

Bonus Chapter 5

Creating Calculator Programs

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The programming language used by the calculator is similar to the Basic programming language. It uses the standard commands (such as the “If ..., then ..., else ...” command) that are familiar to anyone who has ever written a program. And, of course, it also makes use of commands that are unique to the calculator (such as **ClrHome**, which clears the Home screen). This chapter explains the basics of creating a calculator program. (Chapter B6 describes the Basic programming commands used by the calculator; Chapter B7 discusses programming commands that are unique to the calculator.)

Creating Calculator Programs on the Calculator

It is much easier to create a calculator program on a computer than it is to create it on the calculator. Then again, there may be times when a computer is not handy so you have no recourse but to create the program on the calculator. This section tells you how to create, save, and edit a program on the calculator. Later in this chapter, I tell you how to create a calculator program on a PC.

Creating and saving a program on the calculator

These are the basic steps for creating a program on the calculator:

1. Press **PRGM** **▶** **▶** **ENTER** to create a new program using the Program editor.

This is illustrated in the first picture in Figure B5-1.

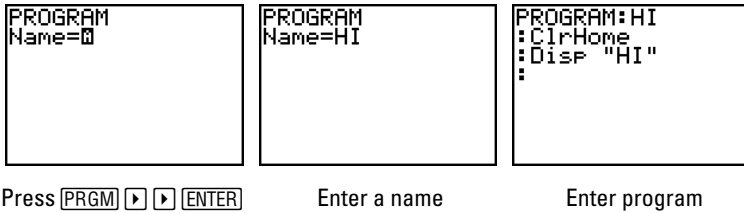


Figure B5-1: The steps for creating a program.

2. Give your program a name and then press **ENTER**.

The name of your program can consist of one to eight characters that must be letters, numbers, or the Greek letter θ . The first character in the name must be a letter or θ , as in the second picture in Figure B5-1.

The **□** after **Name =** indicates that the calculator is in Alpha mode. In this mode, when you press a key you enter the green letter above that key. To enter a number, press **ALPHA** to take the calculator out of Alpha mode and then enter the number. To enter a letter after entering a number, you must press **ALPHA** to put the calculator back in Alpha mode.

When you press **ENTER** after naming your program, the calculator puts you in the Program editor, as in the third picture in Figure B5-1. The program appearing in this picture is entered in the next step.

3. Enter your program in the Program editor.

Your program consists of a series of commands, each of which must be preceded by a colon, as shown in the third picture in Figure B5-1. After entering a command, press **ENTER** so the calculator supplies the colon preceding the next command you enter. When you finish writing your final command, press **ENTER** and ignore the colon that is waiting for a command to be entered.

An example of entering a program appears in the third picture in Figure B5-1. The program in this picture writes HI on the Home screen. The **ClrHome** command is entered into the program by pressing `PRGM` `▶` `8` `ENTER`, and **Disp** is entered by pressing `PRGM` `▶` `3` `ENTER`.

The program commands supplied by the calculator, such as **ClrHome** and **Disp**, are explained in Chapters B6 and B7.

4. Press `2nd``MODE` when you're finished writing your program.

This saves your program in the memory of the calculator and returns you to the Home screen. The name under which the program is stored in the calculator is the same name you gave the program in Step 2.

Editing a program on the calculator

To edit a program stored on the calculator, follow these steps:

1. Press `PRGM` `▶` and press the number of the program you want to edit.

2. Edit the program.

Editing is explained in Chapter 1. Pressing `CLEAR` erases the line containing the cursor.

3. Press `2nd``MODE` to save the program and return to the Home screen.



After creating a program on the calculator, you can transfer it to a computer and edit it on the computer. To edit the program on a computer you need the free TI-Graph Link software. Downloading, installing, and using this software is explained in the next section.

Creating a Calculator Program on the Computer

You can create a program on the computer and then transfer it to your calculator (or vice versa). To do so, you need the TI Connect software, the TI-Graph Link software, and a TI-Graph Link cable to connect your calculator to your computer. The software is free; the TI-Graph Link cable, if it didn't come with your calculator, can be purchased at the Texas Instruments online store at www.education.ti.com.

Downloading and installing TI-Graph Link software

The TI-Graph Link software is in the TI Connectivity directory on the TI Resource CD that most likely came with your calculator. It can also be downloaded from Texas Instruments' Web site. If TI hasn't revised its Web site since this book was written, then to download the software:

1. **Go to Texas Instruments' Web site that is located at www.education.ti.com.**
2. **Open the "Know what you're looking for?" drop-down menu and click on TI Connect.**
3. **Click on downloads in the column on the left of the screen.**
4. **Click on "Are you looking for TI-GRAPH LINK Software?"**
5. **Click on Windows, Macintosh, or MS-DOS.**
6. **Click on the type of calculator you have.**
7. **Click on the language you want.**
8. **Follow the directions given during the downloading process. Make a note of the directory in which you save the download file.**

To install TI-Graph Link, double-click on the downloaded TI-Graph Link file (t i 83pUSA, for example) you saved on your computer or double-click on the file on the TI Resource CD. Then follow the directions given by the installation program you just launched.

Using TI-Graph Link to create and save a calculator program

After installing TI Connect and TI-Graph Link, as explained earlier in this chapter, you can create a program using TI-Graph Link, as follows:

1. **Start the TI Connect software.**
2. **Click the Program Editors button at the top of the screen.**

You see a screen containing pictures of the various TI calculators.

