreadsheet)

The data in Cell A2 is an example of a label—which is any text you use to <u>describe</u> the data that are in a spreadsheet. All the column and row headings are labels also. Let's put some labels in a couple of other cells in Column A

> Select cell **A4** and type the label **Class:** (note the colon), then press **Enter** to move the cell pointer to cell **A5**

> Type the label **Semester:** and press **Enter** to move the cell pointer to cell **A6**

> Next type the label **Year:** and click on the **Accept** button (⏎) in the **Entry bar**

At this point you should be thinking about saving the work you have completed to this point! Since you have already named the document (*Gradebook Template*), you can use a quick keyboard shortcut.

> Press **Ctrl+s** to save your work to this point

Aligning the labels in spreadsheet cells
The grade book will look best if the three labels you just entered into cells A4, A5, and A6 of the spreadsheet are *right aligned* in their respective cells. Right aligned means that the label is aligned to the right side of the cell. Unless you tell *Calc* otherwise, the system will *left align* any text

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(letters of the alphabet, for example). Likewise, the system will *right align* any data that are made up of numbers. This makes sense if you look at Fig. 4.7.
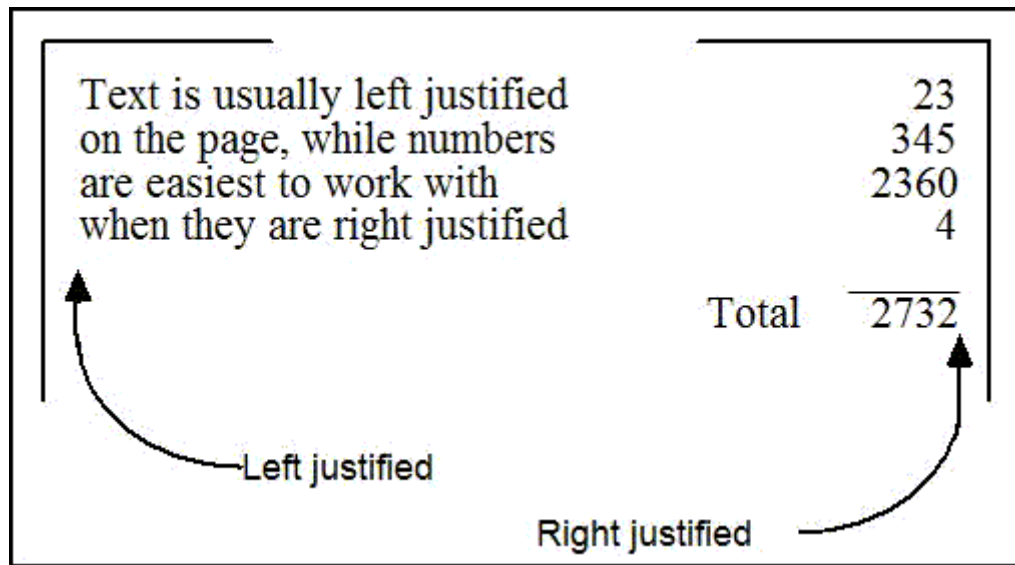

Fig. 4.7 Text is left aligned; numbers are right aligned

However, text sometimes looks best when it is right aligned in the cell. This is the case with the labels you just entered into cells A4, A5, and A6. Here is how you *right align* the text in these cells.

Position the spreadsheet cursor on cell **A4**

Hold down the mouse button and drag down to cell **A6**, so that **all three cells** are selected (cell **A4** will still be selected even though it is not highlighted—it has the heavier border which also indicates selection in the spreadsheet)

In the **Formatting toolbar** click on the **Right Alignment** button

This will right align the cells that you have selected (A4 through A6). Check this on the screen before you go on.

Press **Ctrl+s** to save your work so far (this is a good habit to get into!)

Entering the column and row labels
Now you will enter the labels for each of the columns that eventually will contain the scores for the assignments you might give your students during the course of a school session.

Select cell **D8** and enter the grade label **A1** (short for **Assignment 1**)

Check that you have typed the label correctly, then press the **Tab** key to move to the next cell across and enter the assignment label **A2**

Do the same thing three more times, using the labels **A3**, **A4**, and **A5** (your last entry should be in cell **H8**)

Click the **Accept** button (↵) next to the entry bar at the top of the screen

These labels might represent homework or quizzes for a unit or for a whole semester, depending on how many assignments you might assess for grading purposes. When you use this Gradebook

Template document for an actual grade book, you will edit these column labels so that they contain appropriate titles relating to the actual assignments you might give your students; their scores will be stored in the respective columns. There is, of course, room in the grade book for you to include as many assignments as you want.

> Once you have entered **all five** of the assignment labels, press the **Tab key twice**; this should bring you to cell **J8**

> Type **TOTAL (all caps)**, then press the **Tab** key **2** times to move to cell **L8**

> Type **PCNT**, then press the **Tab** key **2** times to move to cell **N8**, type **GRADE**, and click the **Accept** button (↵)

Now you will enter the row label for the Maximum Scores.

> Select cell **C10**, type **MAX** (this row will be used to keep a record of the maximum score for each assignment, test, and so forth), then click the **Accept** button (↵)

Finally, you need to enter the column labels for the First and Last names.

> Select cell **A12**, type **LAST NAME**, then click the **Tab** key to go to cell **B12**

> Type **FIRST NAME**, then click the **Accept** button (↵) and press **Ctrl+s** again to save your work so far

You need to widen columns A and B to allow for longer student first and last names.

> Click anywhere in **column A**, then, in the **Format menu** > **Column** > **Width… dialog box** that pops up type **1.5”**, then click on **OK**

> While you're at it, click anywhere in **column B** (first name column) and adjust its width to **1.5”**, too

Entering "dummy" scores

For the Gradebook Template you're going to enter a set of "dummy" maximum scores (all zeros). Later in the tutorial you will edit these Maximum Scores to reflect maximum scores for *actual* assignments.

> Move to cell **D10** and enter the number **0 (zero)**

> Enter a **0 (zero)** for the **MAX**imum **Score** into each of the remaining assignment columns (**E10** through **H10**), then **Save** your work again

Adjusting the width of columns

You will notice that the numbers (the zeroes) are not quite lined up under the labels in the assignment columns. Recall that in *Calc* the labels (text in general) are aligned on the *left* of the column, while numbers are always aligned on the *right* (check Fig. 4.7 on page 117 above if you're still confused about this).

   To improve the appearance of your Grade book you probably want your column labels to be more in line with your entries. You already practiced one way of doing this: namely, to right align the labels. Another way is to reduce the width of the columns containing scores. They need be no wider than the width of the column labels. By default *Calc* makes all the columns about an inch wide (0.89" is the *Calc* default value for the column width).

   Let's practice changing column widths in general before we change specific column widths in the Gradebook Template.

You can simultaneously change the widths of several *adjacent* columns, provided you want them all to be the same width. There are a couple of ways to do this. Let's try both ways and you decide which is easiest for you.

First use the mouse pointer to drag across the **column headers** from **column C** to **column N** (Fig. 4.8)
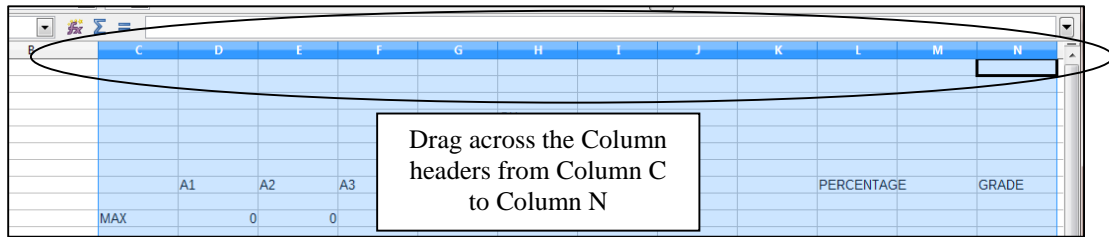

Fig. 4.8 Selecting a set of columns

Select **Format** > **Column** > **Width…** (or simply **right click** on the **column header** and, in the **context menu**, select **Column Width…**)

This will bring up the Column Width dialog box (Fig. 4.9).
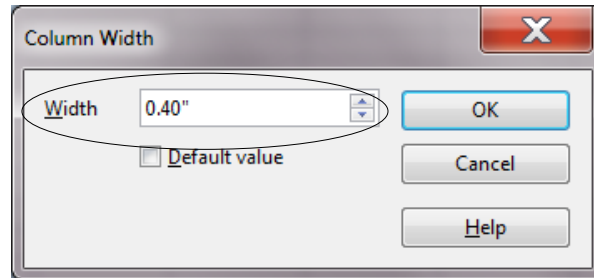
Fig. 4.9 Column Width dialog box

Type **0.40"** in the **Width** entry box and click on **OK**, then click anywhere to de-select the columns

All the columns from C to N are now a column width of 0.40". Simple.

You do not want to leave the columns at this width, so hit **Ctrl+z (Undo)** to restore the columns to their previous widths

Adjusting the column width by dragging

Another way to adjust the width of an adjacent set of columns is by first selecting (highlighting) the set of columns, as you did for columns A thru N just now, and then, with the cursor positioned between any two column headers, drag to the left or the right, as illustrated in Fig. 4.10.

