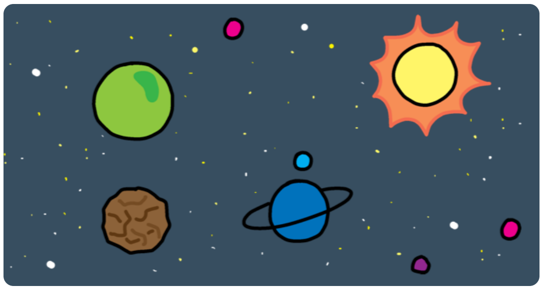
Projects

Lost in space

Learn how to program your own animation!

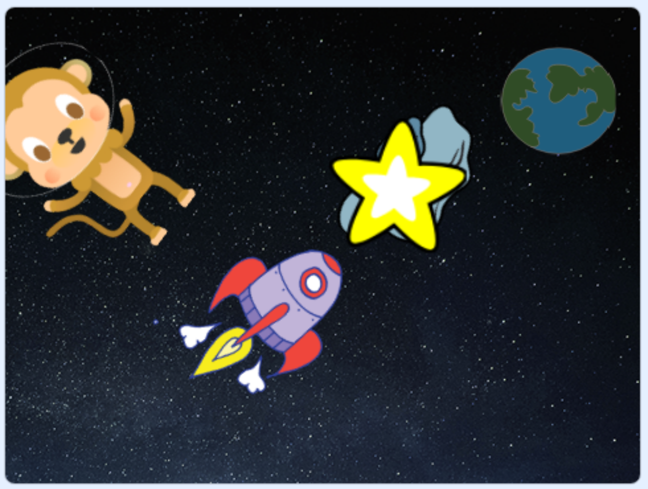
Scratch



Step 1 Introduction

You are going to learn how to program your own animation!

What you will make



What you will need

Hardware

- A computer capable of running Scratch 3

Software

- Scratch 3 (either **online** (http://rpf.io/scratchon) or **offline** (http://rpf.io/scratchoff))

Downloads

- None

What you will learn

- Animate a sprite using a loop
- Change the appearance of a sprite

Additional information for educators

If you need to print this project, please use the **printer-friendly version** (https://projects.raspberrypi.org/en/projects/lost-in-space/print).

Here is a link to the solution for this project (http://rpf.io/p/en/lost-in-space-get).

Step 2 Animating a spaceship

Your first step will be to create a spaceship that flies towards the Earth!

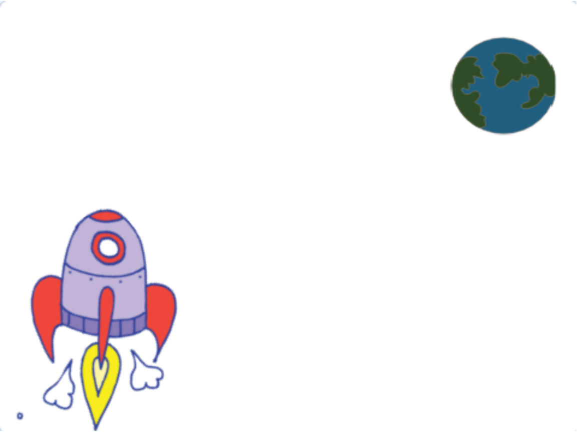
Open a new Scratch project. ☐

Online: open a new online Scratch project at **rpf.io/scratchon** (http://rpf.io/scratchon).

Offline: open a new project in the offline editor.

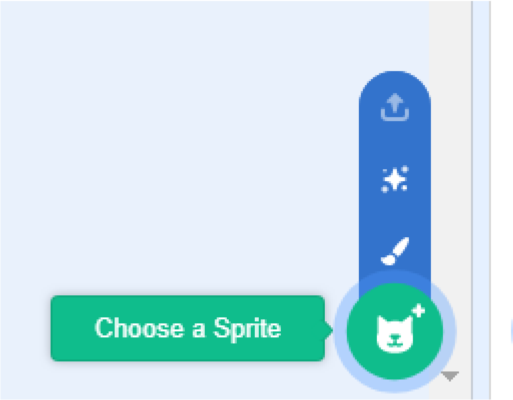
If you need to download and install the Scratch offline editor, you can find it at **rpf.io/scratchoff** (http://rpf.io/scratchoff).

