

Memory Management on the TI-84 Plus

Concepts

- Managing memory on the TI-84 Plus

Overview

This activity features how memory can be managed on the TI-84 Plus. This will include working with memory in RAM and archive memory. Participants will also learn about grouping files, lists, and variables for later retrieval.

Materials

- TI-84 Plus

Introduction

The TI-84 Plus graphing calculator is equipped with FLASH memory: special hardware that allows you to upgrade the operating system, install special software called APPS, and utilize additional memory features. This extends the use life of the device and expands its functionality.

This document explains two ways in which you can use the memory of the calculator for backing up your work: **Archiving** and **Grouping**.

The memory of the TI-84 Plus is divided into two sections:

1. RAM (an acronym for **R**andom **A**ccess **M**emory) is the “working memory” for most of the things that you do on the calculator: programs, lists, matrices, functions, and other data are kept in RAM. Each of these “things” that you work with in RAM is called a variable. Each variable has three properties: a name, a type, and a value.
2. ARCHIVE memory is a separate, but connected, portion of memory used for APPS, GROUPS, and “safe” storage (archiving) of your RAM variables.

Memory management is important because you may need to “free up” RAM to make room for other data or programs.

Notes: Archiving protects your files from intentional or inadvertent resets.

Grouping allows you to make copies of files, such as one student’s Lists, so that another student can use the calculator for the same activity.

Procedure

1. Press **[2nd] [MEM]** (on the **[+]** key) to access the MEMORY menu shown in Figure 1.
2. Select 2:Mem Mgmt/Del. With this option, you can delete variables or move variables between the RAM and Archive areas of memory. See Figure 2.
 - When a variable is in RAM, it is “usable”. The variable is available for general use as a “normal” variable.

Archiving

1. When the variable is in Archive memory, it is not available for use.
 - Why put a variable in archive? The main reason is to free up RAM for something else without deleting any variables.
 - You will usually put programs and lists into archive because these variables take up the most memory.
2. To archive, press **[2nd] [MEM]**. Then select 2:Mem Mgmt/Del (see Figure 2 again).
3. Next, select 1:All to see all of the variables in the TI-84 Plus (Figure 3).

The variable list screen in Figure 3 contains a lot of information.

- The two numbers at the top, RAM FREE and ARC FREE, are the numbers of bytes available in each portion of memory, RAM and Archive.
- On the left side of the screen is the “selection pointer” pointing to a particular variable. Move the selection pointer down or up with the arrow keys, **[↓]** and **[↑]**.
- The second column (just to the left of the variable names) is the indicator that tells you whether a variable is in RAM or Archive. A blank space indicates that it is in RAM, and an asterisk (*) indicates that it is in Archive.
- The number on the right of the screen is the size of the variable in bytes.



Figure 1

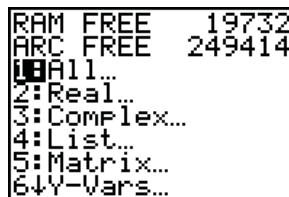


Figure 2

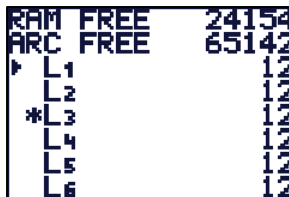


Figure 3

4. Press **[ENTER]** when the selection pointer is pointing to the variable.
 - **[ENTER]** switches the location of the variable.
 - “Archiving” is the act of moving a variable from RAM to Archive. “Unarchiving” is the opposite process.
 - As you move between RAM and ARCHIVE, notice the numbers at the top of the screen change to indicate new memory-free values. When you move a variable from RAM to Archive, the RAM FREE value increases and the ARC FREE value decreases by the size of the variable.

The Memory Management variable list screen is also used for deleting variables, although it is seldom necessary to delete variables on the TI-84 Plus. It is more convenient to move it into Archive memory.

5. To delete a variable, make sure the “selection pointer” is pointing to it, then press **[DEL]**.
6. Some variables, programs and anything in Archive memory provide you with one last chance to change your mind: “Are You Sure?” (Figure 4).
 - To finally delete the variable, select 2:Yes.
 - If you decide not to delete the variable, press **[ENTER]** or select 1:No.