Fig. 4.10 Adjusting column width by dragging

Try this for yourself now by selecting **all 6** of the columns from **Column C to Column H**, and widening or narrowing them as much or as little as you want, then hit **Ctrl+z** to restore the columns to their default width

Do this a couple more times, widening or narrowing the column width of a few *adjacent* columns (columns next to each other), each time hitting **Ctrl+z** afterwards to restore the columns to their default width
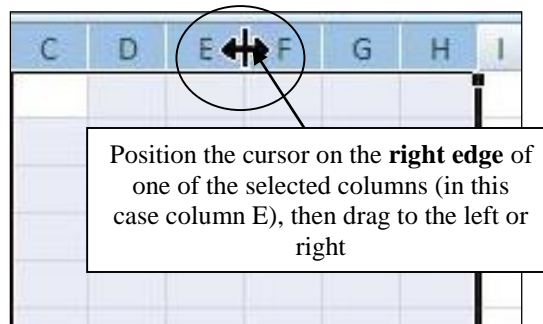
Adjusting the column width in non-adjacent cells

You also can simultaneously change the width of several, *non-adjacent* columns, again provided you want them all to be the same width. You do this by holding down the *Ctrl key* while clicking on the Column Header of the columns you want to adjust and then, with the mouse pointer between any two of the selected columns so the pointer becomes a crosshair (Fig. 4.10 above), you would drag one of the selected columns to the left or the right. Try this for yourself now.

Hold down the **Ctrl key** while you click on any **three** column headers (C, H, K for example) to select them, and then position the mouse pointer on the **right edge** of any selected column and widening or narrowing them as much or as little as you want

Click anywhere to **de-select** the columns and hit **Ctrl+z** to restore the columns to their default width

Do this a couple more times, widening or narrowing the column width of a few *non-adjacent* columns (columns that are **NOT** next to each other)

Let's now change specific column widths so that the Gradebook Template ends up looking like the example illustrated in Fig. 4.6 on page 116. You're going to start by changing the width of columns C through H so they are only as wide as necessary.

Use the **arrows** either side of the **horizontal scroll bar** at the **bottom** of the spreadsheet window (Fig. 4.11) to scroll the Grade book to the **left** until **Column C** is at the **left edge** of the spreadsheet
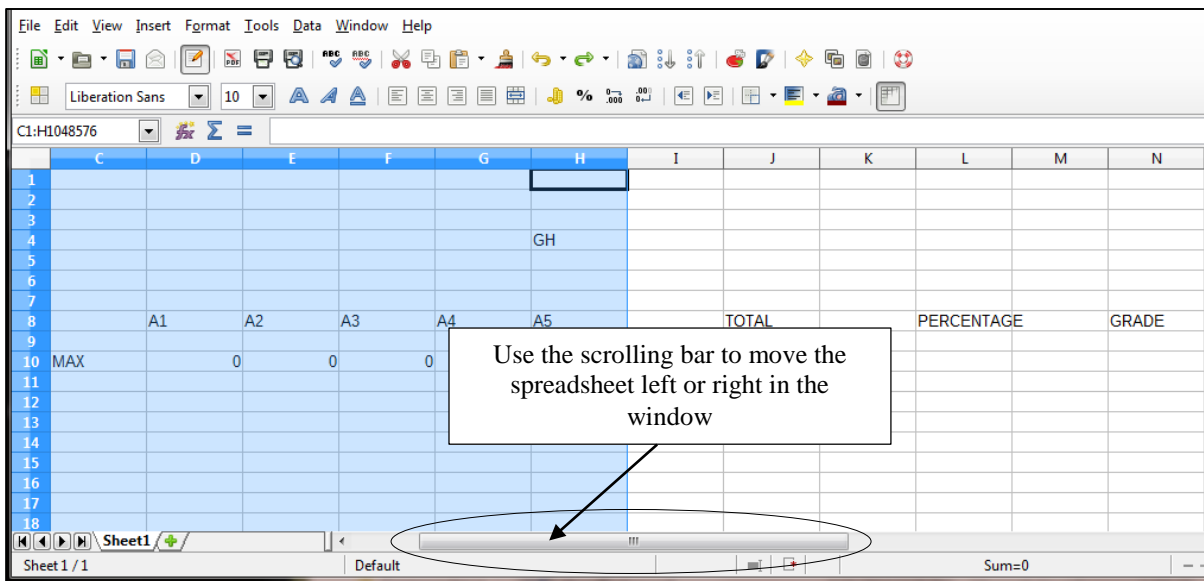

Fig. 4.11 Selecting a set of columns in the spreadsheet

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Position the mouse pointer on the column header "**C**" at the top of the column, hold down the mouse button, *and keep it down*, while you drag across the screen to the right as far as **Column H** (Fig. 4.11 again)

When you have columns **C through H** selected, let go of the mouse button

All six columns (C through H) should now be highlighted, as illustrated in Fig. 4.11 above.

Select **Format** > **Column** > **Width…** (or simply **right click** on the **column header** and, in the **context menu**, select **Column Width…**)

This will bring up the Column Width dialog box.

Type **0.40"** for the **column width**, click on **OK**, then click anywhere to **de-select** the columns

Now use the **horizontal scroll bar** if necessary to scroll the spreadsheet **to the right** until you can see column **A** again

Another way to change the column width, as you know, is to to drag with the mouse. Let's try this.

Position the mouse pointer in the column headers **between column B and column C** so the pointer becomes a **crosshair**

Now drag left or right and notice the **small box** that pops up and tells you the exact column width (Fig. 4.12)—end up with the width of **Column B** at **1.40"**
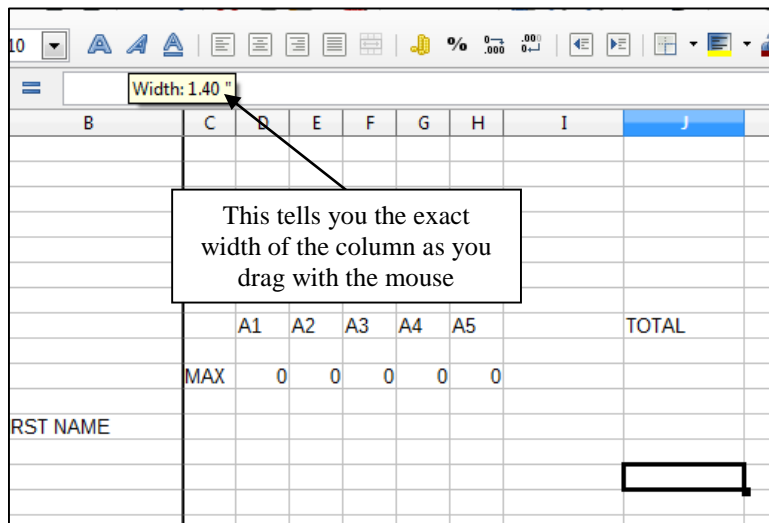
Fig. 4.12 Adjusting column width using the mouse

Changing the alignment of the column labels

It would also be a good idea at this point to change the alignment of the column labels in cells D8 thru H8 so that they are all *center* aligned.

Position the mouse over cell **D8**, hold down the mouse button, and drag across to cell **H8** before letting go of the mouse button

All the column labels for the 5 assignments should now be highlighted.

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In the **Formatting toolbar** click on the **Center Alignment** icon

Other columns in the spreadsheet also need adjustment. Here's what you need to do:

Reduce the width of the **columns** in **Table 4.3** to the **width** indicated

Column	Width
I, K, & M	**0.30"**
J and N	**0.60"**
L	**0.50"**

Table 4.3

Drag to select the labels for the headers in cells **J8**, **L8**, and **N8** and **Center Align** them, then press **Ctrl+s** again to save your work (**Gradebook Template**)

4.4 CREATING AND COPYING FORMULAS

The difference between Functions and Formulas

Functions and Formulas are powerful tools in spreadsheets which can save you hours of work.

Functions are routines that are built into the *Calc* spreadsheet—in other words, there's not much you need to do to set them up and make them work.

Formulas, on the other hand, are defined by the user—in other words, you have to know what you're doing and set everything up yourself.

Formulas will often include the built-in functions as part of the formula.

Both functions and formulas accomplish the same task: they tell *Calc* to do some kind of more or less complex or time-consuming calculation for you.

For example, at the end of a semester you will want to calculate a total point value, and probably a percentage, for each student. To do this, you can program the spreadsheet to carry out a formula on the values in the cells that contain the students' scores (*column J* in our spreadsheet). You can have the spreadsheet add up the numbers in a set of cells. Or you can have the spreadsheet tell you the average score in a range of cells, and so on. You can also have the system copy a formula into other cells.

Let's try a few things along these lines now.

Creating a formula

Let's enter a formula and see what it does.

Select cell **J10**, type **=SUM(D10:H10)**, then click the **Accept** button ( )

The "=" symbol at the beginning is a clue to the system that what follows is a *function* or *formula*. So remember this:

> **ALL SPREADSHEET FUNCTIONS OR FORMULAS BEGIN WITH THE EQUALS (=) SIGN**

The formula **=SUM(D10:H10)** tells *Calc* to sum (add together) the scores entered in cells **D10** through **H10** and store the result in cell **J10** (cell J10 is the cell in which you want the formula to put the result of doing its calculation).

