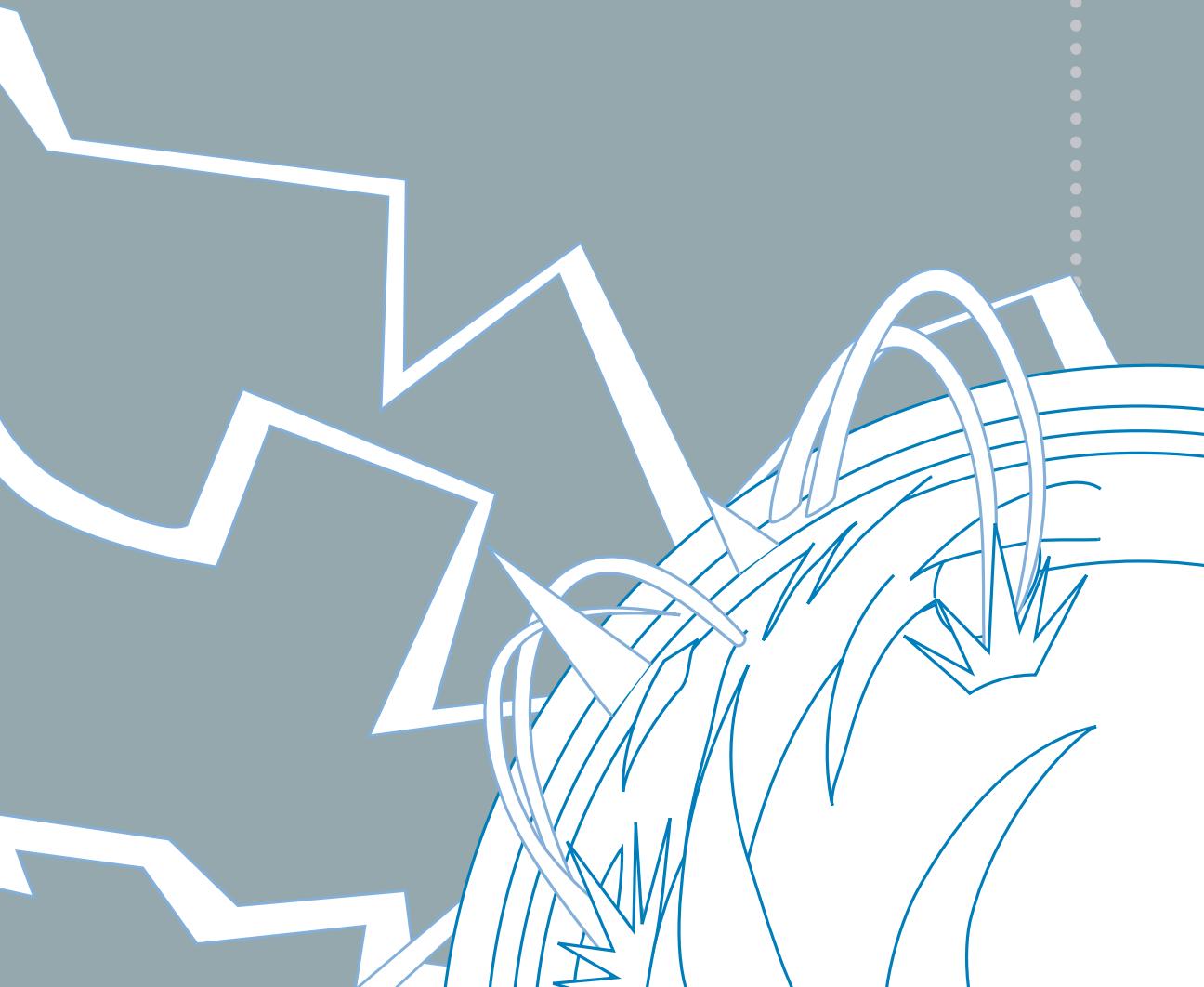


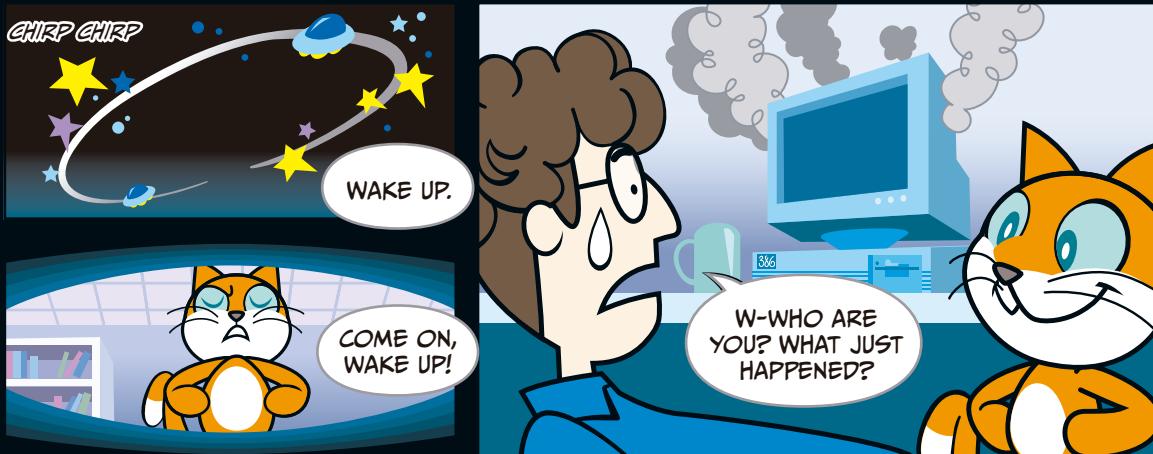
# RIDING A FLARE FROM THE SUN

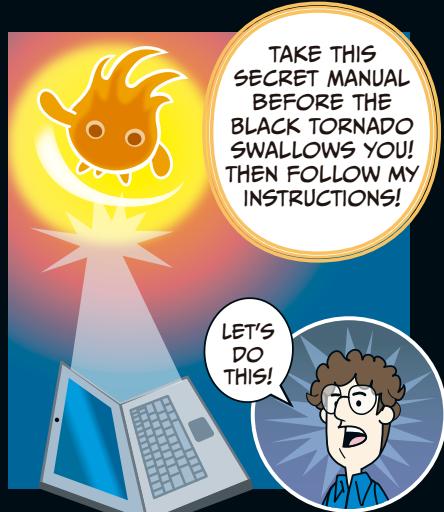
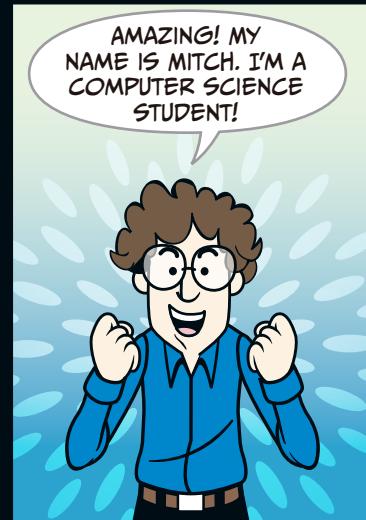
1  
STAGE



STAGE

# 1





# 1 STAGE

## BREAKING THE SPELL!

### + Chapter Focus

Let's get to know Scratch! We'll also talk about *sprites* and *coordinates*.

