

CMPSCI 145 Fall 2009
Lab #2
Professor William T. Verts

Setting Up

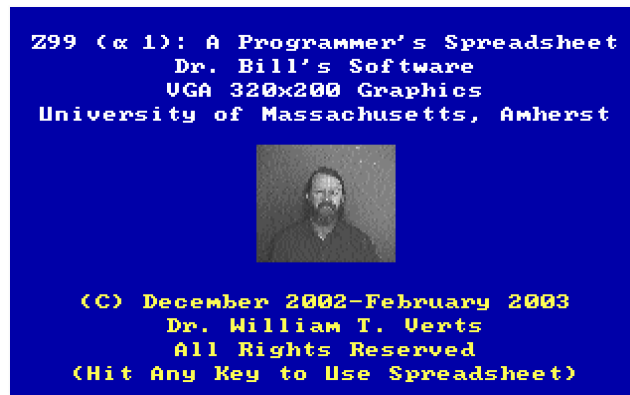
Create a special folder at the root of your **C :** disk called **DOSapps** to hold everything associated with this project. (If you wish to use a flash drive, put the **DOSapps** folder at its root instead. For example, if your flash drive comes up as disk **E :** create the **DOSapps** folder at the root of the **E :** disk.)

Go to the class Web page and download the Z99 spreadsheet, or go directly to:

<http://www-unix.oit.umass.edu/~verts/software/software.html#Z99>

Download the 17K **.ZIP** file into your **DOSapps** folder. Unpack the 139K program **Z99.EXE** file from the archive into your **DOSapps** folder.

This program is an old-style MS-DOS program that will run on any machine back to a 1980s PC with a VGA graphics card, and runs under any version of Windows up to and including Windows XP. When running, it often takes over the entire computer screen. Try running the program; if it works on your computer you will see a blue splash screen containing my picture and some descriptive text:



If the Program Does Not Work, Which is Probably the Case

This program will not run under Windows Vista or Windows XP 64 (and might not run under some regular versions of XP). If this is the case you must first download and install a DOS environment called DOSBox. Go to **<http://dosbox.sourceforge.net/>** and download the latest version of DOSBox (version 0.73 as of fall 2009).

Install DOSBox. This should also create a shortcut on the desktop to the DOSBox program. You can also launch the DOSBox program through the Start-All Programs-DOSBox menu.

Run DOSBox. In DOSBox type one of the following commands:

`mount C: C:\DOSapps` (if *DOSapps* folder is on *C:*)
-or- `mount C: E:\DOSapps` (if *DOSapps* folder is on *E:*)

This creates a "virtual" **C:** drive in the DOSBox environment that will point to the "actual" **DOSapps** folder on your disk. Next, in DOSBox type:

C:

This changes the active drive to the virtual **C:** drive (which is really **DOSapps**). Type **DIR** at the **C:\>** prompt and you should see the **Z99.EXE** file in the directory listing. Next, type:

Z99

This runs the Z99 program in a window on the desktop. Perform the assignment. When Z99 is no longer running and the assignment is complete, at the next DOSBox prompt type:

exit

This closes the DOSBox environment.

Running the Program

When the program runs successfully, hit any key to clear the splash screen. You should see the following spreadsheet grid appear:

File Edit Options Help 11:11pm				
A1 :				
	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

On some computers (or in DOSBox) you *might* be able to toggle Z99 to run either in a Window or in full-screen, as you choose, by holding down **Alt** and hitting **Enter**. To go back to the previous mode hit **Alt****Enter** again. Use whichever view appeals to you the most.

Try typing text and numbers into the various cells, and use the arrow keys to scroll around the grid (there is no support for the mouse, sorry). The menus work much like those in Windows: use **Alt****U**nderlined Letter to bring up a main menu, then for the desired option hit its underlined letter (or directly enter the shortcut key). Explore the **O**ptions and **H**elp menus. Once you are comfortable with the basic structure and format of Z99, hit **F**ile-**N**ew and discard any existing cell contents.

Steps of the Assignment

1. In cell **A1** type the formula **=TODAY ; YOUR NAME** with your own name after the semicolon. You will see a number appear in cell **A1**, with the formula and your name in the title bar. Hit Options-Date (**Alt**+**O** followed by **D**) to show the number as today's date. Hit Options-Center (**Alt**+**O** followed by **C**) to center the result.

