

SUGAR LABS

**Sugar Labs**

08

**Fall**

Advanced Blocks Manual for Turtle Blocks

Sugar Labs

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Table of Contents

All About Turtle Blocks 3

What is Turtle Blocks? 3

Where can we get Turtle Blocks? 3

Turtle Palette 4

Angle-Arc-Radius Block 4

Bezier Block 5

Set Heading Block 6

Set xy Block 6

# All About Turtle Blocks

## What is Turtle Blocks?

Turtle Blocks is an activity with a Logo-inspired graphical "turtle" that draws colorful art based on snap-together visual programming elements. Its "low floor" provides an easy entry point for beginners. It also has "high ceiling" programming features, which will challenge the more adventurous student.

## Where can we get Turtle Blocks?

<http://activities.sugarlabs.org/en-US/sugar/addon/4027>

**Note:** There are two inter-compatible programs: [Turtle Art](http://activities.sugarlabs.org/en-US/sugar/addon/4298) and [Turtle Blocks](http://activities.sugarlabs.org/en-US/sugar/addon/4027). Turtle Art, which closely parallels the Java version of Turtle Art maintained by Brian Silverman, offers a small subset of the functionality of Turtle Blocks. **Sugar users probably want to use Turtle Blocks rather than Turtle Art.** (Also see [Turtle Confusion](http://wiki.sugarlabs.org/go/Activities/Turtle_Confusion), a collection of programming challenges designed by Barry Newell; as well as the [Activities/TurtleFlags](http://wiki.sugarlabs.org/go/Activities/TurtleFlags), [Activities/Tortuga de Mexico](http://wiki.sugarlabs.org/go/Activities/Tortuga_de_Mexico) and [Activities/Amazonas Tortuga](http://wiki.sugarlabs.org/go/Activities/Amazonas_Tortuga) variants.)

Debian (and Ubuntu) users can install Turtle Blocks from a repository maintained by Alan Aguiar ([https://launchpad.net/~alanjas/+archive/turtleblocks](https://launchpad.net/%7Ealanjas/+archive/turtleblocks)):

1. sudo add-apt-repository ppa:alanjas/turtleblocks
2. sudo apt-get update
3. sudo apt-get install turtleblocks

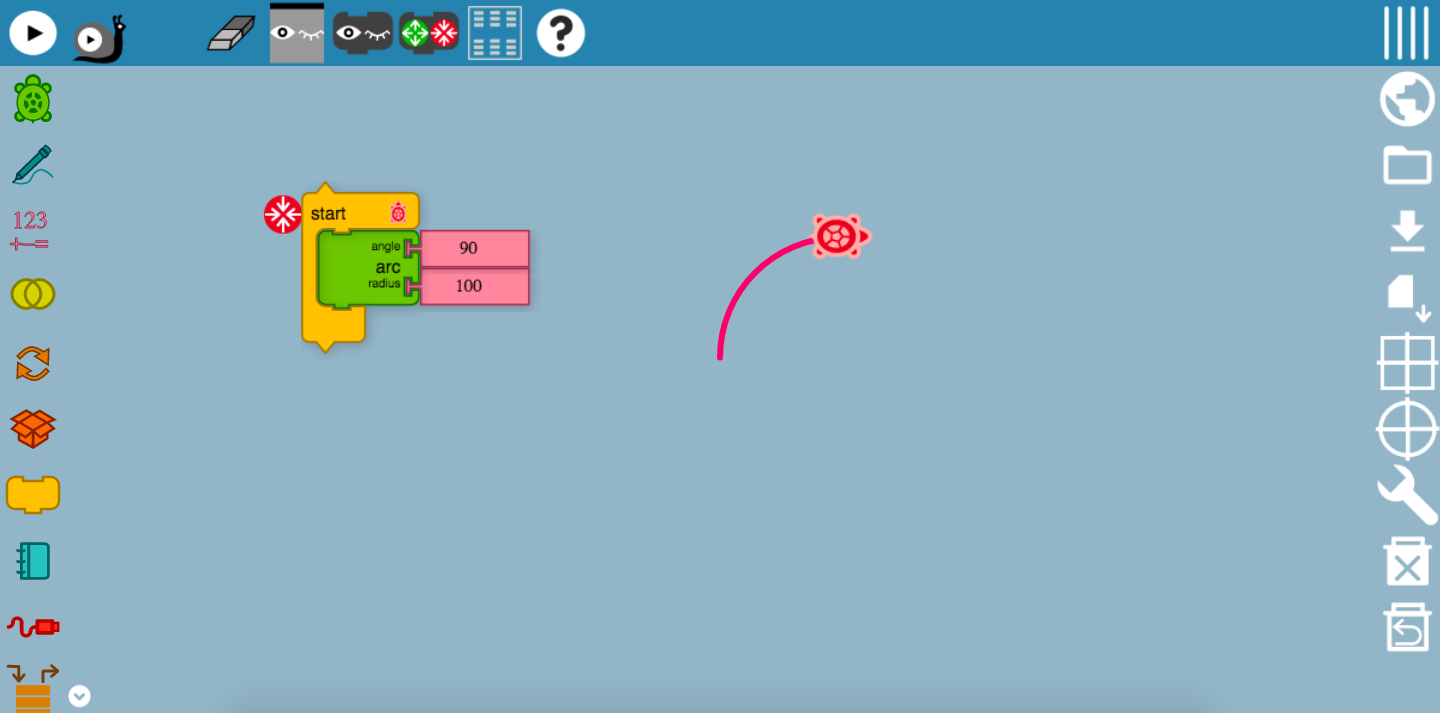
Fedora users can do:

