

Cadette Coding for Good, Badge 1:

meme, functions, pseudocode, shareable

1. Learn about functions and arguments.
2. Explore how memes are created.
3. Write pseudocode for a meme.
4. Write shareable code.
5. Share your meme.

Be sure to review the “Cadette Coding for Good” guide for the badge requirements and badge steps provided by your leader and the Girl Scouts. It also includes relevant vocabulary and interesting background information to spark your interest in coding. This lesson will allow you to earn the **Badge 1: Coding Basics** using your TI-84 Plus family graphing calculator.

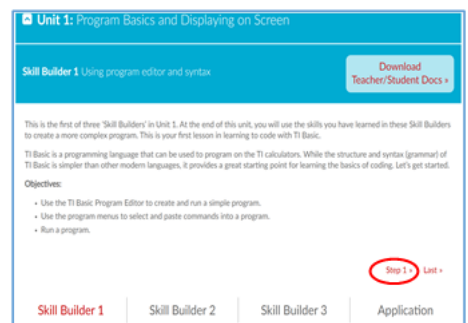
Introduction

The programming language **BASIC** (stands for **B**eginner’s **A**ll-purpose **S**ymbolic **I**nstruction **C**ode) was developed in the 1960s as an easy system for teaching computer programming. TI-Basic is similar to other flavors of BASIC, but you must select the programming words and commands from the onboard menus, as you will soon see.

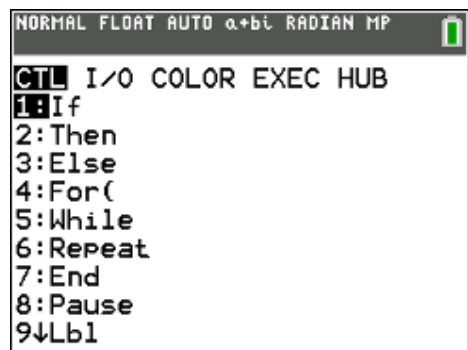
1. For an introduction to programming on the TI-84 Plus family graphing calculator, see the TI Codes lessons at education.ti.com > **Activities** > **TI Codes** > **TI-Basic**. Units 1 through 5 should be enough to get started. Then return to this lesson for the **Cadette Coding, Badge 1** project. Go to [10 Minutes of Code \(for TI-84 Plus technology\)](#).



How to navigate TI Codes: Be sure to notice that each unit has three Skill Builders (SB) and one Application activity, as you can see here. You will navigate through each Skill Builder by clicking on the “Step 1” in the right bottom corner, which will take you through the content. This screenshot shows you are currently in Skill Builder 1 > Step 1. After you complete all the steps in SB 1, you will then move to SB 2, and so on, until you complete all of Unit 1. You will then move on to Units 2, 3, 4 ... and do the same thing.



2. After you have completed the TI Codes units, you know about:
 - The programming process (planning, coding, testing and debugging)
 - Using the TI-84 Program Editor and its menus
 - Running a program
 - Some important pieces of TI-Basic code: Input, Disp, variables and assignment statements, **If...Then...Else** structures and loops, like **For** and **While** (some of these statements are shown to the right)





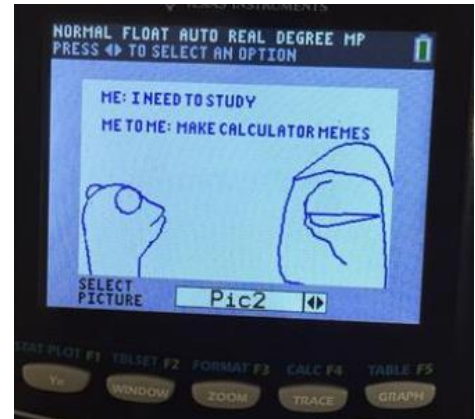
TI-84 PLUS / TI-84 PLUS CE TECHNOLOGY

STUDENT ACTIVITY

- Your Badge 1 project will be to create a “meme.” Before pressing the buttons, think about the idea of a meme and how the TI-84 Plus family graphing calculator can produce graphics and text to convey a relevant message.

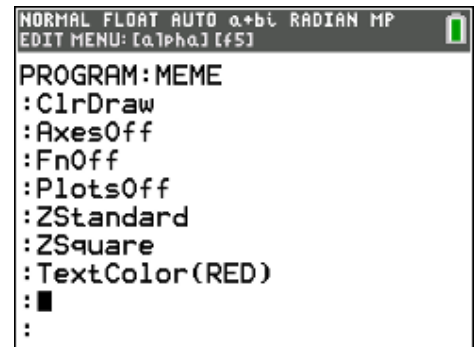
There are several **functions** on the **[draw]** (**[2nd]** **[prgm]**) menu that let you design interesting graphics and text. These functions produce points, lines, circles, text and more. Unit 5 of the TI-84 Codes lessons dealt with Graphics commands on the TI-84 and TI-84 Plus CE graphing calculators.