Add ‘rocketship’ and ‘Earth’ sprites to your Stage. ☐

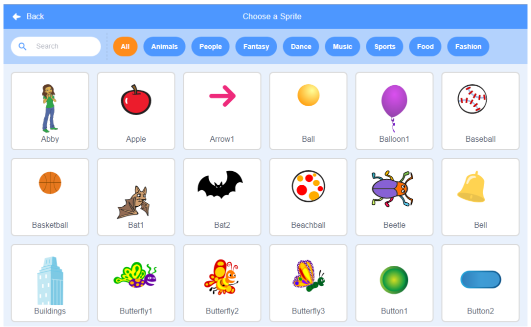


Adding a Scratch sprite from the Library

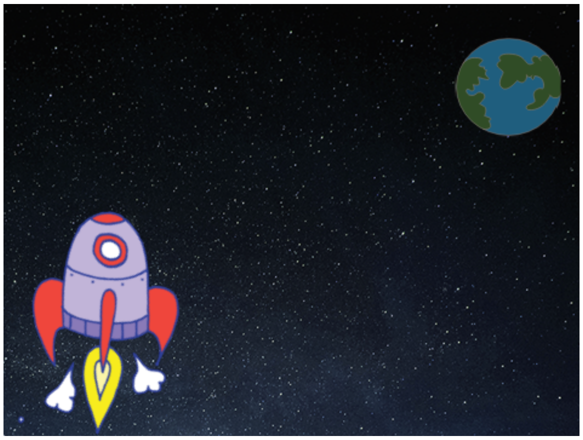
- Click **Choose a sprite** to see the library of all Scratch sprites.



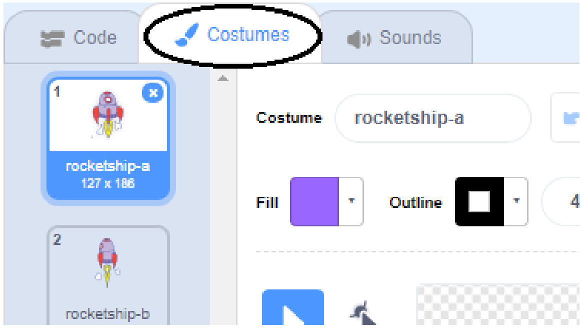
- You can search or browse sprites by theme. Click on a sprite to add it to your project.



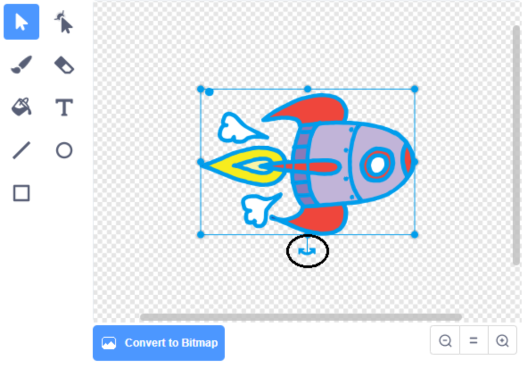
Add the ‘Stars’ backdrop to your Stage. ☑



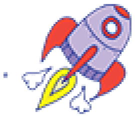
Click on your spaceship sprite, and click on the **Costumes** tab. ☑

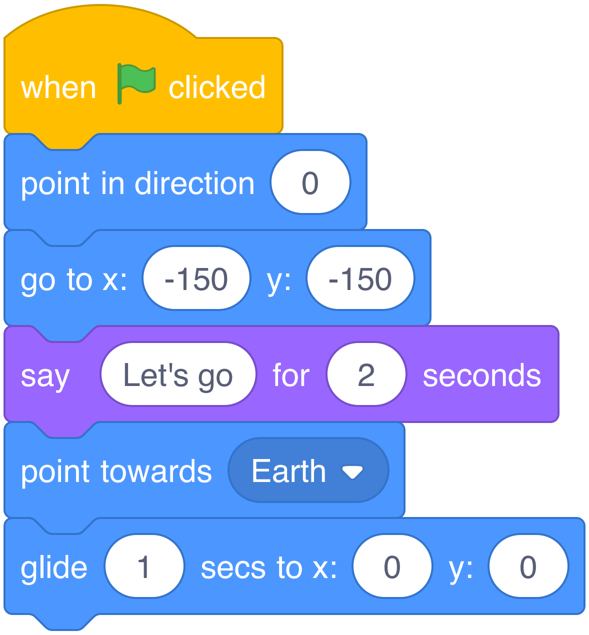


Use the **arrow** tool to click and drag a box around the whole spaceship image. Then click on the circular **rotate** handle, and rotate the image until it is on its side. ☑



