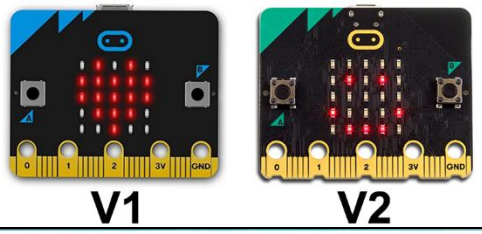
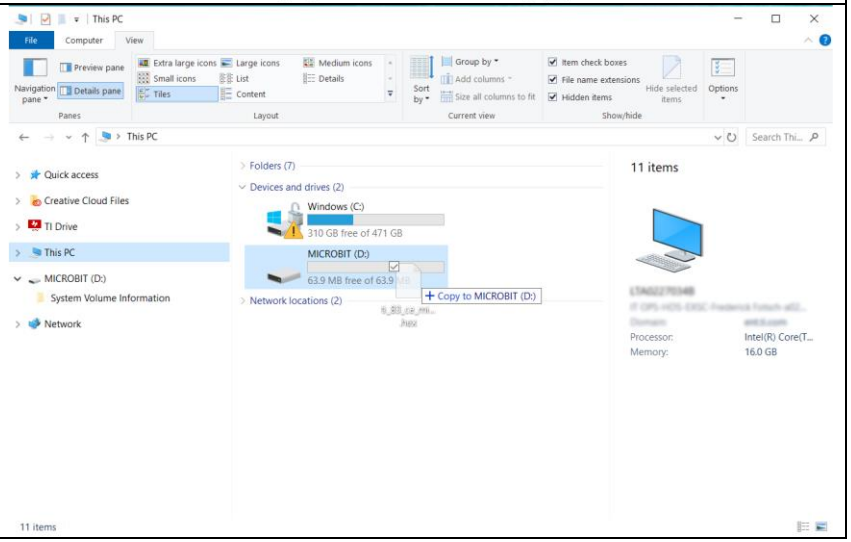
## Installation of ti_runtime and 84 Plus CE micro:bit modules

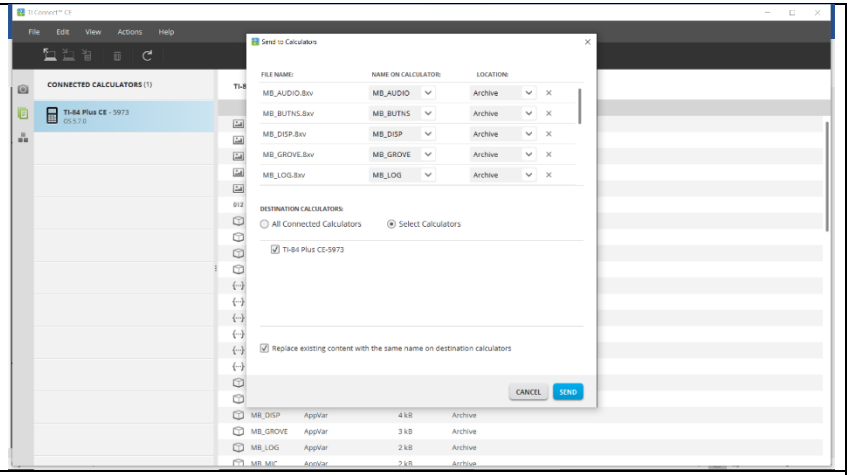
1. Determine if your micro:bit card is a V1 or V2. The V2 card has scallops on the board's gold edge, while the V1 is straight. Use the file versions that match your card. A V1 card will use the 1.x.x ti_runtime and modules, while the V2 card will use the 2.x.x ti-runtime and modules. Both versions are in the download .zip file. Download and unzip the file in a convenient location such as your desktop.




2. Use a USB cable to connect the micro:bit to a computer. The micro:bit will appear as a drive on your computer. Drag and drop the required version ti_runtime.hex file to the micro:bit. Alternatively, left-click on the file and use the 'Send to' command to copy from the .zip folder to the card. This file provides functionality between the TI-84 Plus CE Python and the micro:bit card. The ti_runtime installation is a one-time process. If the micro:bit is connected back to the PC and programmed in a different language other than Python, such as MakeCode, the ti_runtime.hex will need to be installed again. See additional information at the end of the document.



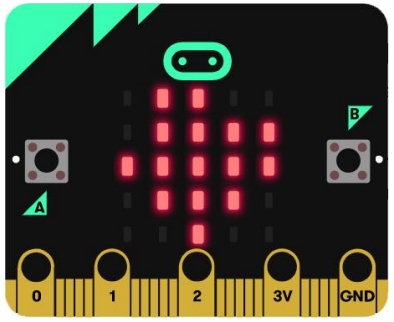
3. Use TI-Connect to transfer all of the .8XV micro:bit modules from your computer to the calculator. These modules will install automatically into the archive memory.
    a. Select Actions from the menu.
    b. Select Add Files from Computer…
    c. Navigate to the modules folder.
    d. Shift+Select to highlight all of the files in the folder and select Open.
    e. The menu on the right will appear. Select SEND to complete the transfer.