At the bottom of this screen you see a message that says the TI-Graph Link software does not support the USB TI-Graph Link cable. This means that USB cable users can still use TI-Graph Link to write their program, but they must use TI Connect, and not TI-Graph Link, to transfer the program to the calculator. This issue is fully addressed in the following steps.

3. Click on the appropriate calculator.

On the left of the screen you see a picture of the calculator keyboard, and on the right you see the Program editor.

4. If necessary, clear the Program editor.

If a program appears in the Program editor, click **File** → **New** → **OK** to clear the Program editor.

5. In the box following Name, enter a name for your program.

The name of your program can consist of one to eight characters that must be letters, numbers, or the Greek letter θ . The first character in the name must be a letter or θ .



Don't press the **Enter** key on the computer after entering the name of the program. If you do, the software attempts to send the not-yet-completed program to your calculator. If you have a USB cable or a serial cable that isn't connected to the computer, you get an error message.

6. If desired, in the box following Comment, enter a comment.

Use the mouse or **Tab** key to get from the **Name** box to the **Comment** box (see the above warning). Because an eight letter name for your program usually doesn't tell you much, writing a comment really helps when at a much later date you find yourself wondering what the program does.

Don't press the **Enter** key on the computer after entering the comment. See the previous warning for details.

7. Enter your program.

Use the mouse or **Tab** key to get from the **Comment** box to the large box where the program is entered. (Also note the warning that follows Step 5 in this procedure.)

Your program consists of a series of commands. In TI-Graph Link, commands are separated by pressing the **Enter** key after entering a command, or by placing a colon between

two commands appearing on the same line of the Program editor. If the **Enter** key is pressed after each command, the result should look like the third picture in Figure B5-1 without the colons. The program in this picture writes HI on the Home screen. (Explicit directions for entering the program in Figure B5-1 appear in Step 3 in the previous section “Creating and Saving a Program on the Calculator.”)

The calculator keyboard to the left of the Program editor is fully functional. Click on the keys using the mouse. For example, to enter π in your program, click $\overline{2nd}$ and then click $\overline{\pi}$.

The program commands supplied by the calculator, such as **ClrHome** and **Disp**, are explained in Chapters B6 and B7.



When writing a program using the TI-Graph Link software, if you precede each command with a colon — as you do when writing a program on the calculator — no harm will be done. The calculator simply interprets each colon as a command that does nothing.

8. Save your program on the computer.

To do so, click **File**⇨**Save As**. Select the directory in which you want to save the program, and then click **OK**. The program is saved under the name you gave it in Step 4.

Editing a program saved on a computer

After installing TI Connect and TI-Graph Link (as explained earlier in this chapter), to edit a program using TI-Graph Link, follow these steps:

1. If necessary, place your program in the Program editor.

If the Program editor (TI-Graph Link) isn't currently running on your computer, follow the first three steps in the section, “Using TI-Graph Link to create and save a calculator program.”

If the Program is running on your computer but your program does not appear in this editor, click **File**⇨**Open**. Select the directory containing your program, click on your program, and then click **OK** to enter the program in the Program editor.

2. Edit your program.

You edit your program the same way you would edit your work in a word processor. The **Edit** menu in TI-Graph Link contains the typical editing commands, such as **Undo**, **Cut**, **Copy**, **Paste**, and so on.

3. When you're finished editing, click File⇨Save to replace the previous edition of your program with the revised edition.

Transferring a program created in TI-Graph Link to your calculator

To transfer a program from a computer to a calculator, the computer and the calculator must be connected using a TI-Graph Link cable.

If the computer and calculator are connected with a serial TI-Graph Link cable, then after creating your program using the TI-Graph Link software, as explained earlier in this chapter, you can transfer your program to the calculator by clicking on the **Send to RAM** button in the upper right hand corner of the TI-Graph Link Program editor. If the computer and calculator are connected with a USB cable, then clicking the **Send to RAM** button results in a transmission error message because the TI-Graph Link software does not support the USB cable. Creating a program using TI-Graph Link is explained earlier in this chapter.

Independent of the type (serial or USB) of TI-Graph Link cable used to connect the computer and calculator, you can always use the TI Device Explorer program housed in the TI Connect software to transfer your program to your calculator.

Executing a Calculator Program

After creating your program and saving it on the calculator, you can run the program on the calculator by performing the following steps:

- 1. Press **PRGM** to enter the Program Execute menu and use **▾** to move the indicator to your program.**

This is illustrated in the first picture in Figure B5-2.

2. Press **ENTER** to place the program on the Home screen.

This is illustrated in the second picture in Figure B5-2.

3. Press **ENTER** to execute the program.

This operation is shown in the third picture in Figure B5-2. The program being executed in this figure is the program in the third picture in Figure B5-1. When the calculator is finished executing the program, it writes *Done* on the Home screen.



Figure B5-2: Executing a program.

Deleting a Program from the Calculator

To delete a program from the calculator:

1. Press **2nd|+** to access the Memory menu.
2. Press **2** to access the Mem Mgt/Del menu.
3. Press **7** to access the Program files stored in the calculator.
4. If necessary, repeatedly press **↓** to move the indicator to the program you want to delete.
5. Press **DEL** to delete the program.

You are asked whether you really want to delete this program. Press **2** if you want it deleted or press **1** if you've changed your mind.

6. Press **2nd|MODE** to exit this menu and return to the Home screen.