Add this code to your spaceship sprite: ☑

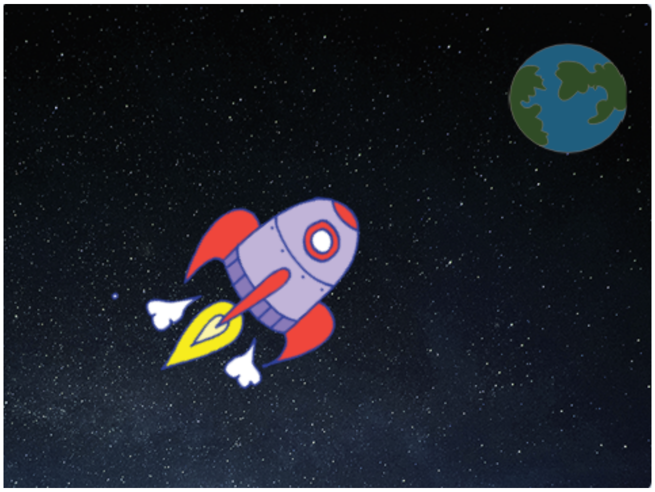




```
when 🏁 clicked
point in direction (0)
go to x: (-150) y: (-150)
say (Let's go) for (2) seconds
point towards (Earth ▾)
glide (1) secs to x: (0) y: (0)
```

Change the numbers in the code blocks you've added so that the code is exactly the same as above.

If you click the green flag, you should see the spaceship speak, turn, and glide towards the centre of the stage.



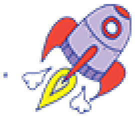
🏆 Challenge!

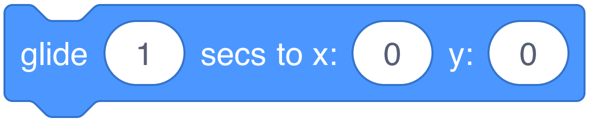
Challenge: improve your animation

Can you change the numbers in your animation code so that:

- The spaceship moves until it touches the Earth?
- The spaceship moves more slowly towards the Earth?

You'll need to change the numbers in this block:





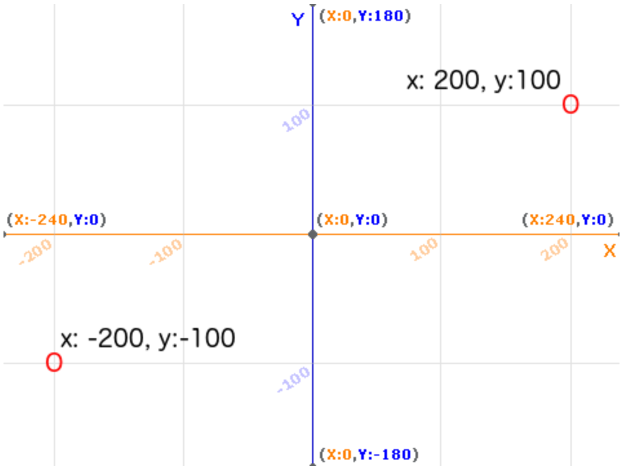
```
glide 1 secs to x: 0 y: 0
```

Scratch coordinates

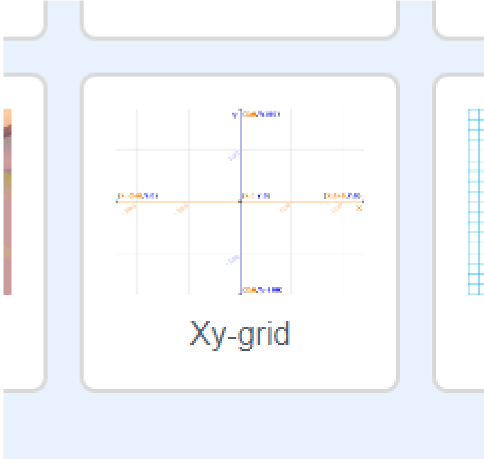
Scratch coordinates

- In Scratch, the coordinates `x:0, y:0` mark the central position on the Stage.

A position like `x:-200, y:-100` is towards the bottom left on the Stage, and a position like `x:200, y:100` is near the top right.



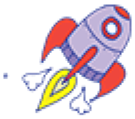
- You can see this for yourself by adding the **Xy-grid** backdrop to your project.