If this is confusing to you, don't feel bad. Spreadsheets do mathematics—they calculate stuff, So in order to use spreadsheets effectively, you need to understand some (mostly simple) mathematics.

SUM is one of many *Calc* built-in functions. It ADDS UP or TOTALS the series of additions to produce the required result. We'll look at other built-in functions in a moment.

Notice the *0 (zero)* that now appears in **cell J10**

This number is the sum of the zeroes you typed in cells D10 through H10. If you add any number of zeroes together, they equal—you guessed it—ZERO!

In a short while you will have an opportunity to test whether the formula is correct. You will be entering into the spreadsheet a maximum score for real assignments along with a set of scores for a roster of students. When you do this, you will see how the spreadsheet automatically adds up the numbers for you as you go along and puts the result in cell J10.

For now, if you typed in the formula correctly and clicked the Accept button (↵) you should see that J10 contains the sum of all the maximum scores, which for the time being is 0 (zero), of course.

Press **Ctrl+s** again to save your work

Copying and pasting formulas

Soon you will be entering a set of data for 10 students. But first you must complete the Gradebook Template by creating formulas that will produce a TOTAL or SUM of the scores for EACH student, as well as a percentage (a score out of 100) for each student in the class.

Before you carry out the exercise, here is a description of what is involved. Fig. 4.13 illustrates the process.
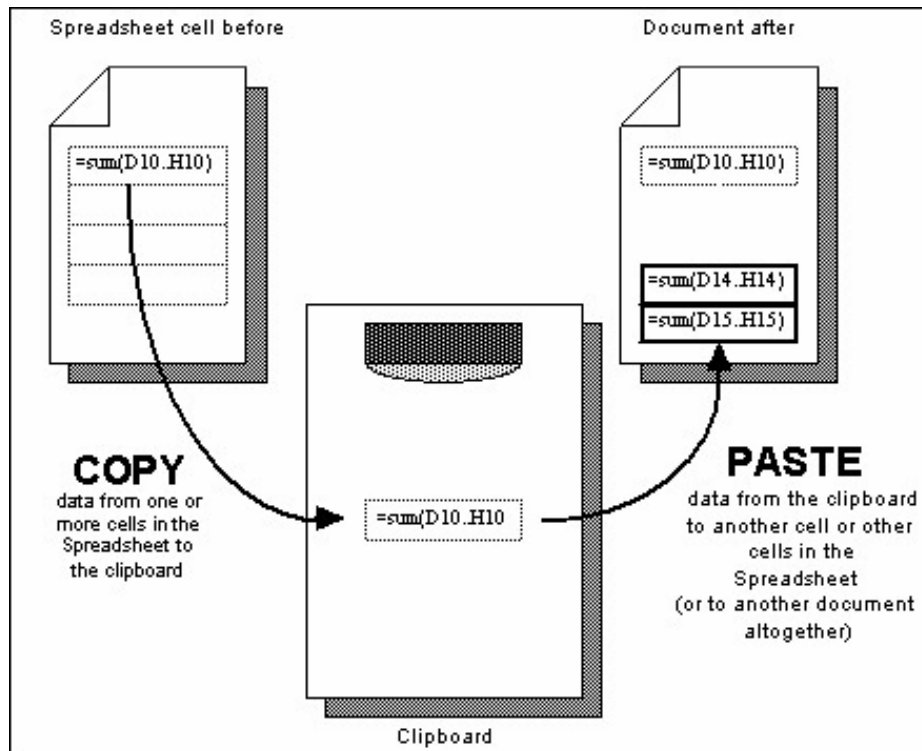
Fig. 4.13 Copying and Pasting

You are going to copy the formula from cell **J10** to the relevant cells in the same **TOTAL** column (cells J14 thru J23). You'll start by copying the formula to the clipboard. Then you'll paste it into the first of the cells (J14) where you want the formula duplicated. Finally, you will tell *Calc* to "fill down" a copy of the formula to the remainder of the relevant cells in the column—one for each student in the roster. Here are the steps to follow to complete this task.

Copying the formula...

> Select cell **J10** if it is not still selected from the previous exercise

> Press **Ctrl+c** (this is the **Quick Keyboard** command for **Copy**) to copy the contents of the cell to the clipboard (or **right click** while pointing on the cell and select **copy** from the context menu)

Cell J10 will now have a blinking border indicating that this is the cell from which the data have been copied. The formula in cell J10 has been copied to the clipboard. Think of the clipboard as a temporary holding area for a single set of data. Once something is on the clipboard it can be pasted anywhere you want—whether in this spreadsheet, or in another spreadsheet, or into some other document altogether, such as a *Writer* document, an *Impress* document, a *Draw* document, or wherever on your own computer.

Pasting the formula...

Row 14 is where you will enter the first student's name and scores when you create an actual Grade book after you have saved this template. So you are going to paste the formula you just copied (from cell J10) into cell J14.

> Select cell **J14** by clicking on it

> Press **Ctrl+v** (this is the **Quick Keyboard** command for **Paste**)—or, while positioning the mouse pointer on the cell, **right click** and select **paste** from the context menu that pops up

Look at cell J14. You should see the value 0 (zero) stored there. Now look at the formula in the Entry bar at the top of the spreadsheet (Fig. 4.14).
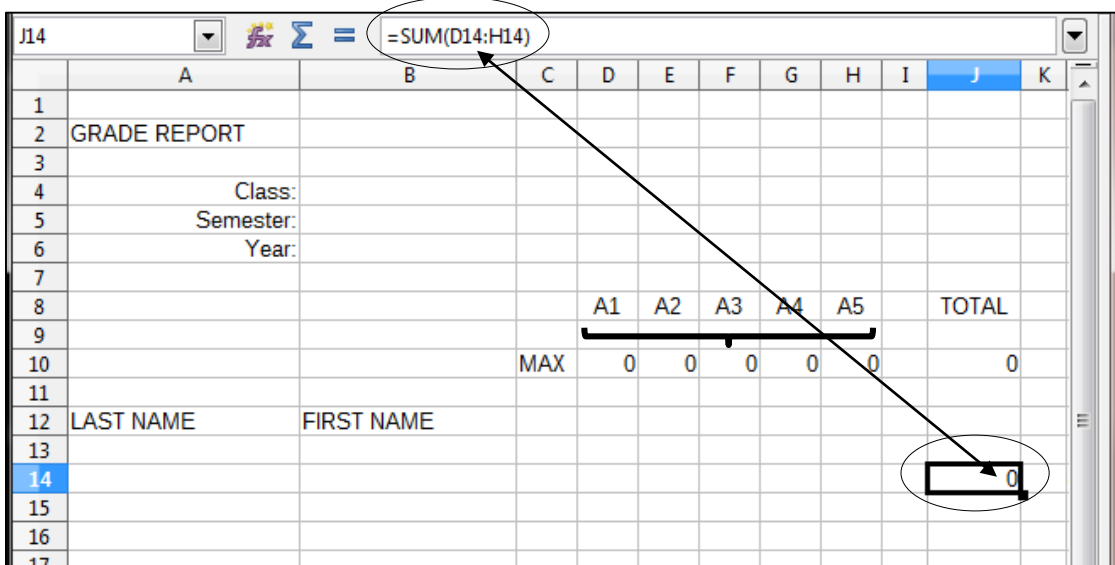
Fig. 4.14 Calc automatically adjusts the cell address in a formula

Interesting! The formula is different from the one you copied from cell J10.

> Check this out—click on cell **J10** again

Notice that the range of cells for the formula in J10 is **D10 through H10**.

> Now click on cell **J14** again

The range of cells is **D14 through H14**. So, you now know that *Calc **automatically*** adjusts the range of cells. The formula, adjusted as it is, makes sense in row 14 (where the first student's scores will be).

This is called *Relative referencing*. What does Relative Referencing mean?

Relative references

You might find this a bit tricky to follow, so put on your thinking cap, OK? The system is copying the formula in cell J10 to cell J14 in relation to ("*relative* to") cell J10. In other words, just as the formula in J10 sums the values stored in cells D10 through H10, so the formula copied to cell J14 will sum the values relative to cells D14 through H14.

Does that make sense? If so, give yourself a pat on the back! If not, don't despair. Read it over a couple of times. The alternative to a Relative Reference, by the way, is an Absolute Reference. You will need to use an Absolute Reference shortly, at which time you will more easily understand what it means in the context of the exercise.

> Press **Ctrl+s** again to save your work so far (are you getting into the habit of doing this?)

Filling down (copying the formula down the TOTAL column)

Calc provides a neat tool to duplicate the contents of cells into a set of adjacent cells. For the sake of this exercise we will assume you will have just ten students in your class. You are going to duplicate the formula that is in cell J14 into the other nine cells below it. As before, *Calc* will automatically adjust the cell addresses so that they are appropriate (relative) to each student's record.

> Select cell **J14**, if it is not already selected

> Use the mouse pointer to grab hold of the **small black Fill handle** (Fig. 4.15) in the **lower right corner** of cell **J14**

Fig. 4.15 The Fill handle

Notice that the mouse cursor changes from an arrow to a small crosshair.