This lesson will review some basic graphics functions. Get creative!



- When designing a screen for graphics display, use some setup commands that are found on **[draw]**, **[format]**, **[statplot]** and **[zoom]** keys. Note that ALL calculator commands can be found on the **[catalog]** key (**[2nd]** **[0]**). Once in the catalog, press the first letter of the command you want, scroll down until you find it and press **[enter]** to add it to your program.

*For the TI-84 Plus CE: In the example to the right, the keyword **RED** is a special color **variable** that must be selected from **[vars]** > **COLOR**.*

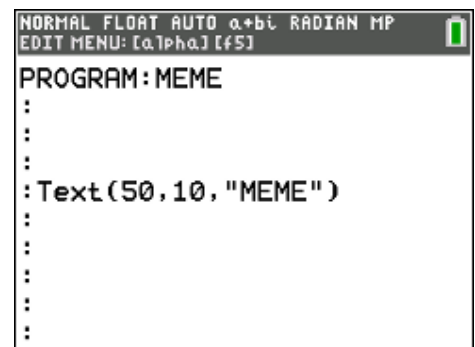


- To draw some text (words) on the graphics screen use **Text(x, y, "MESSAGE")**

If you use the command in the image to the right you will see the word

MEME

starting on line 50, column 10 of the graph screen when you run the program.



For the TI-84 Plus CE: Displayed in the current TextColor, perhaps like this:

TextColor GREEN

- If you are using a TI-84 Plus, your graph screen is 96x64 pixels*
- If you are using a TI-84 Plus CE, your graph screen is 264x164 pixels*



TI-84 PLUS / TI-84 PLUS CE TECHNOLOGY

STUDENT ACTIVITY

6. Besides Text, you can use other DRAW commands found on the [draw] menu ([2nd] [prgm]):

- **Line(A,B,C,D)** draws a segment between the points (A,B) and C,D)
- **Circle(A,B,R)** draws a circle with center at (A,B) and a radius R

Both of these commands depend on the current window setting for the coordinates.

7. Points can be plotted using the commands on the [draw] POINTS menu:

- **Pt-On(A,B)** plots a point at (A,B) depending on the current window
- **Pxl-On(R,C)** plots a point at row R, column C of the screen (ignoring the window setting)

8. **Pic** (picture) files: If you have a good screen drawing, you can store it in one of the 10 Pic variables.

On the graph screen or home screen, press [draw] STO.

StorePic 1 stores the current graphic screen in the variable **Pic1**.

RecallPic 1 will paste the pixels in **Pic1** onto the screen.

You can include these statements in your program to build a graphic screen piece by piece.

9. **Background images:** If you are using a TI-84 Plus CE, you have special storage space for 10 **Background** images. These can be loaded from a computer to your calculator using the free [TI Connect™ CE software application](#).

From the HOME screen (not in the Program Editor) press [format] and use the **Background:** item to see the background images that are stored in your calculator. The preloaded Image4 is shown to the right.

```
NORMAL FLOAT AUTO a+bi RADIAN MP
DRAW POINTS STO BACKGROUND
1:ClrDraw
2:Line(
3:Horizontal
4:Vertical
5:Tangent(
6:DrawF
7:Shade(
8:DrawInv
9↓Circle(
```

```
NORMAL FLOAT AUTO a+bi RADIAN MP
DRAW POINTS STO BACKGROUND
1:Pt-On(
2:Pt-Off(
3:Pt-Change(
4:Pxl-On(
5:Pxl-Off(
6:Pxl-Change(
7:p1-Test(
```

```
NORMAL FLOAT AUTO a+bi RADIAN MP
DRAW POINTS STO BACKGROUND
1:StorePic
2:RecallPic
3:StoreGDB
4:RecallGDB
```

```
NORMAL FLOAT AUTO a+bi RADIAN MP
PRESS [←] OR [→] TO SELECT AN OPTION
RectGC PolarGC
CoordOn
GridOff
GridColor
Axes:
LabelOff
ExprOn Ex
BorderCo
Background: Image4
Detect Asymptotes: On Off
```





TI-84 PLUS / TI-84 PLUS CE TECHNOLOGY

STUDENT ACTIVITY

10. (For the TI-84 Plus CE) In your program, use the [draw] BACKGROUND command

BackgroundOn 1

to load background Image1 onto the screen.