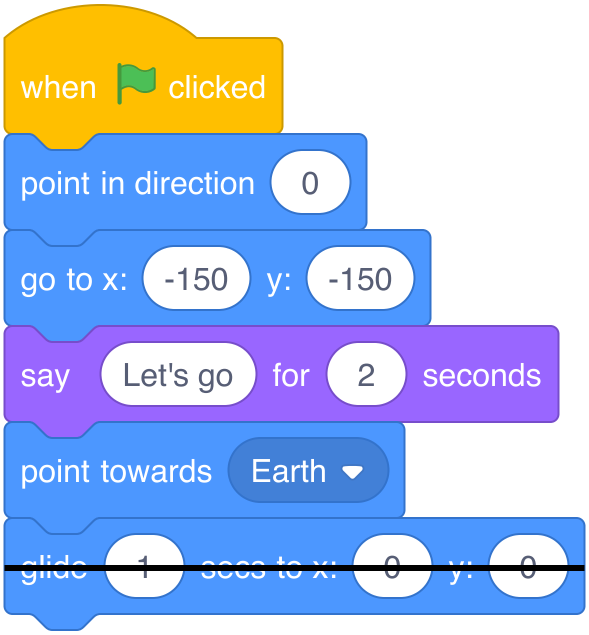


Step 3 Animation using loops

Another way to animate the spaceship is to tell it to move a small amount many times

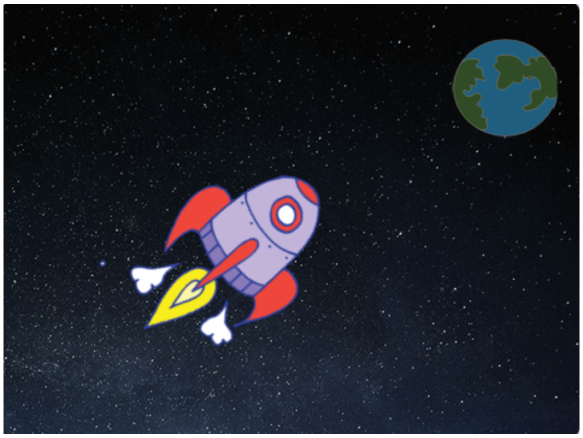
Delete the `glide` block from your code. To do this, drag the block off the Code area and drop it back where the other single code blocks are. ☑



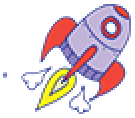


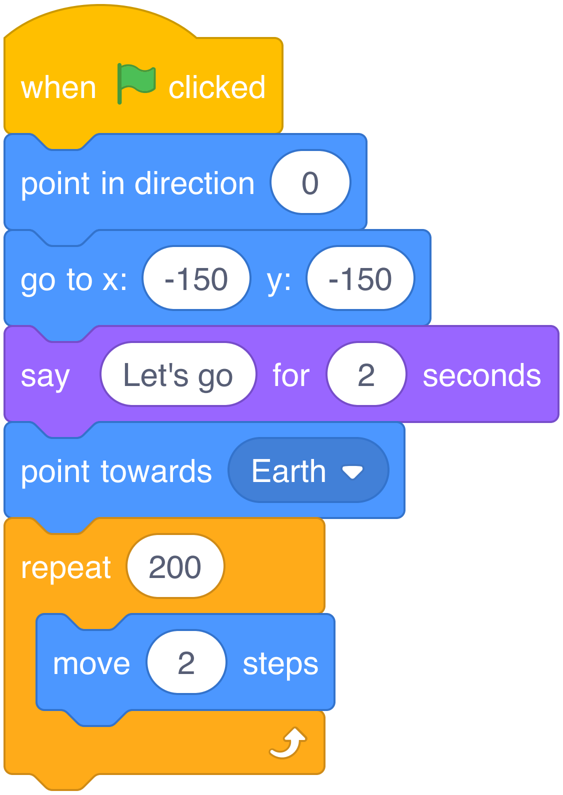
```
when 🏴 clicked
point in direction (0)
go to x: (-150) y: (-150)
say (Let's go) for (2) seconds
point towards (Earth ▾)
~~glide (1) secs to x: (0) y: (0)~~
```

Can you use a `repeat` block to move your spaceship towards the Earth? ☑



Here is the code to animate your spaceship:





```
when flag clicked
point in direction (0)
go to x: (-150) y: (-150)
say (Let's go) for (2) seconds
point towards (Earth v)
repeat (200)
    move (2) steps
end
```

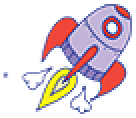
You can use different numbers in the `repeat` and `move` blocks, as long as the spaceship still gets to Earth!