### The Game

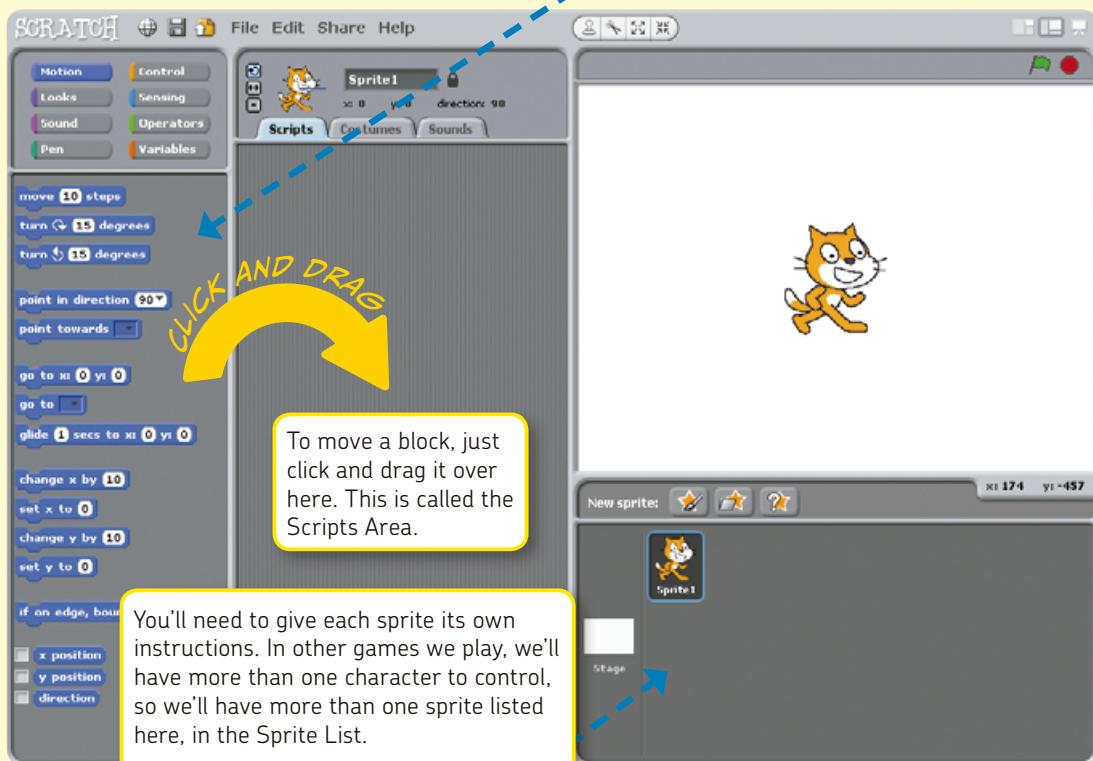
We need to get Scratty the cat moving again. We'll make him dance across the Stage.



To follow along with the Secret Manual, you first need to open Scratch. Once you do, you'll see Scratty the cat on a white background. This is a new project, so the cat doesn't do anything yet.

Scratch calls Scratty the cat—and all the other characters and objects we add to a project—a *sprite*. Soon, we'll start giving him directions to move by using the blue blocks on the left side of the screen.

The command blocks you can give a sprite are over here. Eventually, we'll stack these together to break the magic spell and get Scratty back on his feet. These blocks here are all blue, as they're from the Motion palette.



A screenshot of the Scratch software interface. On the left is the **Scratches Area** containing various command blocks categorized under Motion, Looks, Sound, Pen, Control, Sensing, Operators, and Variables palettes. In the center is the **Stage Area** where a yellow cat sprite named "Scratty" is running. At the bottom is the **Sprite List** showing "Sprite1" with coordinates (x: 174, y: -457). A large yellow arrow labeled "CLICK AND DRAG" points from the blocks in the Scratch Area towards the Stage Area, indicating where to drag them. A callout box in the bottom-left corner says: "To move a block, just click and drag it over here. This is called the Scripts Area." Another callout box in the bottom-left corner says: "You'll need to give each sprite its own instructions. In other games we play, we'll have more than one character to control, so we'll have more than one sprite listed here, in the Sprite List." A callout box in the bottom-right corner says: "Now let's take a closer look at the rest of the interface...".

To give a particular sprite instructions, click a sprite in the Sprite List first and then drag blocks into the Scripts Area.



## A Guided Tour of the Scratch Interface!

### Palette

Each of these eight buttons lets you choose functions (called *blocks*) for programming your sprites. You can combine these command blocks in stacks to create programs that control objects on the screen.