When a variable is in Archive, an asterisk appears to the left of its name in the List menu (**[2nd]** **[STAT]**) too.

- Figure 5 shows a picture of a List menu with one archived list, L3.
- Since L3 is in Archive memory, it is not available for regular use. If you try to make a Stat Plot using L3 while it is in Archive, you get an error message. This error message will appear whenever you try to use an archived variable.
- If you need to use an archived variable, you must move it back from Archive to RAM using the Memory Management tool.

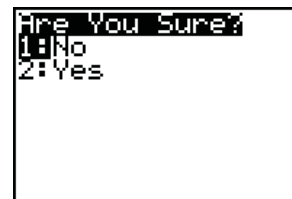


Figure 4

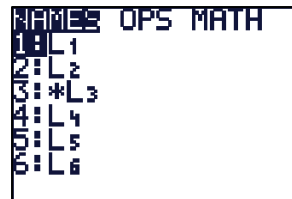


Figure 5

Grouping

The second useful memory management tool on the TI-84 Plus is the ability to “group” variables into a Group file. This is identical to the computer linking technique of grouping variables into a single file using TI Connect™ software (*.8xg files), but a computer is not needed here.

Grouping makes a file in the calculator containing copies of the variables that you want. Grouping does not “free up” memory. The Group file resides in Archive, so it does not use any RAM. This is a very handy tool for backing up your TI-84 Plus variables, especially programs and lists.

1. Select **[2nd]** **[MEM]** and then 8:Group (Figure 6).
2. Select “Create New,” enter any name up to eight characters long for the GROUP file, and press **[ENTER]** (Figure 7).
 - The next screen works like the LINK-selection screen.
3. Selecting 2:All gives a list of all variables in the TI-84 Plus (that can be put into a Group file), unselected (Figure 8).
4. Just as in linking, use **[↑]** and **[↓]** to point to variables and press **[ENTER]** to select (or deselect) them for copying into the Group file (Figure 9).
 - In Figure 10, the two lists, L4 and L6, have been “selected” for this Group file (note the square mark).
 - You may choose mixed data types as well. For instance, choose some lists, some programs, and some matrices.
 - When you have selected all your variables, press **[▶]** to go to the “DONE” menu, and press **[ENTER]** to finish making the Group file.

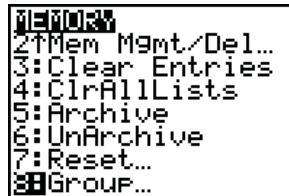


Figure 6

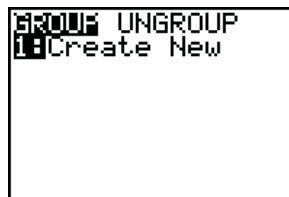


Figure 7



Figure 8

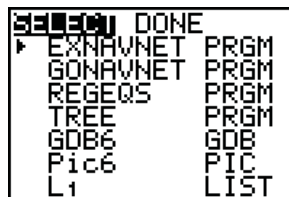


Figure 9



Figure 10

- The Home Screen displays the message: “Copying Variables to Group: yourname”, and then displays “Done” on the right side of the screen.
- The key word here is “copying”— your variables are undisturbed in RAM. The Group file contains copies of the selected variables, just as linking transmits copies of your variables to another TI-84 Plus.

Note: You cannot have a group with just one object. Each group must contain at least two objects.

The Group files reside in Archive, so a “normal” Reset, “[2nd] [+], 7:Reset, 1:AllRam, 2:Reset”, will not disturb any Group files. These Group files can be linked (sent) to other TI-84 Plus units, and can be stored on a computer using TI Connect™ software.

Ungrouping

“Ungrouping” is the act of putting copies of the variables in a Group file back into RAM. The Group file remains intact and the variables are copied back into RAM.

1. Select [2nd] [MEM] 8:Group.
2. Press [▢] to UNGROUP, and select your Group file from the listing using [▼] and [▲] (notice the asterisks – all Group files reside in Archive). See Figure 11.
 - Press [ENTER]. If any of the variables in the Group file are already in RAM, then you get a “DuplicateName” menu of choices.
 - Just as in Linking, choose 2:Overwrite to overwrite the variable with the one from the Group file. See Figure 12.