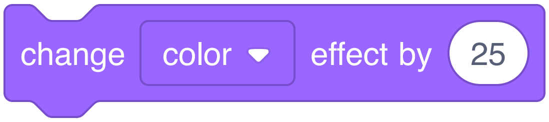
Test and save your code. Your spaceship should move towards the Earth exactly as before, but this time it uses a `repeat` block.

☑

Can you add code to your spaceship sprite so that the spaceship changes colour as it moves towards Earth?

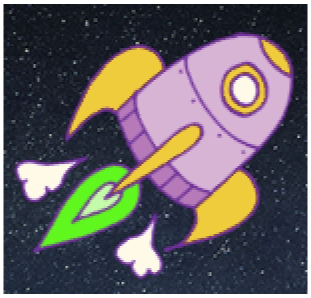
Use this block:





```
change (color v) effect by (25)
```

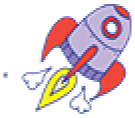
Test and save your code.

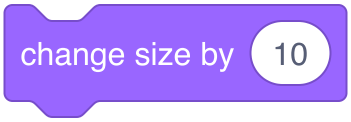


Can you make your spaceship get smaller as it moves towards Earth? ☑

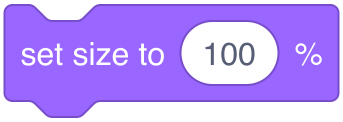
Your spaceship should start at **100% size**, and then **change size** by a small amount each time it moves.

Use these blocks:





```
change size by (10)
```



```
set size to (100) %
```

Test and save your code. Your spaceship should now get smaller as it moves. Test your spaceship a **second time**. Is it the right size when it starts?

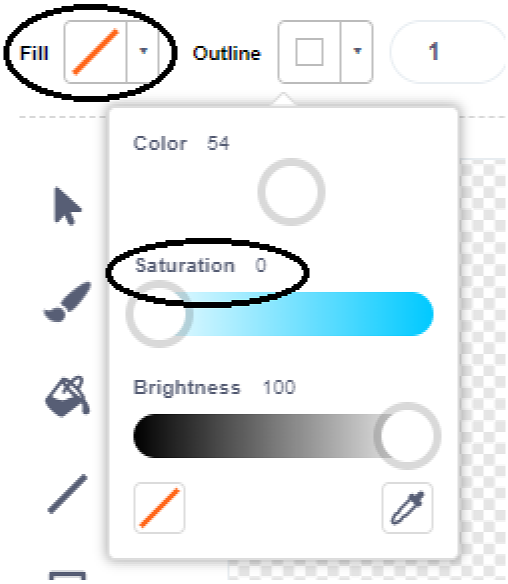
Step 4 Floating monkey

Now you will add a monkey who’s lost in space to your animation!

Start by adding the ‘monkey’ sprite from the library. ☑

Click on your new monkey sprite and then click on **Costumes** so that you can edit how the monkey looks.

Set the fill to be transparent by selecting the red line. For the outline, set a white colour by moving the Saturation slider to `0`. ☑



Fill

Outline

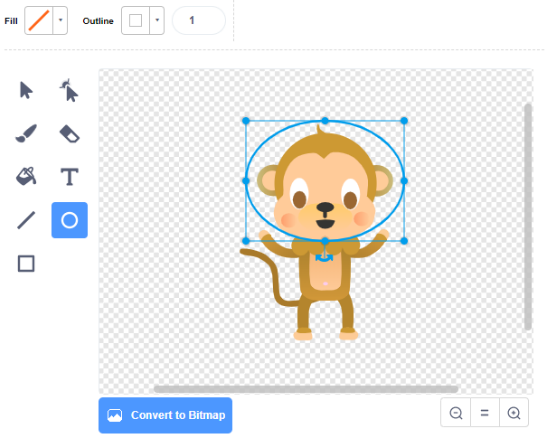
1

Color 54

Saturation 0

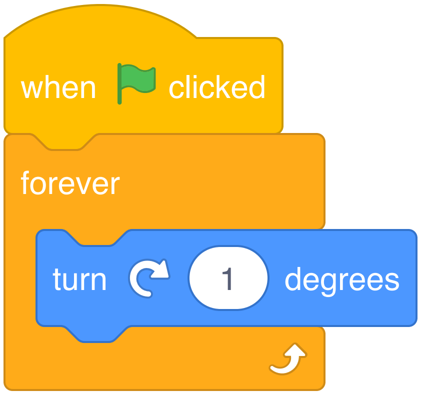
Brightness 100

Click on the **circle** tool and then use it to draw a white space helmet around the monkey's head.



