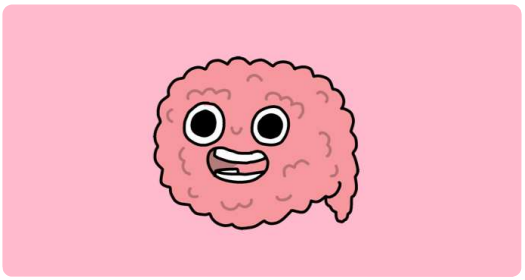
Brain game

Learn how to create a quiz



Step 1 Introduction

In this project you'll create a maths quiz game in which the player has 30 seconds to give as many correct answers as possible.

What you will make

What you will learn

- How to use broadcasts in Scratch
- How to create and use a custom Scratch block

What you will need

Hardware

- A computer capable of running Scratch 3

Software

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

Additional notes for educators

You can find the **completed project here** (https://rpf.io/p/en/brain-game-get).

Step 2 Create questions

You're going to start by creating random questions that the player has to answer.

Open a new Scratch project.

Online: open a new online Scratch project at **rpf.io/scratch-new** (https://rpf.io/scratch-new).

Offline: open a new project in the offline editor.

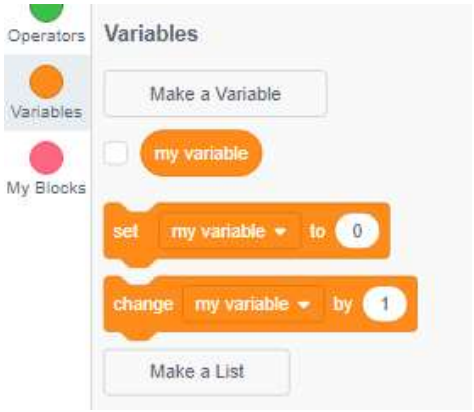
If you need to download and install the Scratch offline editor, you can find it at **rpf.io/scratchoff** (https://rpf.io/scratchoff).

Add a character sprite and a backdrop for your game. You can choose any you like! Here's an example:

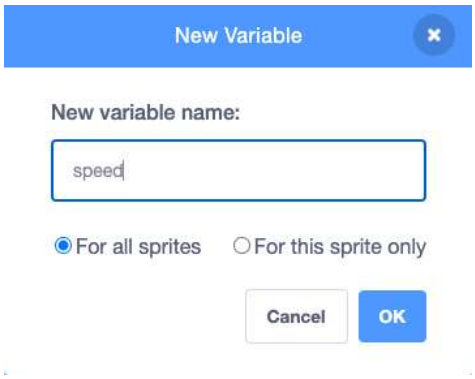
Make sure you have your character sprite selected. Create two new variables, called `number 1` and `number 2`, to store the numbers for the quiz questions.

Add a variable in Scratch

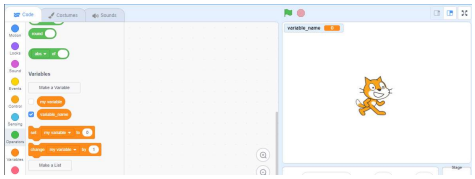
- Click on **Variables** in the Code tab, then click on **Make a Variable**.



- Type in the name of your variable. You can choose whether you would like your variable to be available to all sprites, or to only this sprite. Press **OK**.