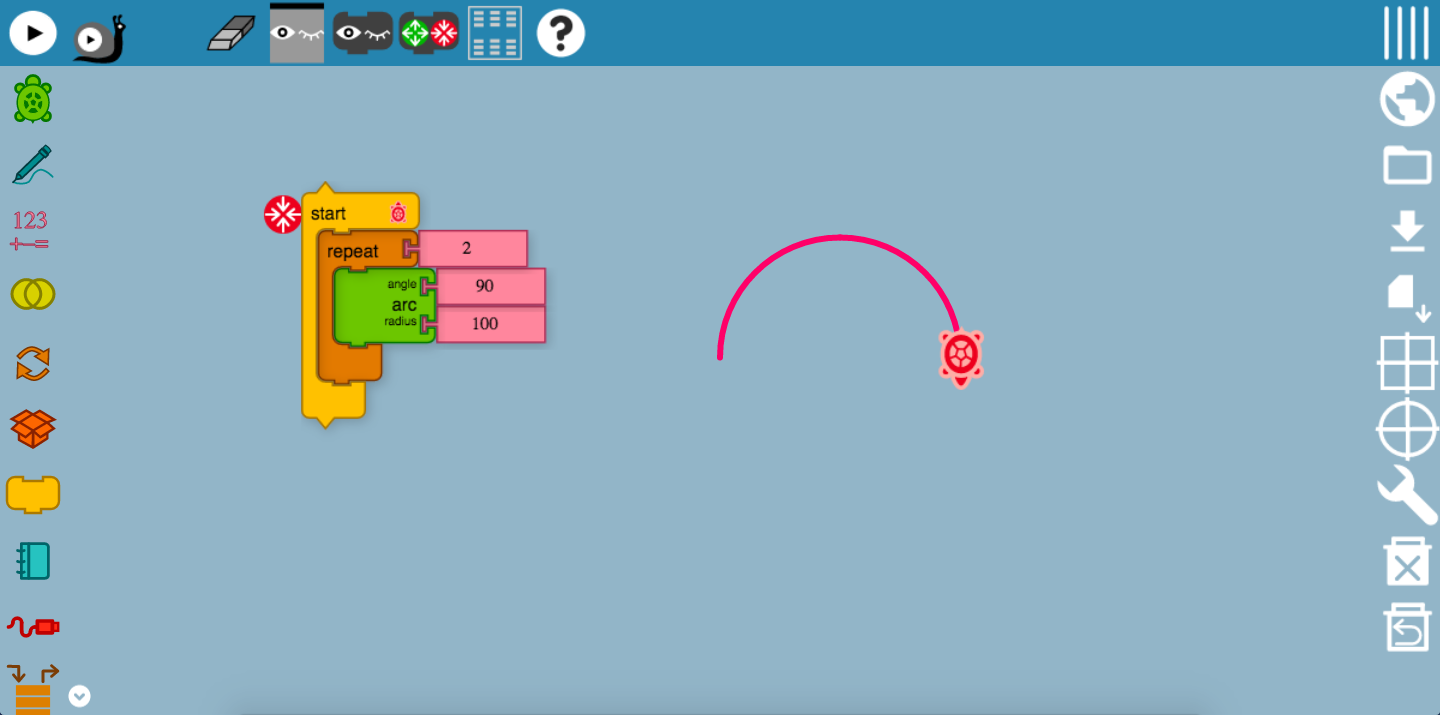
1. sudo yum install sugar-turtleart

For those of you who would like to use Turtle Blocks in a browser, there is a mostly compatible version at [Turtle Blocks JS](http://turtle.sugarlabs.org). See [the Guide](https://github.com/walterbender/turtleblocksjs/blob/master/guide/README.md) ([en ES](https://github.com/walterbender/turtleblocksjs/blob/master/guide-es/README.md)) for more details.