> Drag the **small black Fill handle** *down* to select and highlight all the cells from cell **J14** to cell **J23**

Notice (Fig. 4.16) that the set of cells from J14 through J23 are now selected as a block on the screen, and a zero appears in each cell of the TOTAL column (Column J).

A	B	C	D	E	F	G	H	I	J	K	L
GRADE REPORT											
Class:											
Semester:											
Year:											
			A1	A2	A3	A4	A5		TOTAL		PCNT
		MAX	0	0	0	0	0		0		
LAST NAME	FIRST NAME										
									0		
									0		
									0		
									0		
									0		
									0		
									0		
									0		
									0		
									0		

Fig. 4.16 Copying a formula down into a set of selected cells

This is because you have not yet entered any assignment or other scores. Later, when you *do* enter the students' scores, the current total for each student will appear in the TOTAL column.

> Press **Ctrl+s** again

Setting up the Percentage formula

The next formula you need will go in the PCNT column (column L) and will calculate the percentage for each student. The formula will tell *Calc* to divide the Total Points earned by a particular student by the Total of all the Maximum Scores for each assignment.

> Select cell **L14**, since this is the cell in the **PCNT** column for the first student

The formula you want will divide the value in cell **J14** (which is the **Total** points for the first student) by the value in cell **J10** (which is the **Total** maximum score possible).

> Type the formula **=J14/J10** (don't forget the **"=" sign** which tells *Calc* that you are entering a **formula**), then click the **Accept** button (↵)
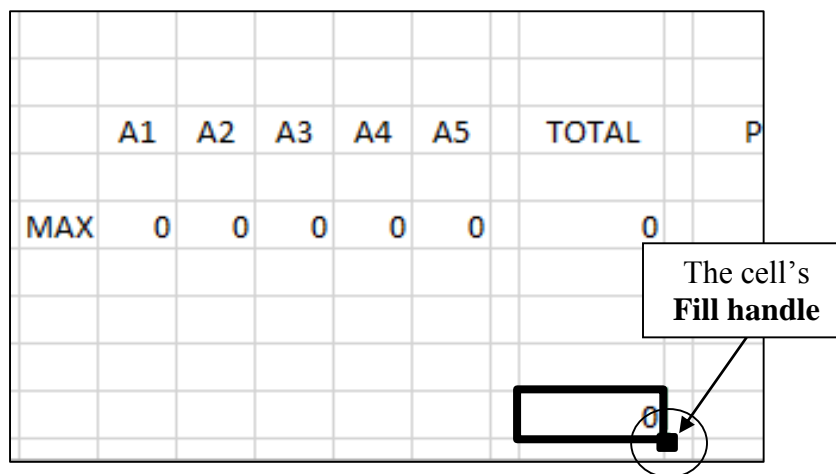
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Error messages are OK as long as they make sense

Hmmmm... The entry **#DIV/0!** is displayed in cell L14. You're maybe wondering: "What on earth is that?"

Well, **#DIV/0!** is an error message warning you that the formula in cell L14 is telling *Calc* to divide the student's total score by *zero* (the value currently in J10). But dividing by zero is an illegal operation because it is undefined in math; hence the error message.

You don't need to worry about this error message for now. You will eventually have a value other than zero in cell J10 when you put actual Maximum scores into the Grade book and this will take care of the enigmatic #DIV/0! message.

Absolute references

You need to make one small change to the formula in cell L14 before you copy it to each of the cells from L15 through L23. This is because part of the formula needs to be an *Absolute Reference*. This is hard to understand if you're not into mathematics and logic, so hang in there and let's see if we can make it clear.

Look at the formula again: =**J14/J10**

Cell J10 contains the total of the maximum scores for all assignments (what a student would get if she/he got everything right). The percentage for *each* student is calculated by dividing a student's total score-to-date (or at the end of the unit) by the value in this *specific maximum score* location. So the reference to this cell *must not change* when the formula is copied to the other cells in column J. This is why cell J10 is called an *Absolute Reference*—it *must not* change; any reference to cell J10 must find the exact same value every time.

The value in J14, on the other hand (the other cell referenced in the formula above), is *relative* to (or related to) the student whose data is entered in Row 14. This reference (to cell J14) must change *relative to* the scores for each student in the other rows (Row 15 - Row 23). Does that make sense? Read the previous two paragraphs over again if you need to. The fact is that you must tell *Calc* that, in the formula specified for cells L14 thru L23, you want any references to J10 to be *Absolute*. Any other cell references must adjust *relative* to each student's scores.

Select cell **L14**

In the Entry bar above the spreadsheet you should see the formula: =J14/J10

Position the cursor **immediately before** the entry **J10** then type a **dollar sign ($)** before the letter **J**, and another **dollar sign ($)** before the number **10**

The formula will now be: =**J14/$J$10**

The $ signs tell *Calc* to treat the reference to column J, row 10 as *Absolute* when copying the formula to other cells. The reference to J14, on the other hand, will be *Relative* and will therefore change relative to whichever cell it is copied to, so there's no need for dollar signs there.

Remember:

A dollar sign ($) before each part of a spreadsheet cell address tells *Calc* to treat the reference to the cell as an *absolute* (unchanging) reference.

In the **Entry bar**, click on **Accept** (✓) to accept the formula, then press **Ctrl+s** to save the change

Now that you have edited the *Logical IF* formula in cell L14, you need to copy it to the other cells in the PERCENTAGE column. To do this, you'll use the *Fill handle* in the lower right corner of

cell L14, just as you did when you copied the Total formula from cell J14 to J23. You can do this whenever you copy the contents of a cell to other cells above or below or to the right or to the left (Fig. 4.21).

Fig. 4.17 Using the active cell's Fill handle to copy the contents of one cell to other cells

> Use the mouse pointer to grab **cell L14's Fill Handle** and drag down to **cell L23**

Voilà! The formula in cell L14 has been copied into the 9 cells below it and all the appropriate cells (L14 to L23) have been set to calculate the percentage for every student once you have entered a set of scores for each student.

For now, remember, you have the "#DIV/0!" message in each cell because you are telling *Calc* to divide by zero. As you know, this problem will be resolved when you enter an actual set of maximum scores into row 10.

> Press **Ctrl+s** again to save your work so far

Notice that you are doing all the hard work up front. Once you have built the template, using it as a Grade book will be easy. You have a few more tasks to complete before the template is ready. Now you need to copy the formula that's in Cell J14 down into the other cells in the PCNT column (cells L15 thru L23).

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To do this, you'll use the *Fill handle* in the lower right corner of cell L14, just as you did when you copied the Total formula from cell J14 to J23. You can do this whenever you copy the contents of a cell to other cells that are immediately above or below or to the right or to the left of the selected cell.

> Use the mouse pointer to grab **cell L14's Fill Handle** and drag down to **cell L23**

Voilà! The formula in cell L14 has been copied into the 9 cells below it and all the appropriate cells (L14 to L23) have been set to calculate the percentage for every student once you get around to entering a set of scores for each student.

For now, remember, you have the *"#DIV/0!"* message in each cell because you are telling *Calc* to divide by zero. As you know, this problem will be resolved when you enter an actual set of maximum scores into row 10.

> Press **Ctrl+s** again to save your work so far

Notice that you are doing all the hard work up front. Once you have built the template, using it as a Grade book will be easy. You have a few more tasks to complete before the template is ready.

Setting the Cell Attribute for the PCNT column
When you divide one number by another the result is usually a fraction. Thus the eventual percentage for each student won't look like percentages at all. Instead of, say, 85%, the computer will display 0.85. It would be best to display the percentages as recognizable percentages with a % sign after them (*LibreOffice*, by default, will format the percentage to 2 decimal places). So you need to add this feature to the Gradebook Template file.

Follow these steps to format (select attributes for) the values in the PCNT column so they will eventually look like recognizable percentages.

> If necessary, drag the mouse from cell **L14** to cell **L23**, then in the **Formatting toolbar**, click on the **%** symbol

That's it. You will not notice any change right now because you still have the "#DIV/0!" message in each of the Percentage cells. But in a short while (Section 4.5) you are going to enter the names of students and their scores to an actual Gradebook roster, and then you will see all the percentages displayed with the % sign.

You are now ready to save your template for the last time.

> Hit **Ctrl+s**

Remember where you have saved the Gradebook Template spreadsheet—in your *Spreadsheet Documents* folder, which is in your Data Files folder, which is inside your Work Files for LibreOffice folder on your USB drive. Don't lose it because it could come in very useful if you decide to use the computer to keep your class grades from now on.

Checking out the formulas
It is useful at times to be able to check out the formulas in the spreadsheet.
Sometimes you may be getting the wrong results and you may need to examine a formula to see if there is an error. Or you may simply want to know how a particular value is computed.

Like everything else, this is easy enough to do when you know how.