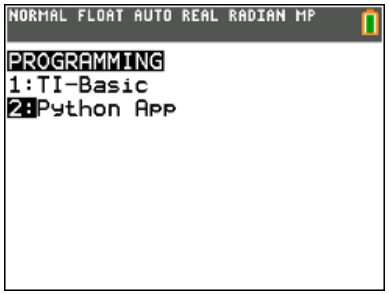

4. Connect the micro:bit to the TI-84 Plus CE Python calculator using the unit-to-micro:bit cable

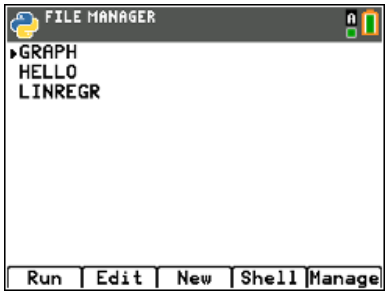
Hint: you can alternatively use a mini USB female to micro USB male adapter attached to the short calculator-to-calculator cable that came with your calculator at the time of purchase.


5. Press the reset button on the back of the micro:bit card next to the micro USB connector. If the ti_runtime.hex has loaded successfully, the Texas logo will display on the card.



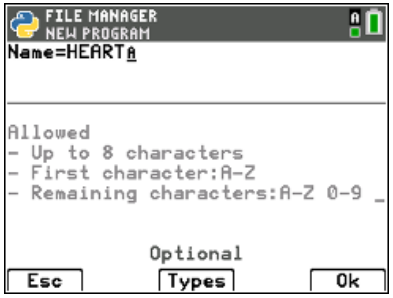

6. Press [prgm] and select Python App to open the Python file manager. The micro:bit modules will not appear in the file manager; since they reside in archive memory. This menu may have three example programs if you have not created any Python programs yet on your calculator.

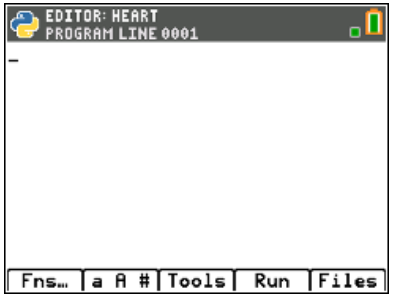


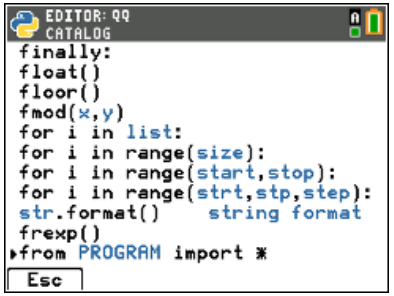

## Creating Your First micro:bit Program

1. Select [New] to create a program with the name 'HEART'
2. Select [Ok].
3. There will be a blank Python editor screen on your calculator.



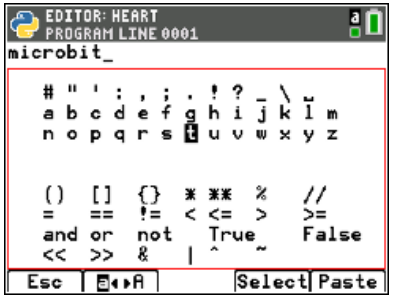



4. Select [2nd][catalog], then scroll down and choose: **from** PROGAM **import ***
   Hint: press the [F] key to jump in the catalog.





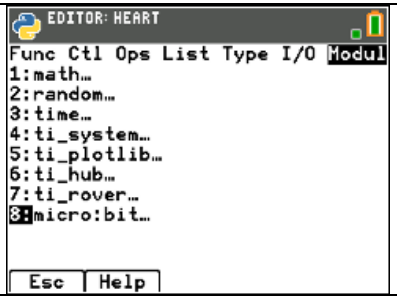
5. Position cursor after **from** and enter "microbit." select [a A #] and select then paste **microbit** into the **from _ import *** statement.
   Hint: you can also use the alpha keys on the calculator's keyboard.



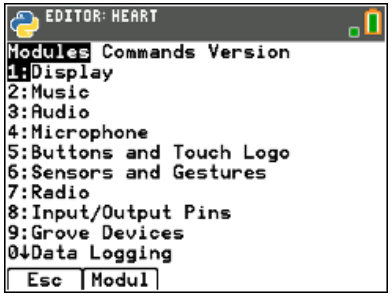


6. Select [enter] to go to the following line in the program after the import statement. This action will import the module into the editor and add the micro:bit menu to the bottom of the module list.