# Turtle Palette

## Angle-Arc-Radius Block

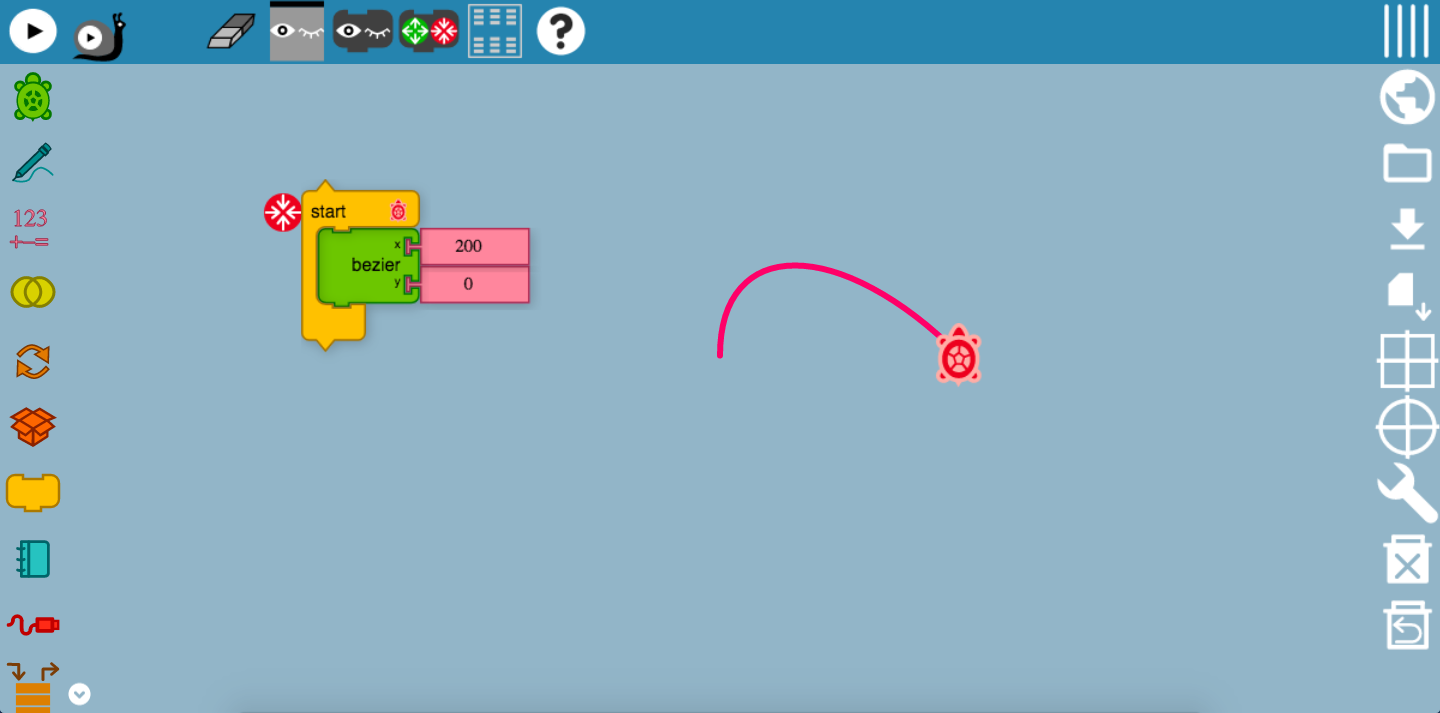


As it can be seen, this block controls the angle that the Turtle would be moving. Have you noticed the 90 turning point? This is a result of the angle of the block being set to 90. However, in this block, we do not expect a sharp 90 turn, unless we specify the arc radius to be 0 counts. In this case, we have set the arc radius to be 100 counts. The 100 counts specify the radius of this circle. By setting it to these values, we have created the arc of a quarter circle! 

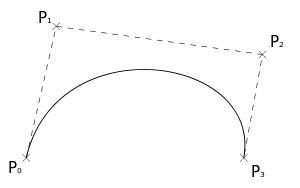
But, what about a semicircle? We could create another angle-arc-radius block with the same angle value, and combine them in a repeat block found in the flow palette? Why so? This will mean that the Turtle will be making another 90 turn and drawing the remaining radius of 100 units, setting the diameter of this semicircle to be 200 units.