Notes: You cannot put an Archived variable into a Group file. Unarchive it first, then make the Group file.

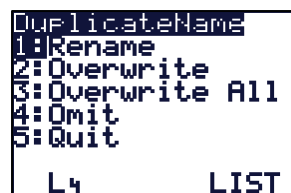
- Once a Group file is established, it cannot be modified, only UNGROUPED or DELETED. Thus you cannot add variables to a group file afterward.
- When linking to a computer, you cannot make a group file on the computer containing a Group file from the TI-84 Plus.



```

GROUP UNGROUP
1:*BALL
2:*BALLBOUN
3:*HANDHEIT
4:*PROGRAMS
5:*PROGRAMZ
  
```

Figure 11



```

DuplicateName
1:Rename
2:Overwrite
3:Overwrite All
4:Omit
5:Quit
L4      LIST
  
```

Figure 12

Tip: Make a Group file of all your programs to prevent loss from inadvertent resets. When you add programs to the TI-84 Plus that you want to keep, delete the programs Group and then make it again.

- It is convenient to Group everything on your handheld before resetting RAM. You can quickly restore everything after resetting the RAM by ungrouping the file. You can then delete that group.

Deleting A Group

1. Selecting $\boxed{2\text{nd}}$ [MEM], 2:Mem Mgmt/Del, and C:Groups gives the list of Group files.
2. Press $\boxed{\nabla}$ next to one of them to delete it, and press the appropriate choice at the “Are You Sure?” menu.

Reminder: Use $\boxed{2\text{nd}}$ [MEM], 8:Group for Grouping and Ungrouping.

Use $\boxed{2\text{nd}}$ [MEM], 2:Mem Mgmt/Del, and C:Groups for viewing the size of and deleting Group files.

Tip: When the archive gets full, consider putting large Group files on a computer, and then deleting them from the TI-84 Plus.

Summary of Memory Management

- Two sections of memory: RAM and Archive.
- Archiving/Unarchiving moves variables.
- Grouping/Ungrouping copies variables.
- Archived variables are unavailable for use.
- Grouped variables are still available for use.
- You cannot put an archived variable into a group file.
- Archived variables and group files can be transferred to other compatible calculators or a computer.
- Ungrouping leaves the group file intact.
- Rather than deleting to free up RAM, consider moving to Archive first.
- Normal Reset— $\boxed{2\text{nd}}$ [MEM], 7:Reset, 1:AllRam, 2:Reset—leaves archived variables and group files intact.

Memory Management Keystroke Summary

Archive/Unarchive:

- $\boxed{2nd}$ [MEM], 2:Mem Mgmt/Del
- 1:All (or choose your variable sub-type)
- $\boxed{\downarrow}$ $\boxed{\uparrow}$ to point to a variable
- \boxed{ENTER} to move a variable (note the * toggle)

Group:

- [MEM], 8:Group, 1:CreateNew
- Enter a group name
- $\boxed{\downarrow}$ $\boxed{\uparrow}$ \boxed{ENTER} to select multiple variables (note the squares)
- $\boxed{\rightarrow}$ to DONE
- \boxed{ENTER} to execute the grouping

Ungroup

- $\boxed{2nd}$ [MEM], 8:Group, $\boxed{\rightarrow}$ to UNGROUP
- $\boxed{\downarrow}$ $\boxed{\uparrow}$ to point to the desired group file
- \boxed{ENTER} to execute the ungrouping

Deleting Variables

- $\boxed{2nd}$ [MEM], 2:Mem Mgmt/Del
- 1:All (or choose your variable sub-type)
- $\boxed{\downarrow}$ $\boxed{\uparrow}$ to point to a variable
- \boxed{DEL} , possibly “Are You Sure?” will appear

One Final Note ...

On the $\boxed{2nd}$ [MEM] menu, there are two menu items, 5:Archive and 6:UnArchive. These are used in programs so that the program can manipulate specific variables' locations.

For example, a program may contain the statement 'Archive L1, L2, L3, L4, L5, L6' which will move these six lists from RAM to Archive. You do not need to use these two commands unless you are programming.