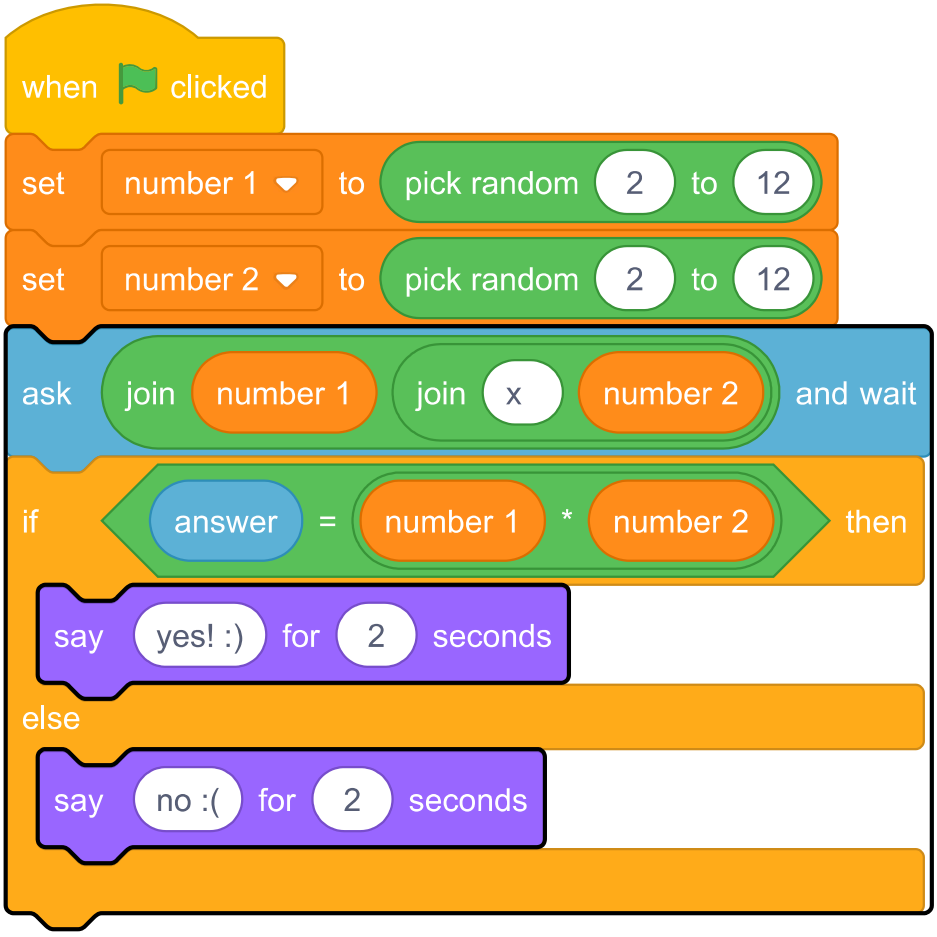


- Once you have created the variable, it will be displayed on the Stage, or you can untick the variable in the Scripts tab to hide it.



Add code to your character sprite to set both of the `variables` to a `random` number between 2 and 12.

Add code to `ask` the player for the answer, and then `say for 2 seconds` whether the answer was right or wrong:

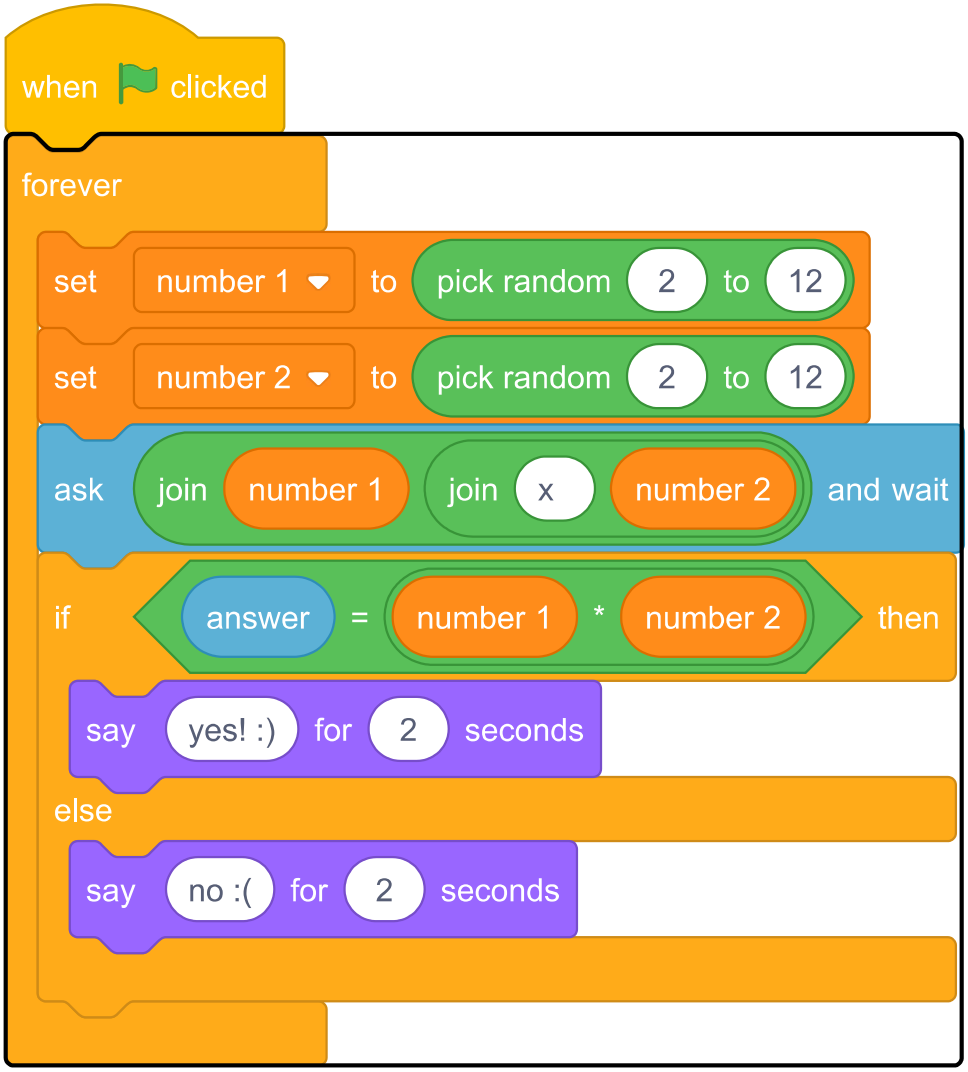


Test your project twice: answer one question correctly, and the other incorrectly.

Add a `forever` loop around this code, so that the game asks the player lots of questions in a row.

I need a hint

Here is what your code should look like:

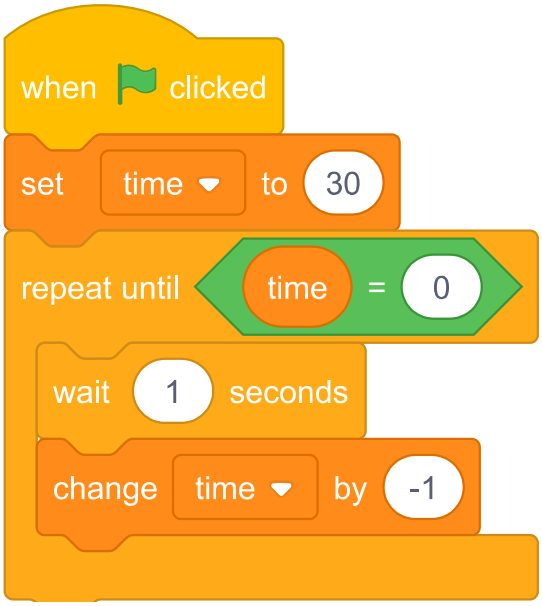


Step 3 Add a timer

Create a countdown timer on the Stage with the help of a new variable called `time`. The timer should begin at 30 seconds and count down to 0 seconds.

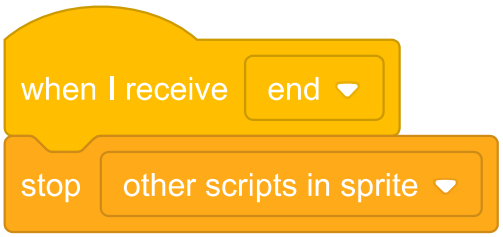
I need a hint

Here is the what your new code should look like:



Create a `broadcast` that sends the message 'end'. A `broadcast` is like an announcement over a loudspeaker: it can be heard by all of your sprites. Add the `broadcast` block to the end of the timer code so that the code will send an 'end' message when the `time` has counted down to `0`.