Of course, we could change the angle and arc radius to different values to experiment with different designs! Moreover, try combining with different move blocks as well! But here’s a tip, a 360 angle count at any radius of your choice, would form a full circle! Alternatively, you could repeat the above codes 4 times.

## Bezier Block

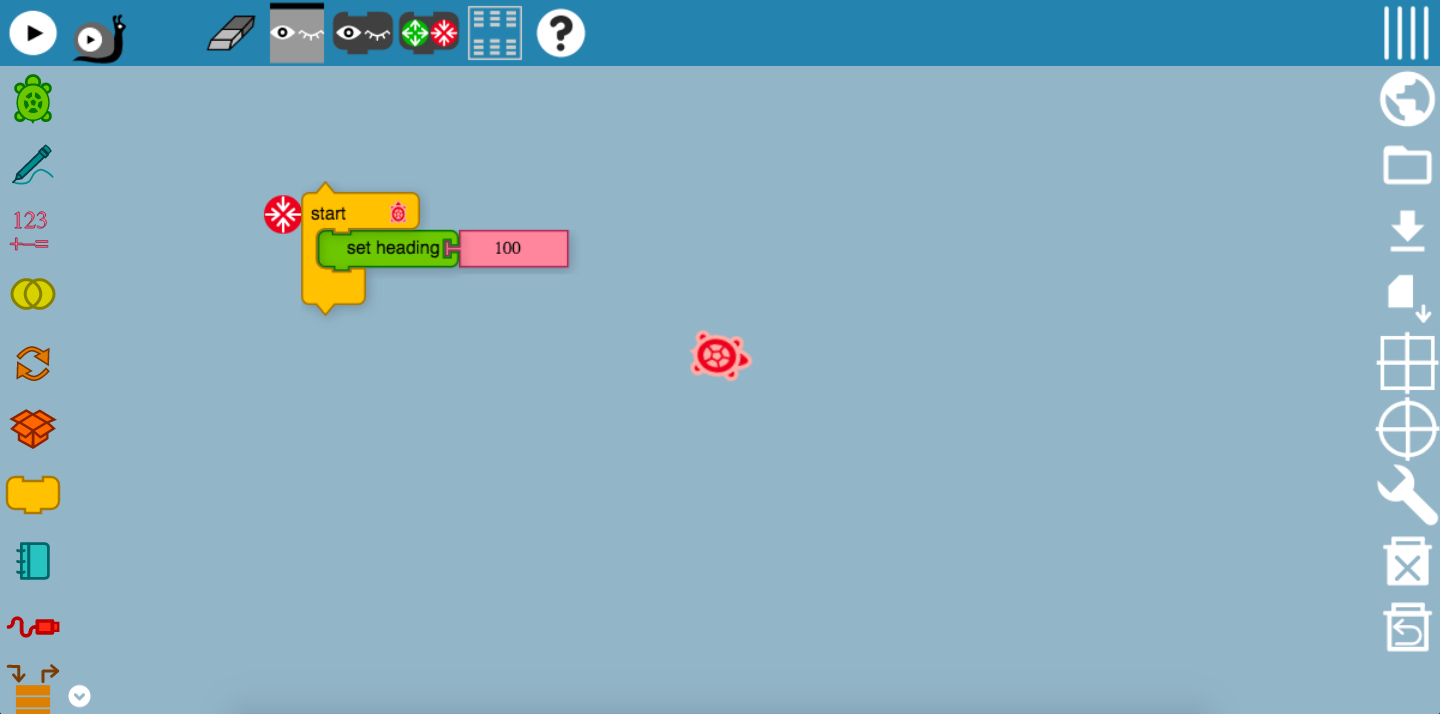


Well, the Bezier block may be slightly confusing. What is a Bezier? A Bézier curve is a parametric curve frequently used in computer graphics and related fields. Generalizations of Bézier curves to higher dimensions are called Bézier surfaces, of which the Bézier triangle is a special case. It looks something like this.