Using multiple images, you can even create an animated "movie:"

:For K,0,9

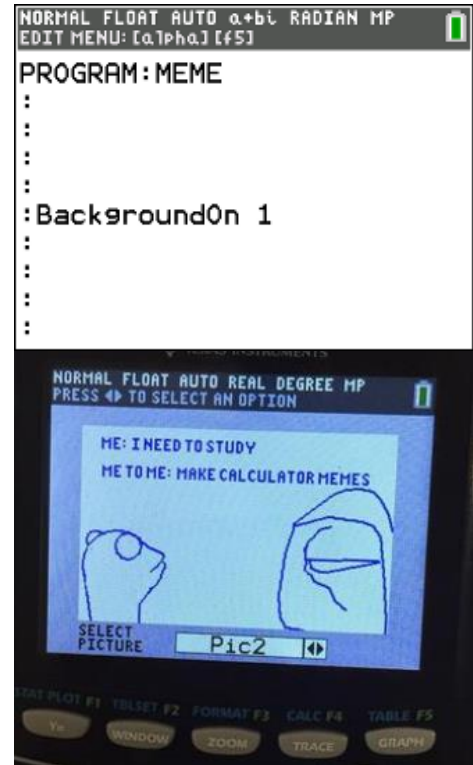
:BackgroundOn K

:End

11. **Sharing your project:**

You can take a picture of your calculator screen to share with the world!

Share it on Instagram, or other social media, and tag it @TICalculators.



12. Here is a sample TI-84 Plus CE program and its result:
(You must select RED and GREEN from the [vars] COLOR menu)

```
NORMAL FLOAT AUTO a+bi RADIAN MP
EDIT MENU: [a1pha] [f5]
PROGRAM: MEME
:AxesOff
:FnOff
:PlotsOff
:ZStandard
:ZSquare
:TextColor(RED)
:Circle(0,0,7, GREEN)
:Text(50,10, "MEME")
:BackgroundOn 1
```



(On the TI-84 Plus omit the **TextColor** and **BackgroundOn** statements and the variable **GREEN** in the **Circle** statement.)
The Background image 1 was loaded (as a .jpg) onto the calculator using TI Connect™ CE software.

Congratulations!

You have completed the requirements for earning your **Cadette Coding for Good, Badge 1: Coding Basics**. Now that you have completed this requirement, you are challenged to *give service* by *sharing* what you have learned about coding with others. Refer to the "Coding for Good" Girl Scout guide for suggestions on how to do so.



What's next? (Optional extensions)

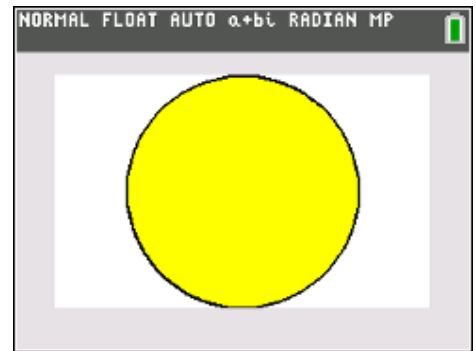
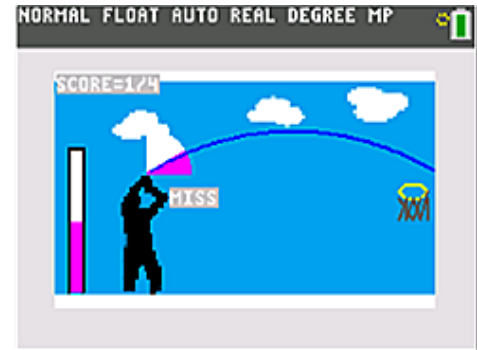
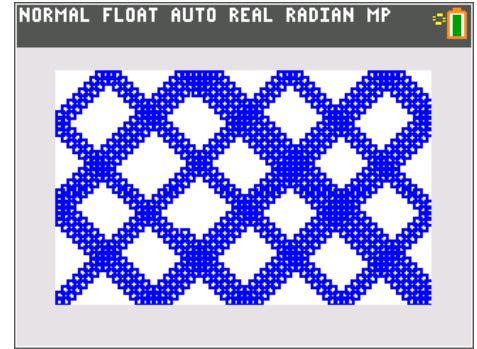
Ready to try some additional practices with your new skills?

1. The graphics tools from Unit 5 of the TI Codes lessons let you to design lots of unique images, create animations and develop challenging games. In the TI Codes Unit 5 Application you made a ball "bounce" around on the screen. Now add a "paddle" that you can move left or right across the bottom edge of the screen using the arrow keys. Modify the program so that only if the ball hits the paddle it bounces up, otherwise you lose the game. For scoring, count the number of times that the ball hits the paddle. Report the score at the end of the game.
2. See the **Basketball Game** in the [Beyond Basics](#) section of TI Codes.
3. The TI-84 Plus does not have a fill command for filling in a circle but you can make a filled circle using a **For** loop to start with a very small circle and then increase the radius to the desired size. Write a program to draw the "smiley face," the original emoji.



(or an emoji of your own design)

Be sure to share your work and tag it [@TICalculators!](#)



```

NORMAL FLOAT AUTO α+β RADIAN MP
EDIT MENU: [α] [T] [h] [o] [α] [f] [5]

PROGRAM: SMILEY
:AxesOff
:ClrDraw
:For(I,0,10,.1)
:Circle(0,0,I,YELLOW)
:End
:Circle(0,0,10,BLACK)

```