### Rotation Settings

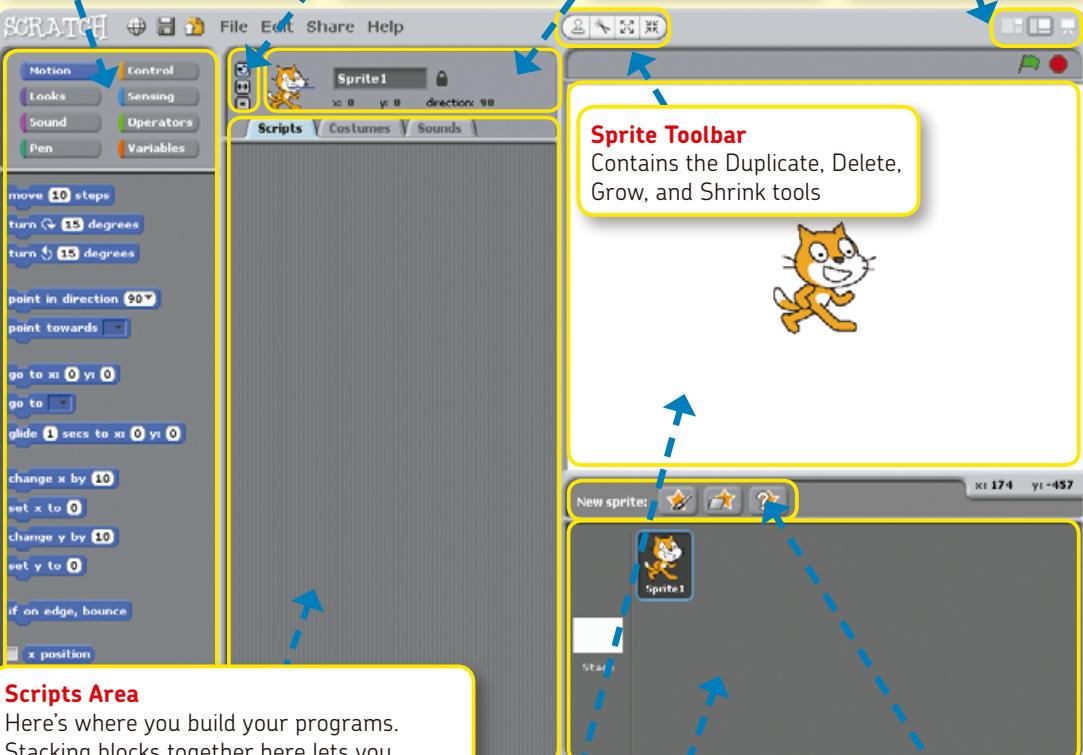
You can control how a sprite rotates in three ways:

- Can rotate freely
- Can face only left or right
- No rotating allowed

### Stage Settings

There are three ways to display the Stage, where your creation appears:

- Small
- Normal
- Full Screen



### Scripts Area

Here's where you build your programs. Stacking blocks together here lets you control the sprites in your project. Click one of the three tabs at the top to change to other functions:

**Scripts:** Allows you to drag command blocks from the Palette and piece them together to write a program

**Costumes:** Allows you to draw, import, or edit images for a sprite

**Sounds:** Allows you to record or import sound files for a sprite to use

### Sprite Information

This section shows the sprite's name, position, and direction it is facing (the little blue line).

### Sprite Toolbar

Contains the Duplicate, Delete, Grow, and Shrink tools



### Sprite List

Here are the characters and objects you've created, including the Stage itself. Click the icons to edit each sprite individually.

### New Sprite Buttons

There are three ways to add a sprite:

- Draw a new one
- Import an image that already exists
- Let Scratch choose one at random

### Stage

Displays your creation

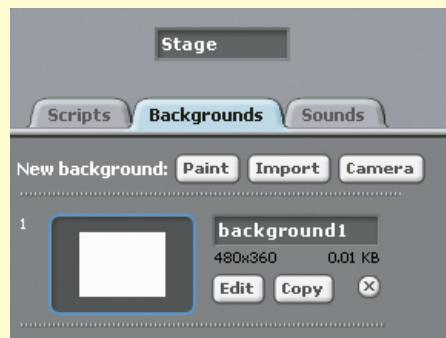
# 1 STAGE



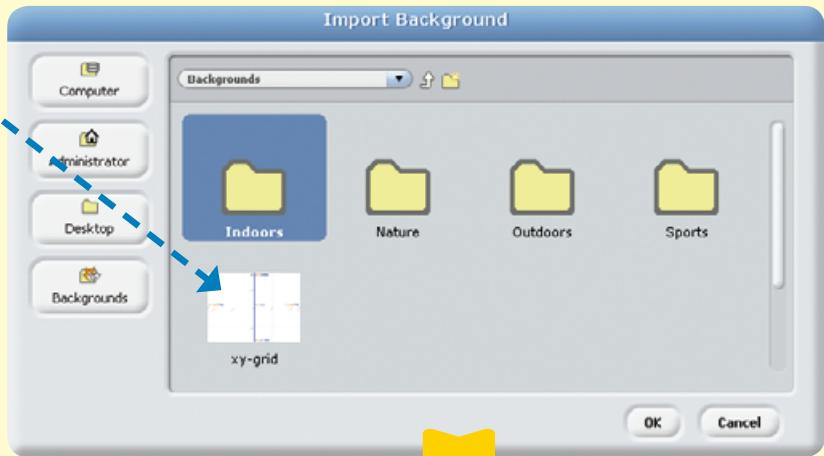
To use Scratch to program movements, you first have to understand how Scratch positions things.