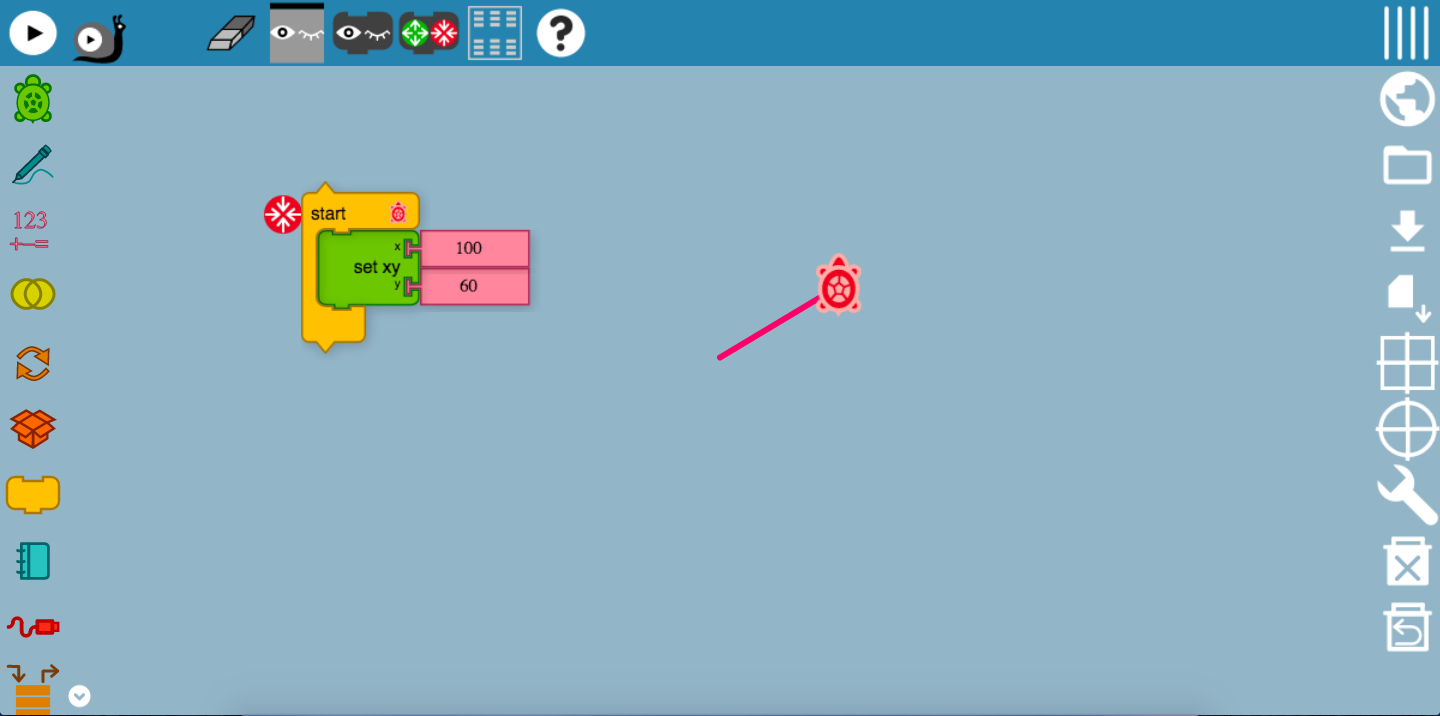
A Bezier block causes the Turtle to move in a very sharp angle. A smaller value gives a steeper and smaller curve, while a larger value gives a wider curve. The x represents the horizontal direction that the Turtle would be moving, while the y represents the vertical direction. Setting a higher y direction tends to create wider and longer curves, and curves would not tend to be too narrow. Try it yourself!

## Set Heading Block



Well, the set-heading block really seems like a left and right movement block. As the name suggests, it specifies the direction that the Turtle would be heading to, based on the angle counts. In this case, assuming that the north direction is vertically upwards, the Turtle is in-between the east and south direction, but has not yet reached south-east. Always remember that the Turtle moves in a clockwise direction here!

