Unit 6: Drawing | **Application: Manual Animation**

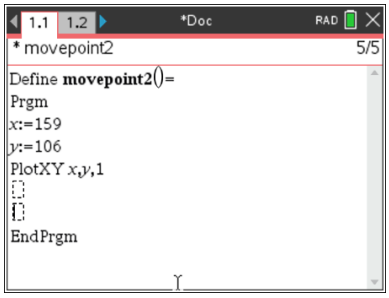
Write a program to move an object on the screen using the arrow keys (an interactive animation). This forms the basis of many video games.

Objectives:

- Use **getKey(1)** to read the keypad
- Make changes to coordinates depending on keypresses
- Erase and redraw a shape

In the previous lesson you made a point move across the screen by itself and used **getKey(0)** to end the program. Now you will write a program that lets the *user* move the point (or any shape) using the arrow keys. In this project you will use **getKey(1)** which pauses processing and waits for a keypress. Only the arrow keys ("up", "down", "left", right") and the "esc" key are important to this project.

Getting Started: Draw the Point



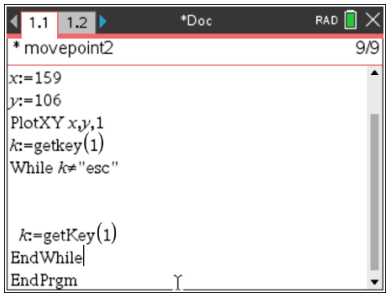
1. Start a new program.
2. **DO NOT USE SetWindow**.
   The *default* window is (0..317) x (0..211).
3. The point will start near the center (159,106) of the screen:

   x := 159

   y := 106

   PlotXY x, y, 1

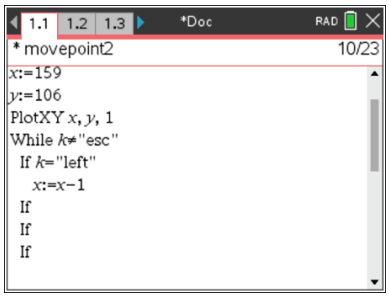
The Main Loop



4. The main program loop continues until the "**esc**" key is pressed.

   k := getKey(1) *wait for a keypress to start*
   While k ≠ "esc" *as long as it's not* **[esc]**
   loop body
   k := getKey(1) *wait for a keypress to continue*
   EndWhile
   EndPrgm

The Arrow Keys



5. The four arrow keys are "up", "down", "left" and "right". Check **k** for each of these values and change either **x** or **y** accordingly:

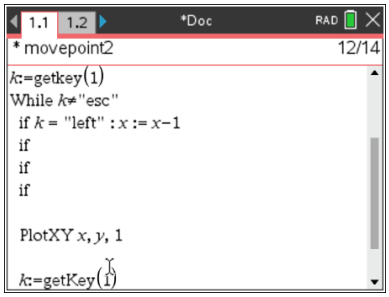
   If k = "left"
   x := x – 1 *(1 is arbitrary; it could be larger)*

   Recall that this is the simplest form of the **If** statements (no **Then** or **Else**). Compete the three other **If** statements for the other arrow keys.

Re-draw the Point

6. After the four **If** statements, plot the point again using its new coordinates.

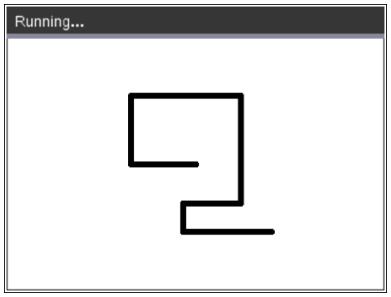
PlotXY x, y, 1



Test the Program

Use the arrow keys. Press **[esc]** to end the program. If all goes well the point moves… and leaves a trail behind.

What happens when the point gets to the edge of the screen? Currently, it goes off the screen. There are some choices to make here: you can make it simply stop at the edge and not go any further or you can make it go elsewhere, typically to the opposite edge of the screen. This last option is called wrap-around or *toral* mode.



Complete the Project

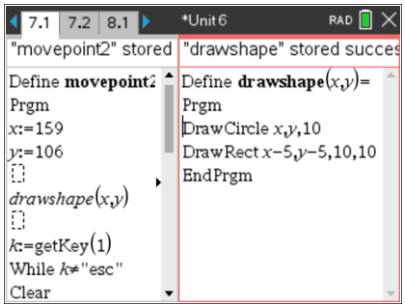
In Skill Builder 3 you learned about 'erasing a point' Add that feature to this project so that the point only appears to move.

To handle the edges of the screen, add four **If** statements to the code:

If x > 317

x:= ?

Can you move an entire set of shapes?



This project only deals with manually moving a point. Consider replacing the point with some *shapes*. An efficient method for doing this would be to write a separate program (a 'subroutine'). Within the same problem, write a new program called **drawshape(x, y)** and, in the **movepoint2** program, use the statement

drawshape(x, y) instead of **PlotXY x,y,1**. See an example to the right.

In the **drawshape(x, y)** program, draw some shapes using **x** and **y** as a reference point. Your object can then consist of several different pieces and use several colors.

To erase the shapes consider using the **Clear** statement (**[menu] > Draw > Clear**). **Clear** all by itself clears the screen. To erase or clear just a rectangular portion of the screen use:

Clear *x, y, width, height* *(similar to* **DrawRect***)*

Have fun!