In the **Tools** > **Options…** dialog box, click on the **plus sign (+)** next to **LibreOffice Calc**, and in the **submenu** that pops up, click on the **View** option
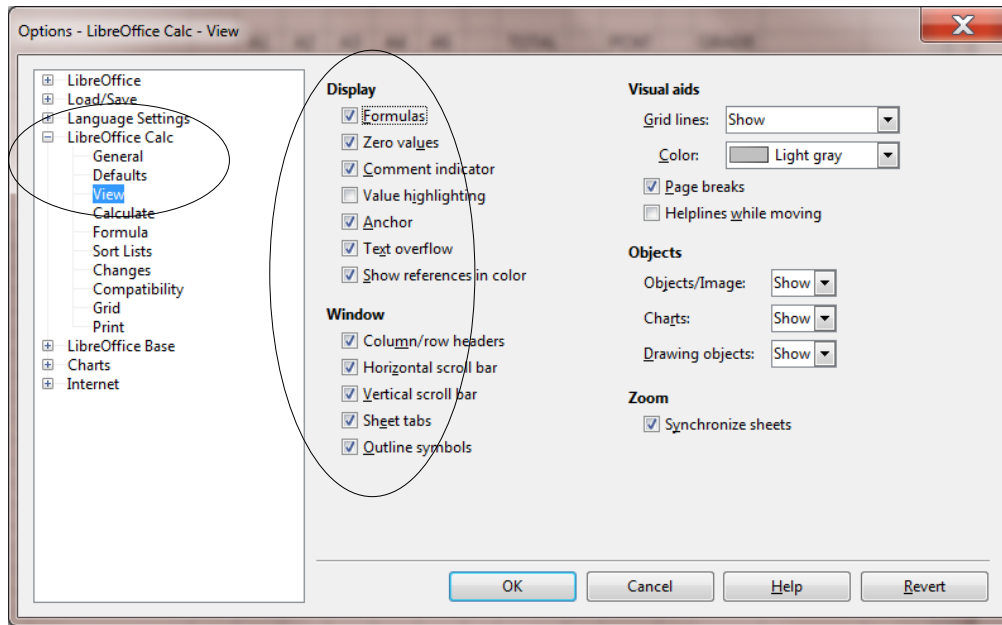
This will display all the Calc View options (Fig. 4.18).

Fig. 4.18 Checking off the Formulas option in the Tools > Options… dialog box

Now, in the **Display area** on the **right side** of the **Options dialog box**, click to put a **check mark** in the box next to **Formulas**, then click on OK

This will display any formulas in your spreadsheet (Fig. 4.19). Later, we'll return to this dialog box again to make other changes to how we view the data in the spreadsheet.
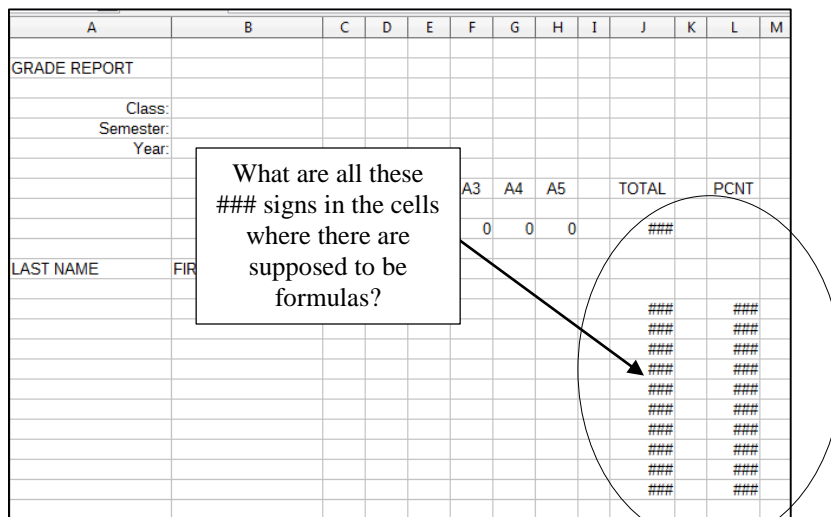
Fig. 4.19 Showing where the formulas in the spreadsheet

Uh oh… What are those columns of ### signs in the cells? Not a problem. What the ### signs indicate is that there's not enough room in the cell for the data to show. You'll get used to this

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when you're working with a spreadsheet because it's not unusual to discover that you need to widen a cell as the data in it changes over time.

So now is a good time to learn how to take care of this.

> Click on the **column header** for **column J**, then hold down the **Ctrl key** while you click on the **column header** for **column L**

This will highlight just columns J and L.

> Now **right click** on any one of the **selected column headers** (**J or L**) then, in the **context menu**, select **Column Width…** and change the column width to **1.5"**

Now you can see the Formulas in the spreadsheet (Fig. 4.20).

	A1	A2	A3	A4	A5	TOTAL	PCNT	GRADE
MAX	0	0	0	0	0	=SUM(D10:H10)		
						=SUM(D14:H14)	=J14/$J$10	
						=SUM(D15:H15)	=J15/$J$10	
						=SUM(D16:H16)	=J16/$J$10	
						=SUM(D17:H17)	=J17/$J$10	
						=SUM(D18:H18)	=J18/$J$10	
						=SUM(D19:H19)	=J19/$J$10	
						=SUM(D20:H20)	=J20/$J$10	
						=SUM(D21:H21)	=J21/$J$10	
						=SUM(D22:H22)	=J22/$J$10	
						=SUM(D23:H23)	=J23/$J$10	

Fig. 4.20 Showing Formulas

> Scroll over if necessary to check out the formulas displayed in **column J** and **column L**

After you have verified that the formulas are put together correctly relative to each of the appropriate cells, you should reset the spreadsheet display so you can see the values in the cells.

> **Ctrl+z** will quickly **undo** what you did to widen the columns and set them back to their original widths, and hit **Ctrl+s** to save your work again

One last task before proceeding. You need to reset the spreadsheet so you no longer see the formulas (which show as those pesky ### signs again).

> In the **Tools** > **Options** dialog box, click on the **plus sign (+)** next to **LibreOffice Calc**, and in the **submenu** that pops up, click on the **View** option

This will display all the *Calc View* options (see Fig. 4.18 on the previous page). We'll return to this dialog box again to make other changes to how we view the data in the spreadsheet.

> Now, in the **Display area** on the **right side** of the **Options dialog box**, click to remove the **check mark** in the box next to **Formulas**, then click on OK

This will remove the display of any formulas in your spreadsheet.

The last summary column in the spreadsheet (column N) is for the final letter grade. For the purposes of this tutorial, you will enter the grade yourself based on the totals, averages, and other factors that you consider significant in assessing the quality of your students' work. Thus, no formula will be supplied for this column at this time.

Later, in Lesson 5, you will learn how to create a *Lookup table* so that *Calc* can calculate each student's letter grade and automatically enter it into the spreadsheet. This will simplify your work still more.

4.5 ENTERING NAMES AND SCORES FOR EACH STUDENT

Changing the name of the template document

The Gradebook Template is safely saved on your disk. Now you can start to use it to build specific Grade books for particular classes.

As you can see, the template is still on the computer screen after you saved a copy of it on your disk. Next you are going to fill it out with actual student names and scores. Thus, the template will no longer be a template; it will become the grade roster for a real class. Therefore, the first thing you must do is *Save it with a different file name*, so that you will not lose the template you have just created. It is always a good idea to do this straight away because you might forget to do it later.

Up until now you have been working with the document that you originally called "Gradebook Template." Let's say you are a 4th Grade teacher, and the year is 2014. A good document name for this grade book would be *Grade 4 2014*.

> From the **File** menu select **Save As** and navigate (**USB Drive** > **Work Files for LibreOffice** > **Data Files**) to your **Spreadsheet Documents** folder

> Type **Grade 4 2014** as the name for the new spreadsheet and click on the **Save** button

The new document name will appear at the top of the *Calc* spreadsheet window. You should start by filling in the specific class and semester details for the new Grade book.

> In cell **B4** type **Grade 4**, hit the **Enter** key, type **1** for the semester, hit **Enter** again, then type **2014** for the year and click on the **Accept** button (⏎)

It will look better if the two entries you just typed into cells B5 and B6 are all *left justified* so that the data lines up with the entry in cell B4.

> Drag to select cells **B5** and **B6**, then in the **Formatting toolbar** click on the **Left alignment** tool and **Save** your work

Entering the student names

> Now select cell **A14** (this is where the first student's **last name** will go)

> Type a student's **Last Name** (make up the data if you don't have a specific class in mind) and hit the **Tab** key to move to cell **B14**

> Type the **student's First Name**

Hit **Enter**, then the **left arrow** key, to move to cell **A15**, and do the same for the next student

Repeat these steps until you have a roster of *10* students. Notice how the names are all lined up on the left of the column (text is normally left aligned). It doesn't matter if your names are not in alphabetical order at this time since *Calc* lets you sort them any time you like, as you will learn later in Lesson 4.

Entering the scores for each student
Your next step will be to enter scores for these students. But before you do this you will need to decide what kind of scores they will be—Homeworks, Tests, Quizzes, and so forth.

Select cell **D8**, and type a brief label in the **Entry bar**, such as **HW1**, or **Test1**, and press the **Tab** key

Do the same for each of the four other labels for the *scores* columns. Next you must decide what maximum scores you want for each assignment.