## Set xy Block

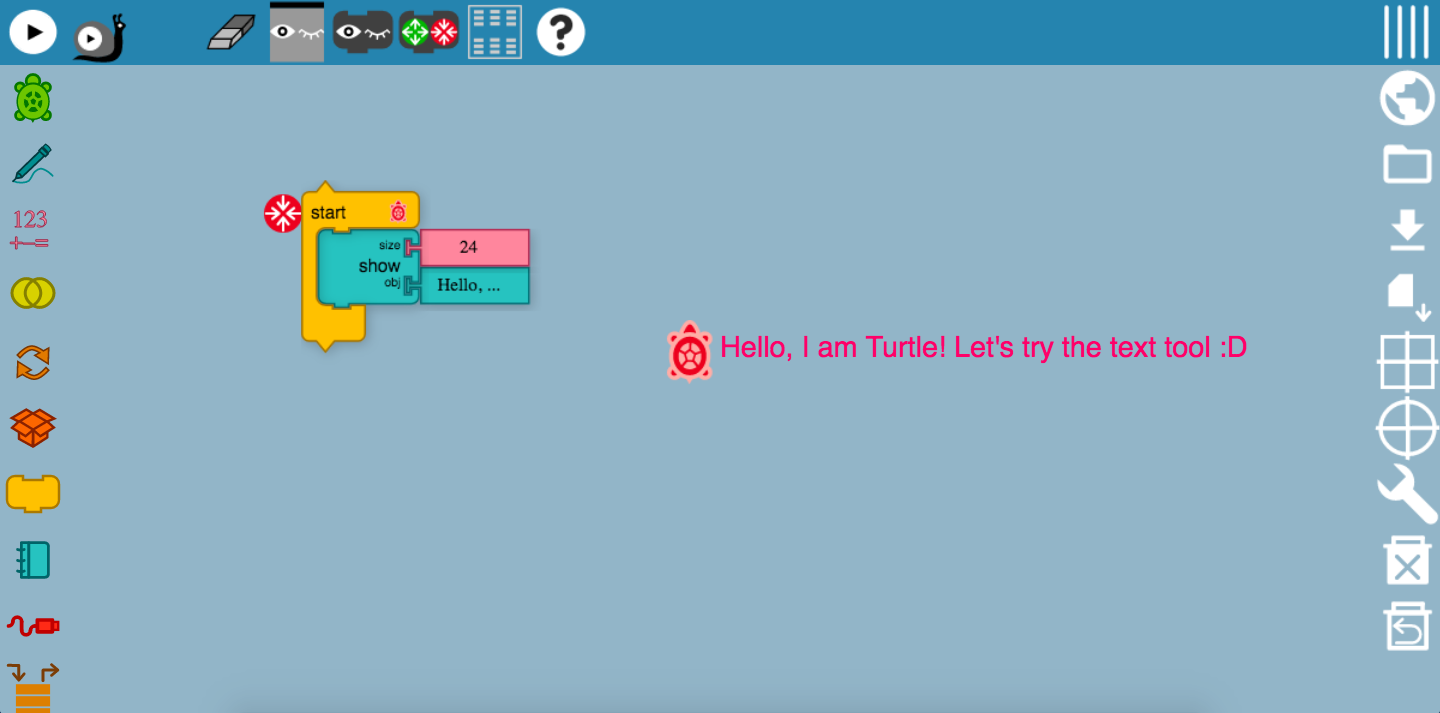


Doesn’t this xy block reminds you of the straight-line graph? Yes, it indeed is! Like the Bezier block, this block sets the x and y direction of that the Turtle would be moving to. In this case, the Turtle has moved 100 counts in the horizontal direction, which means that it is 100 horizontal counts away from the starting point. Applying the same concept, it is 60 counts vertically away from the starting point. However, have you noticed how the line is slanted and it is not exactly 60 vertical counts away from the starting point? The y point is in fact 60 vertical counts away from the end of the horizontal line, which forms this straight-line graph. It will be useful for you to form shapes and even applying the concept of graph. Perhaps, you may even want to use Turtle Blocks to visualize graphical equations!