Select your character sprite and add some code so that the sprite `stops the other scripts` when it receives the `end` message.



Test your game again. It should continue to ask questions until the timer has counted down to 0.

Challenge!

Challenge: add a score and reactions

Can you add a score to your game?

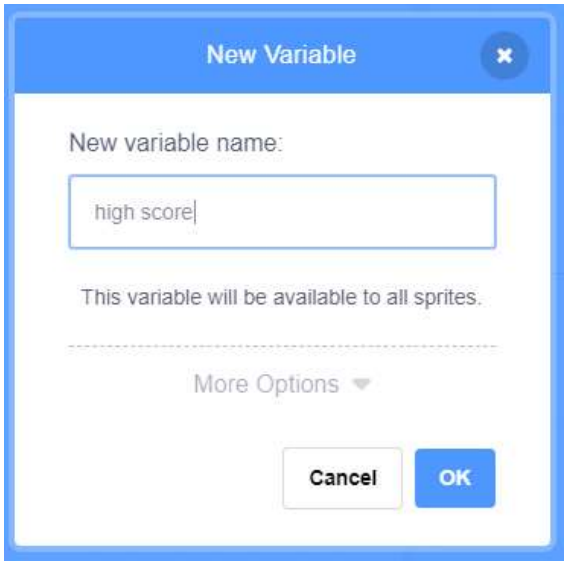
You could add code so that the player scores a point for every correct answer. If you're feeling mean, you could also add code to reset the player's score to zero if they give a wrong answer!

Create a high score in Scratch

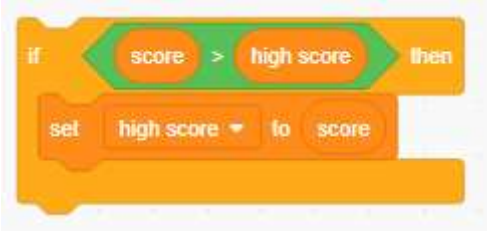
It's fun to keep track of a high score in a game.

Let's say you have a variable called `score`, which gets set to zero at the beginning of each game.

Add another variable called `high score`.



At the end of the game (or whenever you want to update the high score), you'll need to check whether you have a new `high score`.



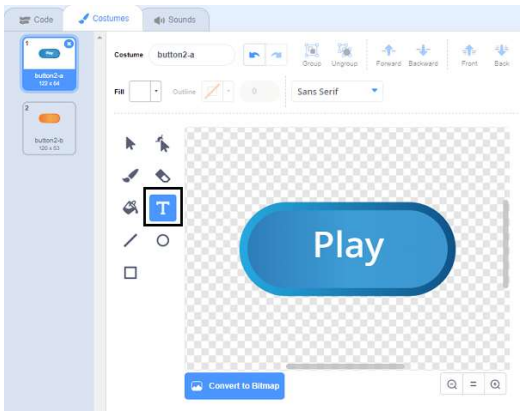
Can you make your character react to the player's answer by changing to a different costume if the answer is correct or incorrect?

Step 4 Multiple games

Now you're going to add a 'Play' button, so that the player can play your game lots of times.

Create a new 'Play' button sprite that the player needs to click to start a new game.

You can draw the sprite yourself, or edit a sprite from the library.