Select cell **D10**

Type a **maximum score** for the assignment or test recorded in this column (column **D**)—a maximum score is the highest possible score that can be achieved for the assignment or test (such as 20 out of 20, or 100 out of a possible 100, and so on)

Move to each of the four other **maximum score** cells (**E10** through **H10**) and enter appropriate maximum scores

Now look across to **column L**

Notice that those warning messages in column L have gone. This is because you are no longer telling *Calc* to divide by zero (0). This is because cell J10 no longer has a value of 0 (zero).

Take a look at cell **J10** and notice that it now has a value other than 0 (zero)

Next, select **D14**

This is the first cell in the first column of scores for your students. You are going to type a score for each student's first assignment. Remember that the score you type should be within the Maximum Score range you decided to set for that HW, Test, Worksheet, or whatever.

Go ahead and type in a set of scores for the first assignment, pressing the **Enter key** after each score because you want to go **down** one cell each time until you reach **cell D23**

Now enter scores for each student in each of the remaining four Assignment categories

If you look across to columns **J** and **L**, you should notice how the Totals and Percentages are all kept up to date as you enter each score and the percentages *look like* percentages! If any cell is filled with ### signs, this is because the column is not wide enough to show the data that you entered, in which case go ahead and make the column wider if you need to.

> **Remember if you ever see those ### signs in a cell, they're not a problem. They're just an alert to you that you need to make the column wider to fit the size of the data.**

The formulas are the most powerful aspect of spreadsheets. When the spreadsheet does the math for you, you begin to appreciate the power of those formulas that you have built into the Gradebook Template. You don't need a calculator any more. The spreadsheet *is* your calculator and it will save you a significant amount of time.

> Once again, when you're done entering the data for each student, don't forget to save your work (**Ctrl+s**)

Everything will be saved under the new file name **Grade 4 2014** in the Spreadsheet Documents folder in the Data Files folder on your USB drive.

4.6 MAKING CHANGES TO YOUR GRADE BOOK

Now that your Grade book is complete and saved on your disk, you can still make changes to it. Perhaps a new student needs to be entered onto your roster, or you have accidentally overlooked an assignment and want to enter it into your Grade book, or you decide to add an extra assignment or test to your normal schedule. This can all be done with little effort on your part.

Adding a student to the roster (Inserting rows)

A new student can be added by inserting a row. To insert a **row** you would select the location ahead of which you want to place the new row or rows (say before **Row 16**). *Calc* inserts a new row immediately ahead of the row you have selected. Follow these steps to try this now.

> Select **row 16** by clicking in the **row label** (the number **16** at the left edge of the spreadsheet—Fig. 4.21)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
7														
8				HW1	HW2	Q1	T1	HW3		TOTAL		PCNT		GRADE
9														
10			MAX	20	20	30	100	20		190				
11														
12	LAST NAME	FIRST NAME												
13														
14	Urchick	Pamela		12	14	28	97	3		154		81%		
15	Gasdick	Barbara		10	15	23	65	16		129		68%		
16	Giorgio	Marilyn		13	18	25	74	17		147		77%		
17	Mitnick	Teresa		16	15	20	32	15		98		52%		
18	Bond	Patrick		14	13	20	78	18		143		75%		
19	Dane	Stephanie		18	19	19	65	19		140		74%		
20	Bond	Andrew		15	16	21	85	16		153		81%		
21	Fraher	Brigid		18	17	26	95	20		176		93%		
22	Brown	Lyn		20	15	19	73	15		142		75%		
23	Potochar	Charlene		16	20	20	91	13		160		84%		
24														

Fig. 4.21 Selecting a row

> Now, with the cursor pointing on the **number** of the row **(16)**, **right click** and, in the **context menu**, select **Insert Rows Above**

You should now see a new, empty, Row 16; the data that was in Row 16 has moved down to Row 17. If you inserted the row in the wrong place, remember that you can undo what you just did by hitting *Ctrl+z*.

Now you must fill the new row with data, as in the rest of the spreadsheet.

> Make cell **A16** the active cell now and, across the row, fill out a **First and Last name** and a **set of scores**

You will also need to copy the math formulas from cells J10 and L14 to the respective cells in the TOTAL and PCNT columns.

> First, select cell **J10** and press **Ctrl+c** (the shortcut for the **Copy** command), then go to cell **J16** and press **Ctrl+v** (the shortcut for the **Paste** command)
>
> Save your work (**Ctrl+s**)

Now follow the same procedure to copy the formula from cell **L14** to cell **L16**. After you have copied the formulas you should check to see that the results in the various cells are correct. Mistakes are always possible.

> **NEVER ASSUME THAT THE COMPUTER IS SHOWING YOU THE CORRECT DATA. THE DATA ARE ONLY AS GOOD AS THE PERSON WHO ENTERED THEM—AND THAT PERSON IS HUMAN!**

Inserting columns

To insert a new column, you will select where you want to insert the column—say between columns F and G. *Calc* will insert the new column(s) to the *left* of the column you select.

> Highlight **column G** by clicking in the **column header** (the letter "**G**" at the top of column G in the spreadsheet), then right click on the **Column Header** (the letter **G**) and, in the context menu, select **Insert Columns Left**

Calc inserts an empty column to the left of column G to allow you to enter a new set of data. The column width is set to be the same as the column next to which it is inserted.

Again you will need to fill in a column label in cell G8, a maximum score for that assignment (in cell G10), and a set of actual scores for the rest of column G, one for each student in the class.

Notice that the column label you enter in cell G8 is right aligned since you set this attribute across the cells from D8 to H8.

Notice, also, that all your totals and percentages are automatically updated to reflect the new set of scores.

> Once again, when you're done entering the data for each student, don't forget to save your work (**Ctrl+s**)

Deleting (cutting) rows and columns

If you need to delete rows or columns from a spreadsheet, you would select a row or column by clicking on its label either at the left of the spreadsheet for a Row or at the top of the spreadsheet for a Column, or you could select a set of rows or columns, then hit the *Del(ete)* key to delete them. No need to practice this now.

The beauty of an electronic spreadsheet such as *Calc* is that, even when you add or delete rows or columns, the system automatically updates the formulas where appropriate to match the new state of the data.

Whenever you make changes like this that you want to keep, you must save your work once again. Do this now.

> **Save** your **Grade 4 2014** document one last time

4.7 PRINTING YOUR GRADE BOOK

You are now going to print a "hard copy" of the Grade book. Unless you decide otherwise, *Calc* will print the page in the Portrait orientation (Fig. 4.22).
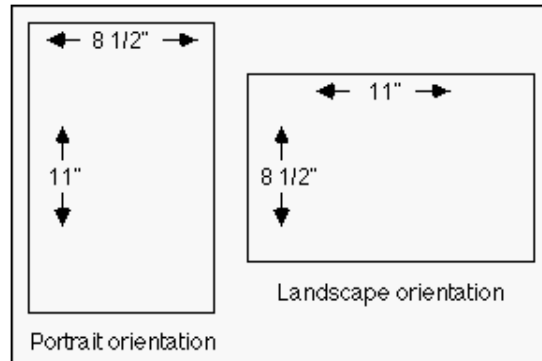

Fig. 4.22 Portrait and Landscape page orientation

If your Grade book is too wide to fit on the 8.5 inch width of standard paper, you can print the Grade book *sideways* (*Landscape orientation*). In fact, this is often the best orientation for a spreadsheet because of the "shape" of the data, which is often set up in multiple columns across the Page. So let's do this for our spreadsheet.

> In the **Format menu** select **Page…**, then in the **Page Style dialog box** click on the **Page tab**, then, in the **Paper format** section > **Orientation**, click on the **radio button** next to **Landscape** (Fig. 4.23), then click on **OK**
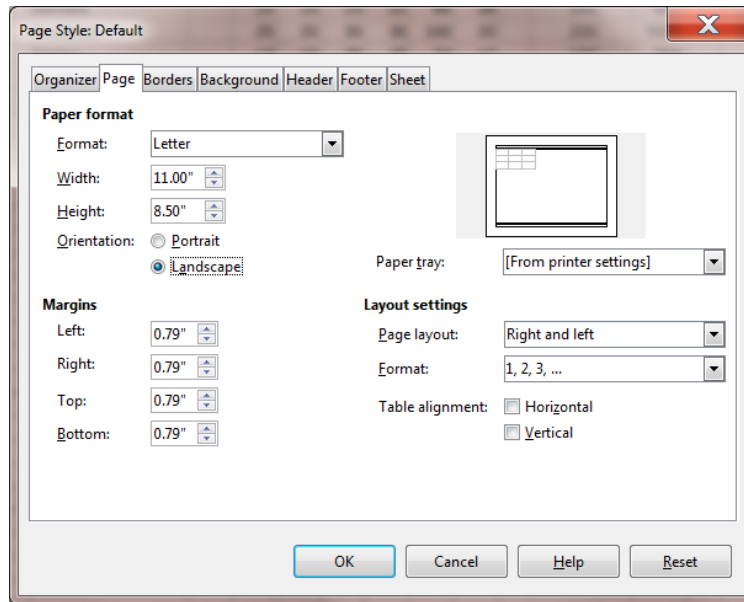

Fig. 4.23 Setting Landscape Orientation in the Page dialog box

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In the Page Style dialog box you can also tell *Calc* to print, or not to print, *gridlines*, *row and column headers*, and so forth. So you can still make changes to the appearance of your spreadsheet on the printed page. Let's try this now.

