

Tech News

Printing numbers in scratch

Scratch is intended primarily as a game-design language, and so does not support much input and output of numbers. There are two methods built into scratch for outputting numbers: scoreboards and speech balloons.

Scoreboards

To use a scoreboard, one simply checks the box next to the variable name on the variable pane. This puts a scoreboard display of the variable on the game window. The scoreboards can show non-integer values like 4.3, but only to the nearest 0.1.

One can double-click to change the style of the scoreboard, cycling among three choices:

- labeled display, which shows the name of the variable;
- large display, which displays just the number; and
- slider, which allows the user to modify the value.

The slider is the only built-in way for the user to set the values of variables, though one can, of course, write scripts that interpret mouse clicks or button presses as commands to change variable values. The slider normally is set to have a range of 0 to 100, but the slider is less than 100 pixels wide, so the resolution is limited to only about every other number. You can change the range of the slider with an option-click (right-click on a PC) to set slider min and max values.

The scoreboards are layered the same way sprites are, though they are initially behind the sprites, moving a sprite back layers can put it behind the scoreboards. Hiding or showing sprites in front of the scoreboard can make the scoreboard disappear or appear.

Speech balloons

Any sprite can also “say” or “think” a number. This is not limited to variables, but can be applied to any expression. Build the expression using the operators in the numbers pane, and drag it into the “say” command’s argument box.

The speech balloons can even handle the Boolean expressions like “ $x > 1$ ”, whose values are “true” and “false.” Numbers are only spoken to the nearest 0.1.

Printing numbers

I have written a program that provides a third mechanism for displaying values. The `print_number` program is available on the web page

http://www.soe.ucsc.edu/~karplus/scratch_programs/

It uses a single sprite called “digit” and the “stamp” command to print numbers whenever the `print_number` message is broadcast. There are three global variables it uses: `print_x` and `print_y` to specify the location, and `print_number` to give the value to print.

The program prints the numbers from right to left, starting with the one’s place. It uses the “mod” function to determine what the last digit is, prints it out by changing costume and stamping, then shifts over one place and divides the number by 10. It keeps doing this until the number left is zero. This method allows it to handle any positive integer.

To handle negative numbers, the program uses a local variable to record sign, prints out the absolute value of the number, then prints out a minus sign if the number was originally negative.

Because the program uses “stamp”, the numbers are always printed on the background, behind any sprites.

No Tech Club for three weeks

Today’s Tech Club is the last for three weeks. The next two weeks are spring break, and April 17 is Outdoor School for the 5th graders, so the next time Tech Club will meet is April 24, which is also the night for Family Science Night.

There is still plenty to do for Family Science Night—look at

<http://www.soe.ucsc.edu/~karplus/family-science-night.html>

for more information.