Click the **Stage** icon in the Sprite List. Switch to the **Backgrounds** tab in the Scripts Area and choose **Import**. Note: Sprites have costumes while the Stage has backgrounds.



Choose the *xy-grid* background and click **OK** to import it.

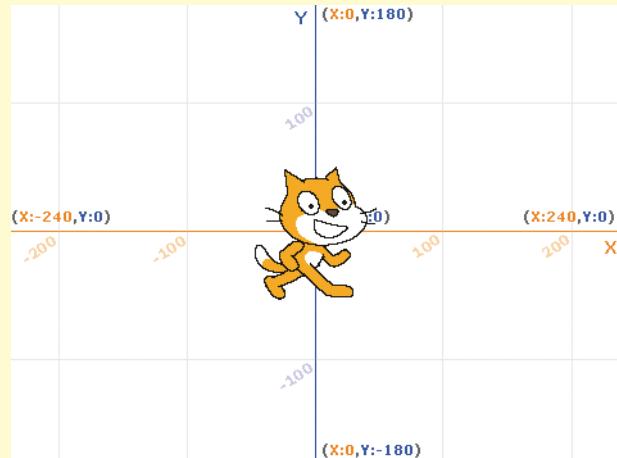


Now you can see how Scratch positions objects. Everything is on a grid with two axes:

**y-axis:** A vertical line that marks up and down positions; ranges from -180 (lowest) to +180 (highest)

**x-axis:** A horizontal line that marks left and right positions; ranges from -240 (farthest left) to +240 (farthest right)

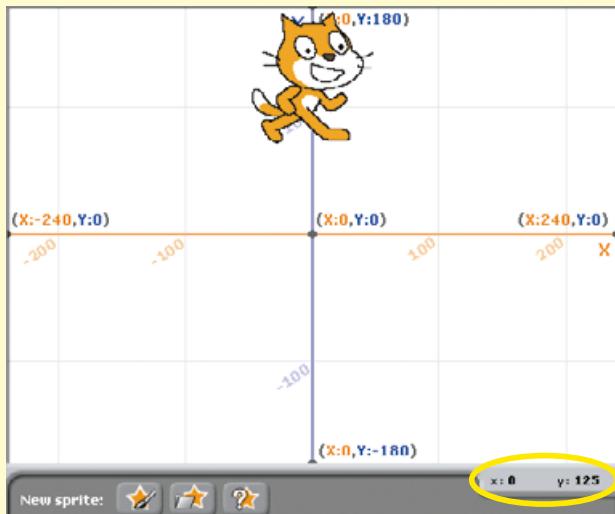
Scratchy's position is at the point where the x-axis and y-axis meet. His coordinates are (X: 0, Y: 0).