> In the **Page Style dialog box** click on the **Sheet tab**, then in the **Print area** click to put a **check mark** in the boxes next to **Column and row headers** and **Grid**, then click on **OK**

This is to tell *Calc* that you *want to keep* those Column and row headers and gridlines in the first printout.

> In the **File menu** select **Page Preview** to bring up the **Page Preview** window, which will look something like Fig. 4.24

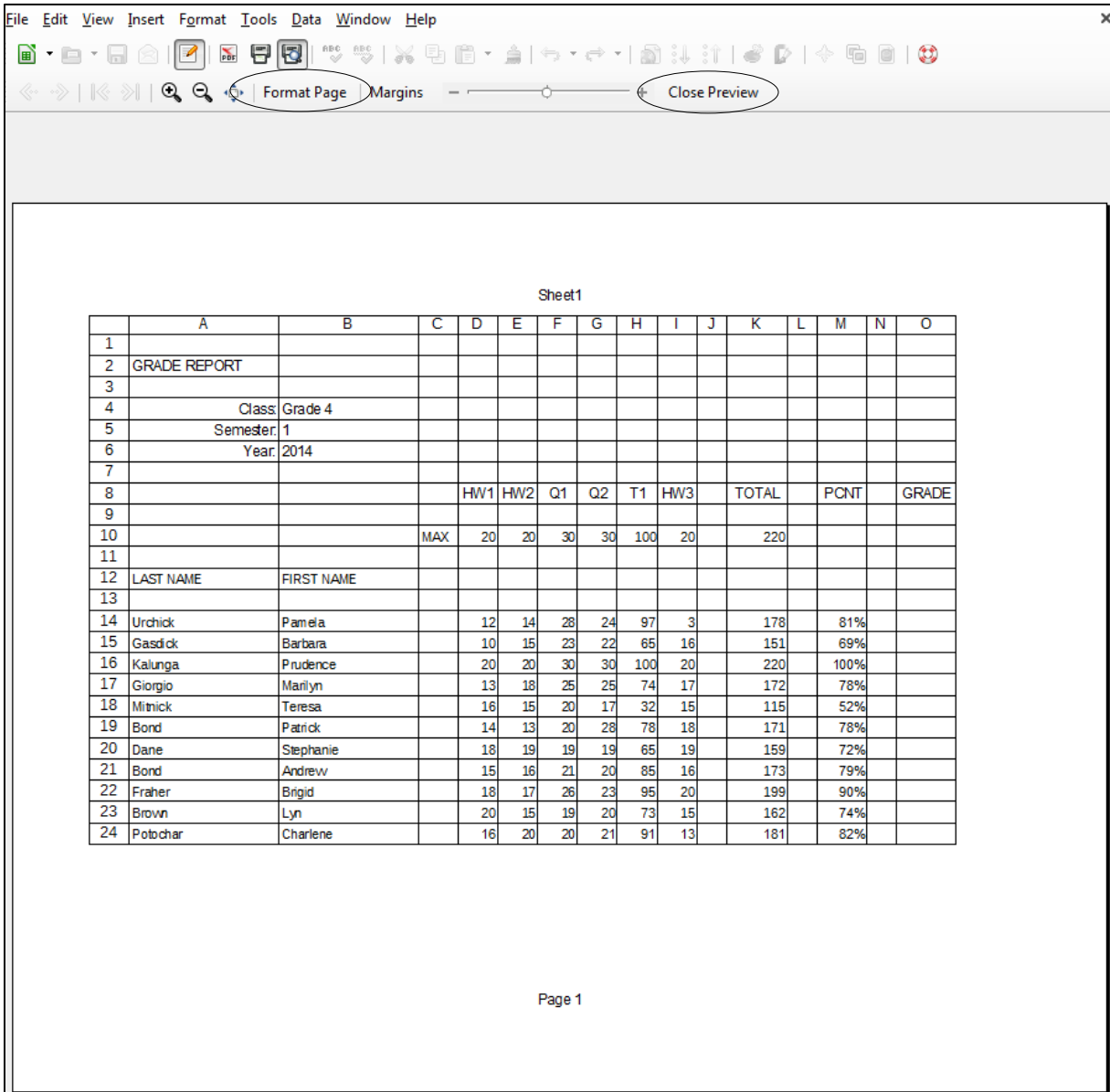|	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2	GRADE REPORT														
3															
4	Class:	Grade 4													
5	Semester:	1													
6	Year:	2014													
7															
8				HW1	HW2	Q1	Q2	T1	HW3		TOTAL		PCNT		GRADE
9															
10			MAX	20	20	30	30	100	20		220				
11															
12	LAST NAME	FIRST NAME													
13															
14	Urchick	Pamela		12	14	28	24	97	3		178		81%		
15	Gasdick	Barbara		10	15	23	22	65	16		151		69%		
16	Kalunga	Prudence		20	20	30	30	100	20		220		100%		
17	Giorgio	Marilyn		13	18	25	25	74	17		172		78%		
18	Mitnick	Teresa		16	15	20	17	32	15		115		52%		
19	Bond	Patrick		14	13	20	28	78	18		171		78%		
20	Dane	Stephanie		18	19	19	19	65	19		159		72%		
21	Bond	Andrew		15	16	21	20	85	16		173		79%		
22	Fraher	Brigid		18	17	26	23	95	20		199		90%		
23	Brown	Lyn		20	15	19	20	73	15		162		74%		
24	Potochar	Charlene		16	20	20	21	91	13		181		82%		

Fig. 4.24 The Print Preview window

Notice (in Fig. 4.25—*Format Page* tool) that you can use the Print Preview window to make the changes that you just made from the Page dialog box.

> Click on **Close Preview** (see Fig. 4.26 on previous page), then in the **File menu** select **Print** to bring up the **Print dialog box** (Fig. 4.25)
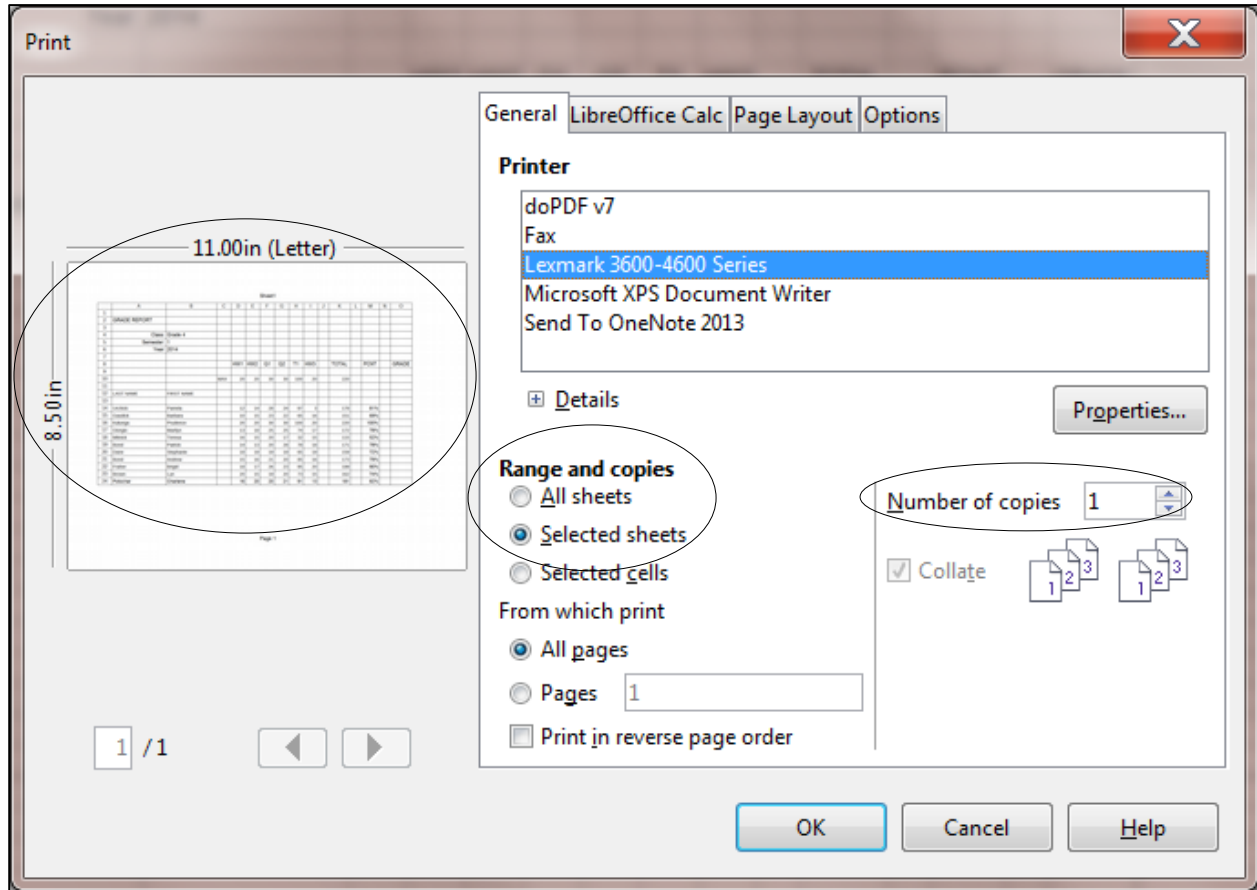

Fig. 4.25 The Print dialog box

As a rule, it is best to have the computer print only *one copy* (the default number of copies) unless you have a high speed printer, since it is easier (and cheaper) to make multiple copies using a photocopier. Also, notice that **Selected sheets** is the default—which means that *LibreOffice* will print only that area of the spreadsheet that contains Grade 4 2014 data.