# Media Palette

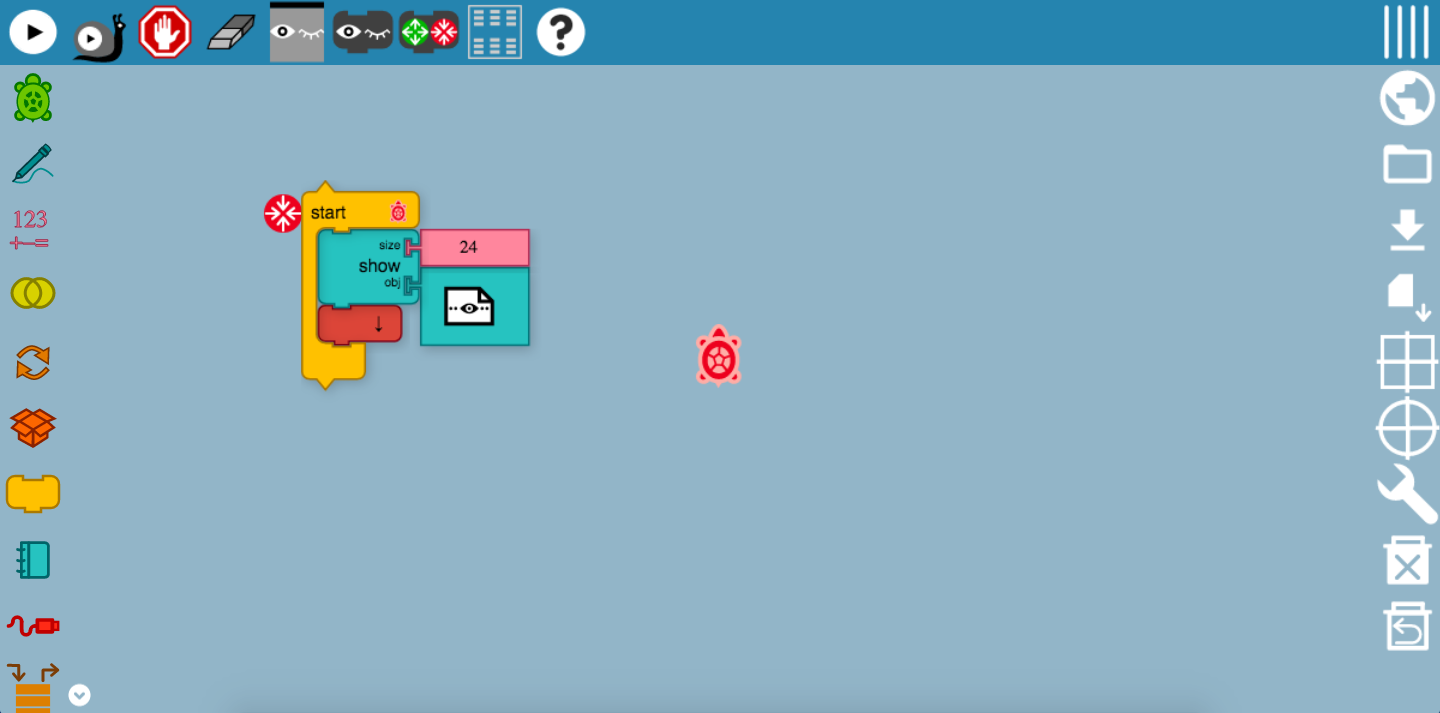
## Show Block

### Text Tool

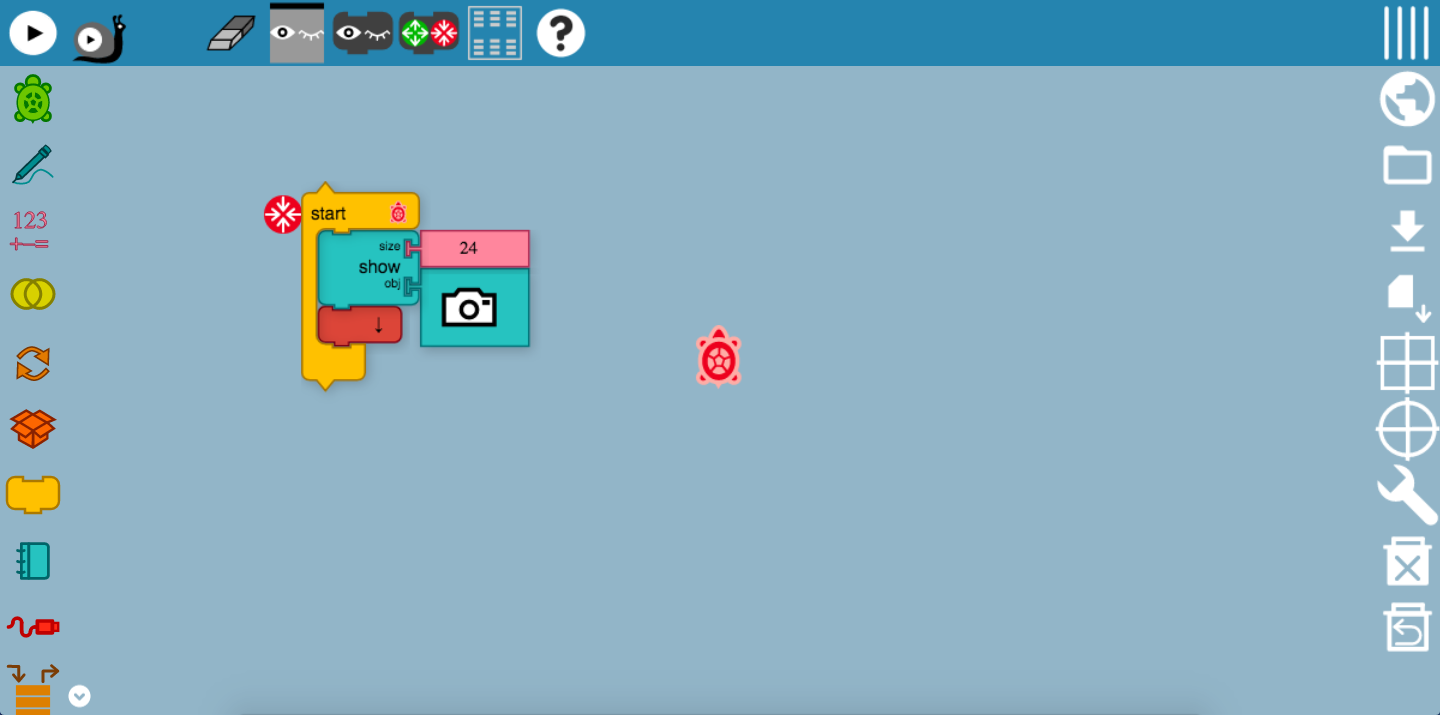


This is the show block! It displays the input that you have entered. For example, the size of the object here was specified to be 24, while the object, have been set to “Hello, I am Turtle! Let’s try the text tool!”