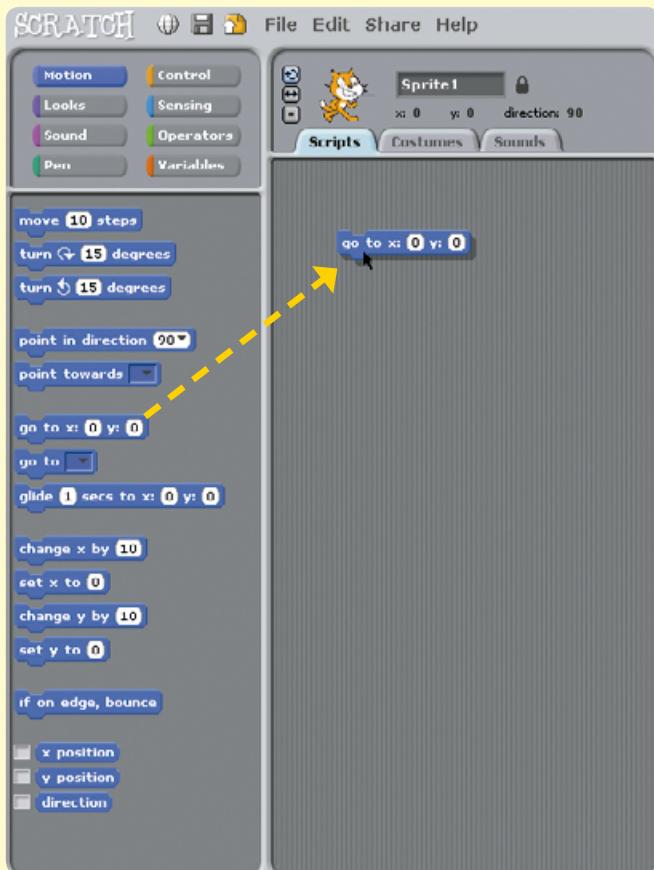
Now we can program movements for Scratchy the cat!

First, drag him to the top of the Stage, as shown on the right.

Note: The bottom-right corner displays the coordinates of your mouse. This will be really helpful when we start setting the positions of sprites!



To make sure we're giving Scratchy the cat instructions, click him in the Sprite List (the box at the bottom right of the screen). Switch to the **Scripts** tab in the Scripts Area and then click the **Motion** palette (in the top left). Click and drag out the command block `go to x: 0 y: 0` to the Scripts Area.



# 1 STAGE

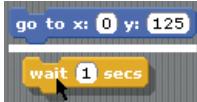


Click the number of a coordinate to change it. Set x to **0** and set y to **125**. Now click the block to run it!

By doing this, no matter where we drag Scratchy on the Stage, when the program starts running, he will automatically go to this position!

We want Scratchy to move around, but at the moment, he moves too fast for us to see!

To make him move slower, click the **Control** palette and drag out the command **wait 1 secs** to the Scripts Area. Make sure to drag it under your blue command block. Wait for a white line to appear and then release the mouse.

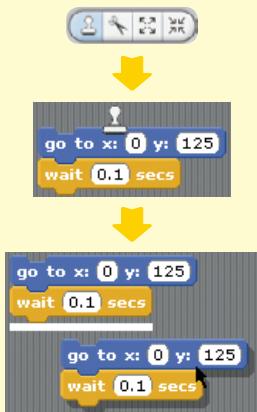


The two commands are joined together! Now change the time to **0.1 secs**.

Tip: If you want to separate the commands, simply drag away the block. If you want to delete a block, simply drag it back to the Palette.



Next, select the **Duplicate** button on the Sprite Toolbar and stamp it on the commands to make five copies.



Follow this picture and type these coordinates. When you're finished, click the whole command block to make Scratchy jump around in a pentagon shape!

```
go to x: 0 y: 125
wait 0.1 secs
go to x: 150 y: 30
wait 0.1 secs
go to x: 100 y: -120
wait 0.1 secs
go to x: -100 y: -120
wait 0.1 secs
go to x: -150 y: 30
wait 0.1 secs
```

To make him move in a loop continuously, drag out the command block **forever** from the **Control** palette and place it at the top of the code.

Click the block, and it will actually run! Click • to stop Scratchy from moving around. You can test any program in this way—just click it with your mouse.

Tip: Whenever you're writing scripts, you'll want to test them every now and then to see if they work the way you expect.

Now let's make Scratchy glide around instead of jumping from point to point.

To do this, click the **Motion** palette, drag out five **glide** commands, and join them together. Follow the picture on the right, and copy the seconds and coordinates. Once you're finished, click the script to see the results!

```
glide 0.1 secs to x: 150 y: 30
glide 0.1 secs to x: -100 y: -120
glide 0.1 secs to x: 0 y: 125
glide 0.1 secs to x: 100 y: -120
glide 0.1 secs to x: -150 y: 30
```

Now we can join these two programs together! From the **Control** palette, drag out the **When green flag clicked** command and put it at the top of your two scripts.