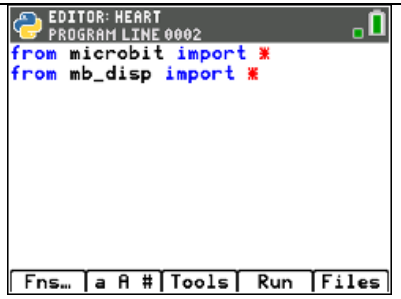
   Select[Fns...] and select Modul tab, then arrow down to micro:bit and press [enter]. The menu will display all of the micro:bit modules.

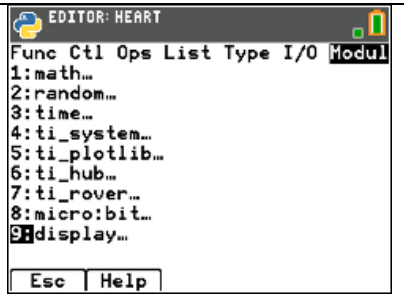



7. Select the **Display** module needed for the new program. The import for the selected module is added to the program. If additional modules are required, return to this micro:bit menu to add them.
   Hint: Choose only modules that are essential to the program to conserve memory.

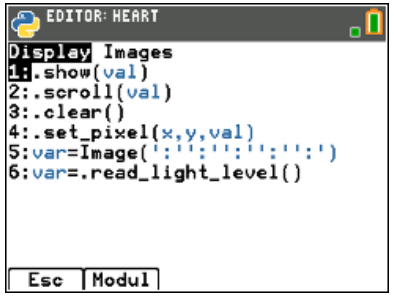


8. The module named mb_disp is added to the program. Select the [Fns] key and select Modul. Notice the new **Display...** menu item is now at the bottom of the list. All of the other Micro:bit modules work in this way.

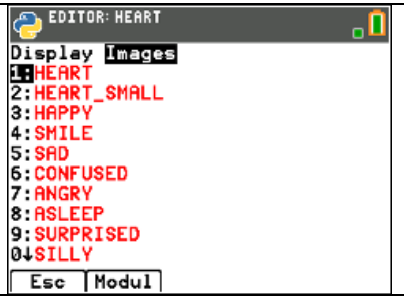



9. Select **Display...** and then **display.show(val)**.

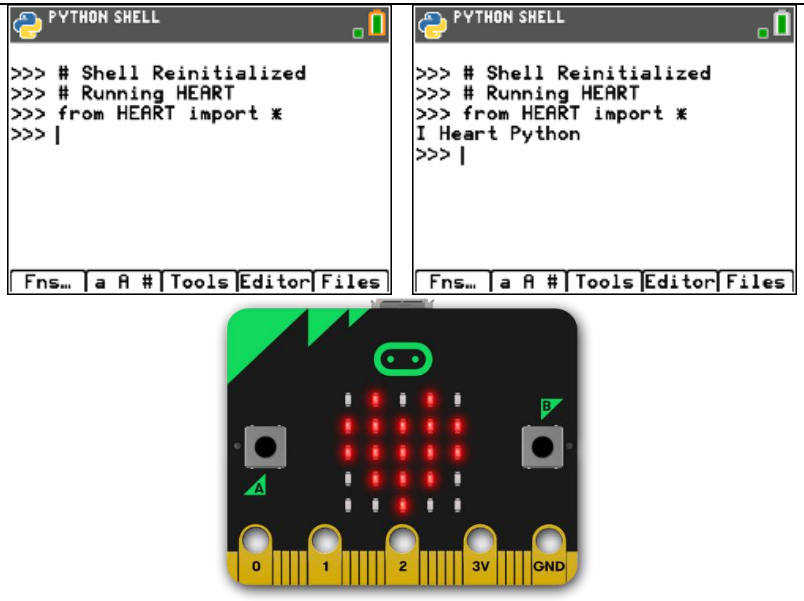



10. Select the [Fns] key and select Modul. Select the **Display...** and then Images. Select **HEART** to paste "Image.HEART" into the program.


11. Select [Fns...], and I/O, then print(). Type in "I Heart Python". The print() statement illustrates how micro:bit statements are used along with standard or TI module python statements within the same program.


12. Be sure the micro:bit is connected to your calculator and then select [Run].
    If you see a heart like the image on the right, you have succesfull programmed the micro:bit with the TI 84 Plus CE python! Congratulations!




Troubleshooting:

- Disconnect the cable from the calculator and reconnect.
- Press the reset button on the back of the micro:bit card.
- Be sure the Texas logo is displayed when the micro:bit is first plugged into the calculator. If not install the ti_runtime on the card.
- Ensure quotes are before and after “I Heart Python”.
- Check that from microbit import * and from mb_disp * are both at the beginning of your program.

## Going Further

- Try 10 Minutes of Code:Python - Introduce students to the basics of Python coding with the micro:bit to help build conceptual understanding of core coding concepts.
- Load and run each of the module test programs in the .zip download folder.
- Refer to the TI-84 Plus CE Python Microbit Module Python Reference document in the download folder for more information and how to use all of the modules’ methods.
- Visit the microbit.org make-it-code-it-website and try some of the many projects. Be sure to click the Python tab in the ‘Code it’ section.