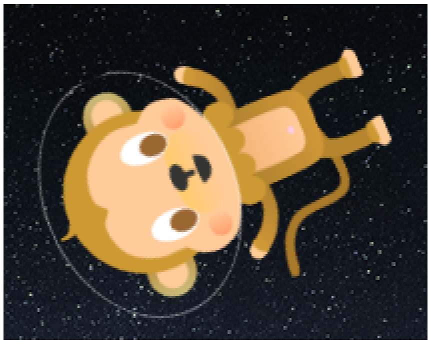
Can you add code to your monkey sprite so that it spins slowly in a circle forever?

Here's the code to make your monkey spin:



```
when 🏳 clicked
forever
    turn ↻ (1) degrees
```

Test and save your project. You'll have to click on the red **stop** button to end this animation, as it runs forever!

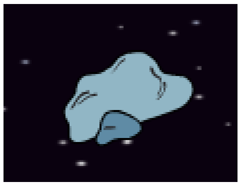


Step 5 Bouncing asteroid

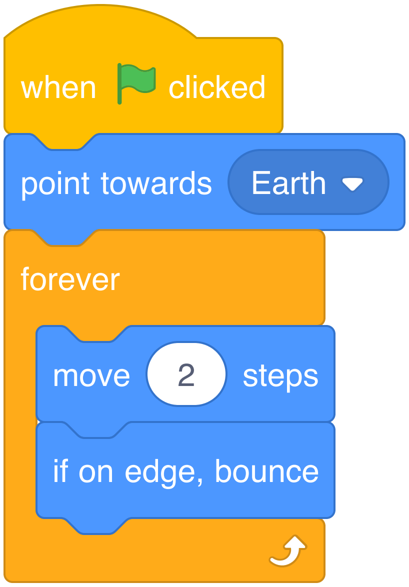
Now you will add a floating space rock to your animation.

Add a 'rock' sprite to your animation. ☑

Can you add code for your rock sprite so that the rock bounces around the stage? ☑



Here’s the code for making your rock bounce around the stage:



```
when ⚑ clicked
point towards (Earth ▾)
forever
    move (2) steps
    if on edge, bounce
↺
```

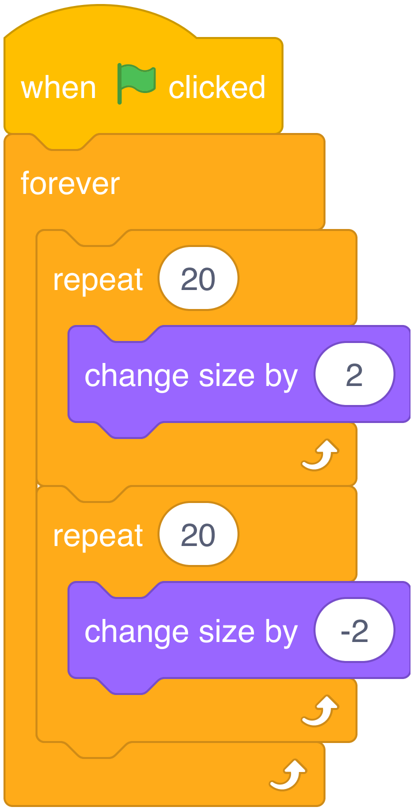
Step 6 Shining star

Now you will combine loops to make a shining star.

Add a ‘star’ sprite to your stage. ☑

Can you add code to your star sprite to make the star repeatedly grow and shrink? ☑

Here’s the code to make your star grow and shrink:



```
when ⚑ clicked
forever
    repeat 20
        change size by 2
    repeat 20
        change size by -2
```

Challenge!

Challenge: make your own animation

Stop your space animation, save it, and start a new Scratch project.

Use what you've learned in this project to make your own animation. It can be anything you like, but try to make your animation match the background you choose. Here are some examples:

Step 7 What next?

Try the **Ghostbusters** (https://projects.raspberrypi.org/en/projects/ghostbusters?utm_source=pathway&utm_medium=whatnext&utm_campaign=projects) project! In that project, you will learn how to create a game with ghosts that appear all over the place and that you need to catch. You will also learn how to add a timer and a score to the game, so that you can see how many ghosts you are able to catch.