Tip: We'll often need multiple scripts to start at the same time, and using the **When green flag clicked** command will help us do that.

```
forever
go to x: 0 y: 125
wait 0.1 secs
go to x: 150 y: 30
wait 0.1 secs
go to x: 100 y: -120
wait 0.1 secs
go to x: -100 y: -120
wait 0.1 secs
go to x: -150 y: 30
wait 0.1 secs
```

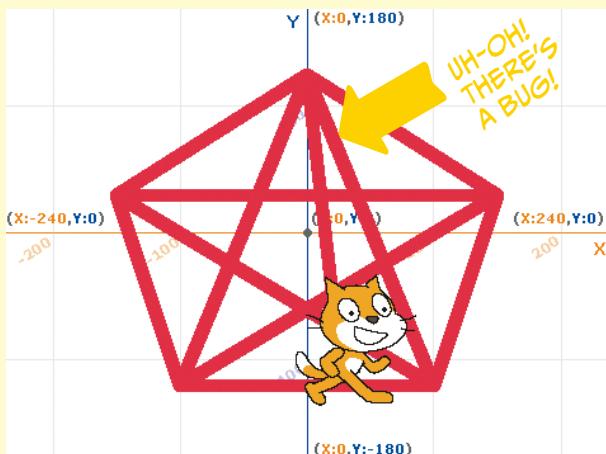
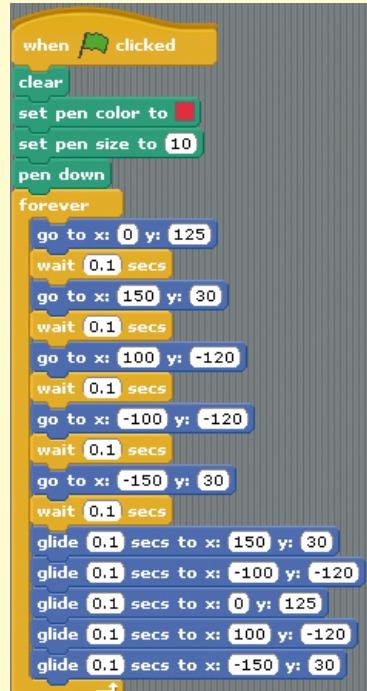
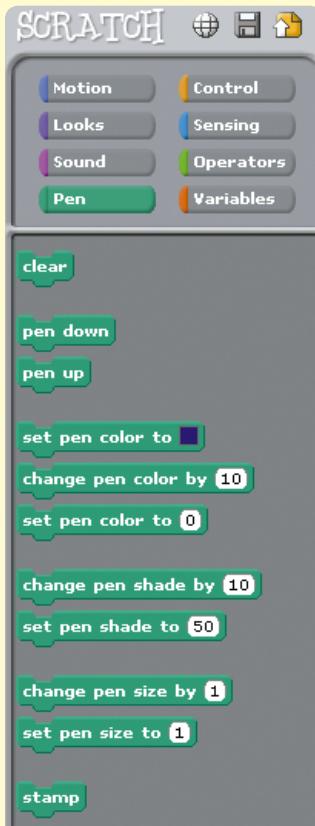
```
when green flag clicked
forever
go to x: 0 y: 125
wait 0.1 secs
go to x: 150 y: 30
wait 0.1 secs
go to x: 100 y: -120
wait 0.1 secs
go to x: -100 y: -120
wait 0.1 secs
go to x: -150 y: 30
wait 0.1 secs
glide 0.1 secs to x: 150 y: 30
glide 0.1 secs to x: -100 y: -120
glide 0.1 secs to x: 0 y: 125
glide 0.1 secs to x: 100 y: -120
glide 0.1 secs to x: -150 y: 30
```

# 1 STAGE

Click these buttons above the Stage to start (green) and stop (red) the game.



Next, click the **Pen** palette and drag out the four green Pen blocks shown on the right. Now when Scratchy moves, he'll draw the *magic star web* as well!



