

CMSC 100 — Fall 2010
Programming Assignment #1
Handed out Thursday 9/16/10
Due Thursday 9/23/10

Notes:

- You should submit your work by saving your final result, and uploading it to blackboard under assignment 1. Since this is a submission via blackboard, just make sure it is submitted by the end of the day.
- The program file name you use should be in the form FIRSTNAME_LASTNAME_PA1
- Some of this material is borrowed from Dr. Adam Anthony (<http://homepages.bw.edu/~apanthon/index.html>)

Programming Assignment #1

1. Read through help screens. Launch Scratch, pull down the “Help” menu and then choose “Help Screens.” This will open up a webpage describing how to use Scratch in various ways. Read through the Motion, Pen, and Control sections. You may want to follow along in Scratch to make sure you understand how to do everything explained in those sections
2. Create a new Scratch project and save it using the file name format noted above.
3. Delete the standard cat Sprite1 (if it is present) by right clicking on the sprite in the bottom-right Sprite’s pane, and choosing delete.
4. Create a new Sprite from an existing file (second button in the Sprite pane tool bar) and navigate to the Animals folder. Choose Cat2.
5. Make the Cat sprite a little smaller. You can do this by right clicking on the cat in the **Stage** pane and choosing “Resize this Sprite.” Once chosen, a couple of arrows will appear. Click and hold on the arrows and drag your cursor to the left to make the cat smaller. Release and click anywhere else on the stage to stop resizing.
6. In this assignment, you will have the sprite drawing with the pen, so we will want to create a *reset script*. A reset script simply clears the screen and puts everything back to the desired starting point. We will accomplish this by making the reset script activate whenever the Green Flag is pressed.
 - a. To start with, drag a “When [Green Flag] clicked” item from the control screen out onto the script pane and build the reset code block so that it is attached to this control.
 - b. From the pen menu drag a “pen up,” and “clear” statement into the block (attach the “pen up” statement to the bottom of the green flag control and “clear” to the bottom of “pen up.”)
 - c. From the motion statements drag a “go to x:__ y:__” statement out and attach it to the bottom of the reset block. Set the values to 0, 0. Also attach a “point in direction” statement and set it to 90 (right).
7. Test that your reset script works. You can do this by dragging the cat sprite to some other location on the stage. Then click the Green Flag on the top right corner of the stage. The cat should be moved back to the center.

8. You will now want to make a new script for this sprite that will draw a square using the pen tool. Further, this script should be activated when a message is broadcast (refer back to the control help screen for more info on this).
 - a. Drag out a “When I receive” control statement. From the drop down menu of this control, choose “new” and specify the name “drawSquare.”
 - b. Now construct a script that draws the square using the following set of statements:
 - i. Pen down
 - ii. Move __ steps
 - iii. Turn __ degrees
 - iv. Wait __ seconds
 - v. Pen up
 - c. You will need to use most of those statements several times and you will have to figure out the correct value for the turn statement (remember, it’s a square!). For the move statement you can experiment with different values, but it should be the same value for each move statement. The wait statement should follow any move statement (to make sure you can watch what the cat is doing), but you can set the wait length to a small value such as 0.5.
 - d. Make sure the pen is up when the script terminates.
 - e. Make sure the script you generated is all attached to the “When I receive” control that you dragged out so that it is activated when the message “drawSquare” is broadcast.
 - f. Test the draw square script by clicking on the “When I receive” statement. You should see the cat move around drawing a square and then stop. You can reset everything by clicking the Green Flag.
9. Now create a new script for this sprite that is activated by another broadcast message.
 - a. Drag out a “when I receive” control (again, unattached to any of the other scripts).
 - b. From the drop down menu of the “when I receive” control, choose “new” and type “move”
 - c. Now attach the following sequence of controls:
 - i. Pen down
 - ii. Turn 45 degrees
 - iii. Move __ steps (choose a value that is greater than the one you used in the draw square script)
 - iv. Wait 0.5 seconds
 - v. Pen up
 - d. Test that this script will cause the agent to turn 45 degrees and then draw a straight line. You can test it by clicking on the “When I receive” at the top. Remember that you can reset everything using the Green Flag. If you test the script eight times in a row without resetting in-between, the sprite should draw an octagon.
10. Create a new **sprite** from a file.
 - a. Navigate to the “things” folder and choose “button”
 - b. On the stage, position the button in the top left corner
 - c. Click on the button sprite in the bottom-right sprite pane to open its script area—it should be currently blank.
 - d. Add a control “When Sprite2 clicked”
 - e. Attach to the control a repeat __ block and set the number of repeats to 8.
 - f. Inside the bracket that the repeat block makes drag in two “broadcast ___ and wait” statements
 - g. Set the first “broadcast and wait” value to “move” and the second to “drawSquare
11. Test the program!
 - a. First click the Green Flag to reset everything.

- b. Then click on the button on the stage.
 - c. You should see the cat draw a pattern like the one shown in the image below.
12. Save your work and submit the file via blackboard!