. This explains what the Turtle is trying to show here. The object has been specified to be a text input. You could really try to experiment with font sizes and print out different texts on the screen!

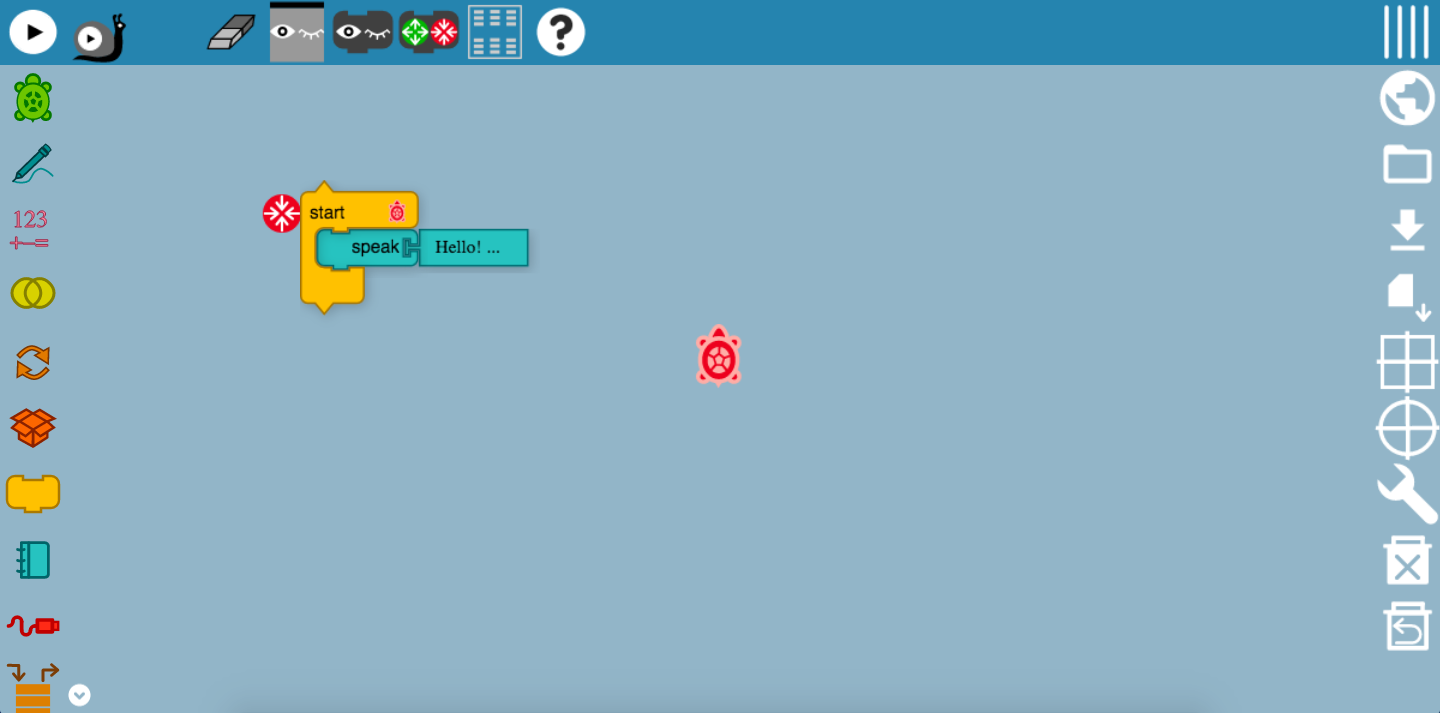
### Video Tool



### Camera Tool



### Speak Tool



“Hello! I am Turtle.”