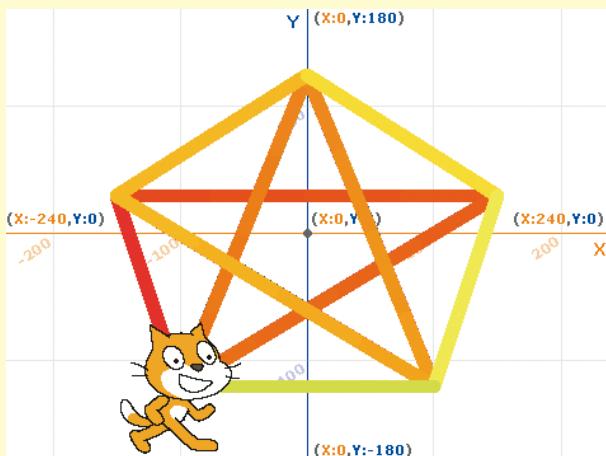
Occasionally, when you run your program, there is a *software bug*. This is the most exciting part of computer programming: discovering an error in something you have made and then solving the problem. In this case, sometimes Scratchy will draw an odd line at the beginning of the program. If we drag Scratchy anywhere else on the Stage, he draws an extra line because he starts in the wrong place. Try dragging Scratchy around and running the program multiple times by clicking the green flag to see if you can spot the bug.

This software bug can be fixed by adding some more code—that is, new blocks—to your program. In this case, simply place a new **go to** block (from the blue **Motion** palette) above the green Pen blocks and below the **When green flag clicked** block.

With this little correction, Scratchy will always begin drawing from the correct position in the grid. The bug is gone!



```
when green flag clicked
  go to x: -150 y: 30
  clear
  set pen color to red
  set pen size to 10
  pen down
  forever
    go to x: 0 y: 125
    wait 0.1 secs
    go to x: 150 y: 30
    wait 0.1 secs
    go to x: 100 y: -120
    wait 0.1 secs
    go to x: -100 y: -120
    wait 0.1 secs
    go to x: -150 y: 30
    wait 0.1 secs
    glide 0.1 secs to x: 150 y: 30
    glide 0.1 secs to x: -100 y: -120
    glide 0.1 secs to x: 0 y: 125
    glide 0.1 secs to x: 100 y: -120
    glide 0.1 secs to x: -150 y: 30
```

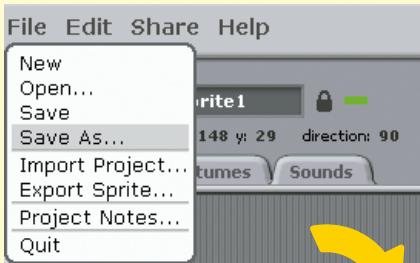


Let's add a whole new program to make a magic star web that changes colors. Build a second stack of blocks that uses the **change pen color by** command and see what happens.

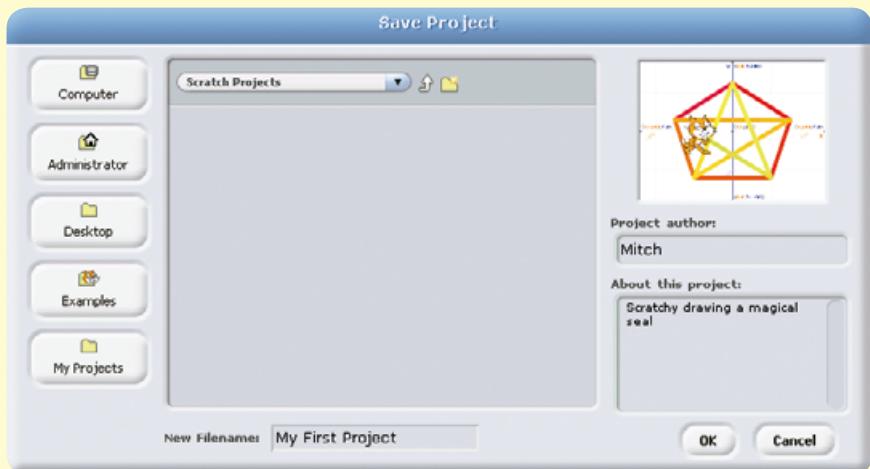
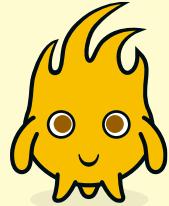
Isn't that cool? You can give a single sprite more than one set of blocks! Scratchy now has two programs.



# 1 STAGE



Remember to save this file when you're finished so you can edit it later!



## Scratchy's Challenge!!

Can you edit this program to make Scratchy draw different kinds of shapes? Give it a try!