Notice that nearly all command menu items have shortcuts. For example, setting the date format may be performed either by bringing up the options menu with **Alt**+**O** and then hitting **D**, or by keying in **Alt**+**D** directly without bringing up a menu. The assignment will use the menu commands, but you are free to use the equivalent shortcuts as you learn them and become more familiar with the program.

2. In cell **A2** type the formula **=NOW** and format it as a conventional time-of-day (hit Options-AM/PM). Center this cell.
3. In cell **A4** type the number **25000**. Right justify this cell (hit Options-Right).
4. In cell **A5** type the number **30000**, and right justify this cell as well.
5. In cell **A7** type the formula **=A4+A5**, and right justify the (negative) result.
6. In cells **B4**, **C4**, and **D4** type the formula **=A4** (type the same thing in all three cells). Right justify all three. In each case you will see exactly the same number as in **A4**.
7. In cells **B5**, **C5**, and **D5** type the formula **=A5**, and right justify these cells. As before, you will see the same number across all four cells.
8. In cells **B7**, **C7**, and **D7** type the formula **=A7**, and right justify these cells. You will now see four copies of the same three numbers in columns **A**, **B**, **C**, and **D**.

Verify that everything is set up correctly by changing the number in **A4** to **20000**. Cells **B4**, **C4**, and **D4** should automatically show the same value, and cells **A7**, **B7**, **C7**, and **D7** should all show the same sum. Restore the value in **A4** back to **25000**.

9. For each of the cells in column **B** (**B4**, **B5**, and **B7**) change the format to Options-Unsigned. There will be no apparent change to cells **B4** and **B5** at this time, but **B7** will suddenly change to a large positive integer.
10. For each of the cells in column **C** (**C4**, **C5**, and **C7**) change the format to Options-Middle Pt.
11. For each of the cells in column **D** (**D4**, **D5**, and **D7**) change the format to Options-Binary.
12. Using File-Save store the spreadsheet on your disk as **LAB1A.Z99** (the file should appear in the same **DOSapps** directory where the **Z99.EXE** program is located).
13. Move the cursor to **A1** so your name shows in the formula bar, then hit File-Capture to save a graphic view of the spreadsheet to a Windows bitmap file called **SHEET001.BMP** (this file should also appear in the same directory as **Z99.EXE** and **LAB1A.Z99**).

14. Change the value of cell **A4** to **25** and the value of **A5** to **51**. Move the cursor back to **A1** so your name shows in the formula bar. Use File-Save to store this version as **LAB1B.Z99**, and use File-Capture to save the graphics view as **SHEET002.BMP**.
15. You are now done with the spreadsheet. Use File-Exit to close it down. If you are using DOSBox, type **exit** to close that environment. Your **C:\DOSapps** folder should now contain **LAB1A.Z99**, **LAB1B.Z99**, **SHEET001.BMP**, and **SHEET002.BMP**, along with the **Z99.EXE** program itself. Do not proceed unless this is true.

What to Turn In

1. Using Windows Notepad, load in and print the two **.Z99** files. Using Windows Paint (or your favorite graphics application), load in and print the two **.BMP** files. The two **.BMP** files must each appear entirely on one sheet of paper (no cut-off images).
2. Using your favorite word processor (Word, Wordpad, WordPerfect, etc.), write a short essay that discusses what is going on in each of the two cases. Discuss the various representations shown (Unsigned, Signed, Middle Point, and Binary), and why the values appear on screen as they do. Which of the answers "make sense" mathematically, and which do not? What is going on with the Middle Point format? How does the Binary format help decode what is happening with the Signed and Unsigned formats?

Your essay must be at least $\frac{1}{2}$ page, but not more than one page, in length. It must be single-spaced, in 12-point Times New Roman, and fully justified, with 1-inch margins. Your essay **must contain your name** as part of the document, not just written in by hand.

3. Sort your printouts in the following order for submission:
 1. Essay
 2. LAB1A.Z99
 3. SHEET001.BMP
 4. LAB1B.Z99
 5. SHEET002.BMP

Staple the five print-outs together and turn them in.

You will be graded as follows:

1. 50% on whether or not, or how well, you completed the tasks in Z99. For example, you will lose major points if your name is not visible in cell **A1** of the two **.BMP** images and on the essay.
2. 40% on the quality of the essay (i.e., the completeness and clarity of your arguments).
3. 10% on the format of the document you turned in, the order of the printouts, etc. (basically on how well you followed the directions).