These are the appropriate Print settings for our Gradebook spreadsheet. We'll check out other options in Lesson 5.

Also, if you have an ink jet printer, select *draft quality* or *quick print* the first time or two, so you don't waste ink (this is not an option with laser printers since laser printers always print best quality).

Another tip, if you have control over your own printer, is to recycle once used paper (clean on one side) for draft copies. You might even start collecting this, instead of throwing it away. Help save the planet!

> Click on **OK** to print your **Grade 4 2014** Grade book (it should print in **Landscape orientation *with* gridlines and Row and column headings**)

The printer will print the Grade book so you can send it to your instructor.

For further reinforcement of the options for printing a spreadsheet, let's print the Grade book again, but this time we'll *remove* the Row and column headings and the gridlines.

> In the **Format Menu** select **Page…**, and in the **Page Style dialog box** click on the **Sheet tab**, then in the **Print area** click to **remove** the **check mark** in the boxes next to **Column and row headers** and **Grid**, then click on **OK**

> Go to **File** > **Print**, and in the **Print dialog box** (where you don't need to change a thing) click on the **Print…** button, and wait while the printer does its job

> Hand in both copies of the **Grade 4 2014** Grade book to your instructor

4.8 SAVING A BACKUP COPY OF YOUR WORK

Your last task before completing this session at the computer is to make a backup of your document on the backup disk. The Grade 4 2014 Grade book is still open in *Calc*. It is also saved in your Work Files for LibreOffice folder, which is in the disk drive.

> From the **File** menu select **Save As** and navigate (**USB Drive** > **Work Files for LibreOffice** > **Data Files**) to your **Spreadsheet Documents folder**

> Change the file name to **Grade 4 2014 Backup**, click on the **Save** button, and wait while the spreadsheet is saved, then close *Calc*

This will save a backup copy of the Grade 4 2014 Grades in the *Data Files* folder > *Spreadsheet Documents* folder.

4.9 A WORD ABOUT TEMPLATES AND STATIONERY DOCUMENTS

In the first two lessons, and in this lesson, you have been introduced to the concept and importance of templates. So much of a professional's work is based on standard forms of one kind or another. There are simply dozens of such forms that you either generate yourself or that are generated for you by administrators. They may be ditto masters, grade sheets, attendance registers, sign-up sheets, course schedules, syllabi, correspondence, you name it.

You should think "Template" whenever you use *LibreOffice*. "How can I leverage the effort I'm putting into creating this document? Are there parts of it that are common to other documents I have to produce? Is there a template here that I should be saving as a separate document for future use?"

LibreOffice uses the term "Stationery" to describe documents that act as templates for word processing, database, spreadsheet, or Presentation applications. A selection of some two dozen "starter" documents are supplied with the software. Over the course of your career you will undoubtedly develop your own set of stationery documents or templates.

The rationale behind templates is personal productivity, where time and ideas are at a premium. Templates are a powerful way of capturing the free flow of ideas in the form of electronic documents which enhance the quality and efficiency of our work.

LOOKING BACK

As you must be aware, there is still a great deal to learn about the *Calc* spreadsheet, but you are on your way.

This should be enough to give you ideas about using the *Calc* spreadsheet to keep records of numerical data. Apart from finding out what a spreadsheet is, you have learned how to build a spreadsheet template, including labels and formulas. This included basic layout operations such as expanding the width of selected columns and aligning cells. You also learned how to copy formulas to other cells in the spreadsheet.

You then learned how to change the name of the spreadsheet so that the template could be kept unaltered for later use.

After you filled out the Grade book and saved the set of data for a class, you practiced making changes such as adding or deleting rows and columns, and changing the value format for certain cells to percentages.

Finally, you learned how to print out the entire spreadsheet. This latter function is not something you would do as a matter of course. You might well, however, print out charts based on a spreadsheet in order to include them in a report that you have developed using the word processor. You'll learn how to do this in Lesson 6.

LOOKING FORWARD

The next spreadsheet tutorial will help you learn other important aspects of working with spreadsheets, such as using the Lookup function and creating charts of various kinds.

You are probably becoming familiar by now with the environment called *LibreOffice*. As you have no doubt noticed, skills learned using the word processor carry over into the use of the spreadsheet or the database. This is the most important advantage of an integrated software package such as *LibreOffice*. It means that the learning curve is less steep.

You will find that completing the remainder of these tutorials will not be nearly as tough. If you found the first three lessons easy, so much the better.

SKILL CONSOLIDATION

Complete as many of these exercises as you can to reinforce what you have learned in Lesson 4.

1. Update Grade 4 2014 by adding an extra column for another assignment, quiz, project, or test score and hand in your printout of the new spreadsheet.
2. Add two students, along with their scores for all assignment categories, to the Grade book that you created using this tutorial. Copy the formulas where necessary.
3. Add an extra column for another assignment (HW, Test, etc.), add a student, and update the summary (totals, percentage) columns where appropriate. Update the calendar data in the top left corner of the spreadsheet for a class taking place in the Fall semester, session 1, 2014.
4. Design and create a spreadsheet to handle an **income statement** for your personal checking account. The income statement will span **one full year**, from January to December. The leftmost column will contain a list of **at least six items** that you typically purchase during the course of a month (Gas, phone bill, etc.). Then the column headers across the spreadsheet will refer to months in the year. The numbers in the cells will be the financial amounts (with **$ signs** and **2 decimal places**) that you spent on each item per month. You will include columns for the **total** for each item at the end of **each quarter** (Quarter 1 is Jan., Feb., and

March, for example) and a column for the **total** at the end of the year. Then, at the **bottom** of each column you will have a breakpoint **total** for each of the **months** (with a row of its own as illustrated below), a **total** for each of the **Quarters** (with a row of its own as illustrated below), and a **grand total** for the **whole year** (in the **rightmost cell** and with a row of its own as illustrated below). As you may have figured out, there will be 18 columns in the spreadsheet, and at least 10 rows.

    Send the exercise to your instructor as an attachment in email when you are done. This could become an ambitious group project if you were to add extra features such as weekly data with break points (sub totals) and so forth—very useful, too. Here is an illustration of what your final Income Statement might look like:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
4	Item	January	February	March	Q1	April	May	June	Q2	July	August	September	Q3	October	November	December	Q4	Total
6	Gasoline	$100.00	$85.00	$80.00	$265.00	$120.00	$85.00	$85.00	$290.00	$80.00	$95.00	$100.00	$275.00	$85.00	$130.00	$90.00	$305.00	$1,135.00
7	Phone Bill	$65.00	$60.00	$63.00	$188.00	$65.00	$65.00	$65.00	$195.00	$62.00	$60.00	$60.00	$182.00	$63.00		$62.00	$125.00	$690.00
8	Entertainment	$50.00	$35.00	$45.00	$130.00	$75.00	$35.00	$40.00	$150.00	$55.00	$65.00	$35.00	$155.00	$45.00	$50.00	$55.00	$150.00	$585.00
9	Car Insurance	$50.00	$50.00	$50.00	$150.00	$50.00	$50.00	$50.00	$150.00	$50.00	$50.00	$50.00	$150.00	$50.00	$50.00	$50.00	$150.00	$600.00
10	Food	$100.00	$85.00	$90.00	$275.00	$100.00	$120.00	$85.00	$305.00	$110.00	$80.00	$95.00	$285.00	$100.00	$80.00	$90.00	$270.00	$1,135.00
11	Rent	$175.00	$175.00	$175.00	$525.00	$175.00	$175.00	$175.00	$525.00	$175.00	$175.00	$175.00	$525.00	$175.00	$175.00	$175.00	$525.00	$2,100.00
12	Cable	$45.00	$45.00	$45.00	$135.00	$45.00	$45.00	$45.00	$135.00	$45.00	$45.00	$45.00	$135.00	$45.00	$45.00	$45.00	$135.00	$540.00
13	Internet	$45.00	$45.00	$45.00	$135.00	$45.00	$45.00	$45.00	$135.00	$45.00	$45.00	$45.00	$135.00	$45.00	$45.00	$45.00	$135.00	$540.00
15	Monthly Expenditures	$630.00	$580.00	$593.00		$675.00	$620.00	$590.00		$622.00	$615.00	$605.00		$608.00	$575.00	$612.00		
16	Quarterly Expenditures				$1,803.00				$1,885.00				$1,842.00				$1,795.00	
17	Annual Expenditure																	$7,325.00

5. Get together with one other classmate and brainstorm for ideas about using the *Calc* spreadsheet with students K-12. List at least 10 suggestions and describe briefly (a sentence or two) how you would use each of them in a subject area and age group of your choice. Specify the subject area and age group for each idea.

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