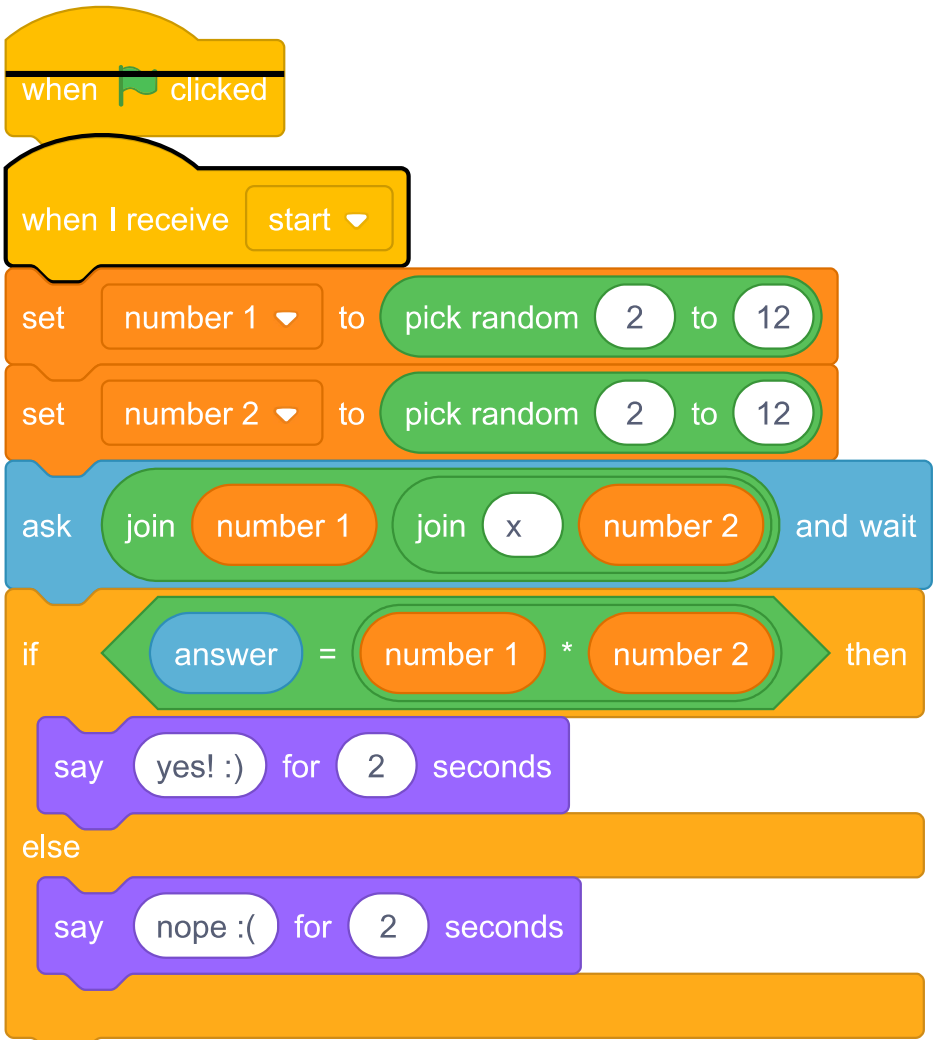
Add this code to your button sprite:

The new code includes another `broadcast` block, which sends the message 'start'.

The new code makes the 'Play' button sprite show when player clicks on the flag. When the player clicks on the button sprite, the sprite hides and then broadcasts a message that other sprites can react to.

At the moment, the character sprite starts asking questions when the player clicks the flag. Change your game's code so that character sprite starts asking questions when it receives the 'start' `broadcast`.

Select your character sprite and, in its code section, replace the `when flag clicked` block with a `when I receive start` block.

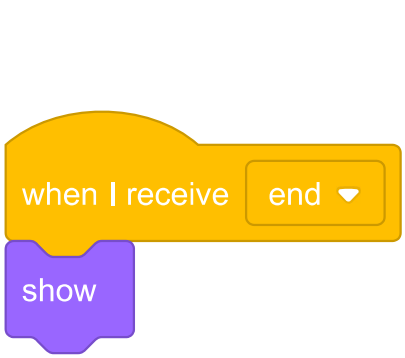


Click the green flag, and then click on the new 'Play' button to test whether it works. You should see that the game doesn't start before you click on the button.

Can you see that the timer starts when the green flag is clicked, instead of when the game starts?

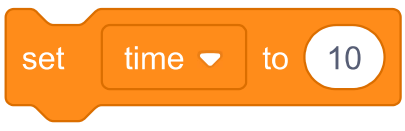
Can you change the code for the timer so that the timer starts when the player clicks on the button?

Add code to your button sprite so that the button shows again at the end of each game.

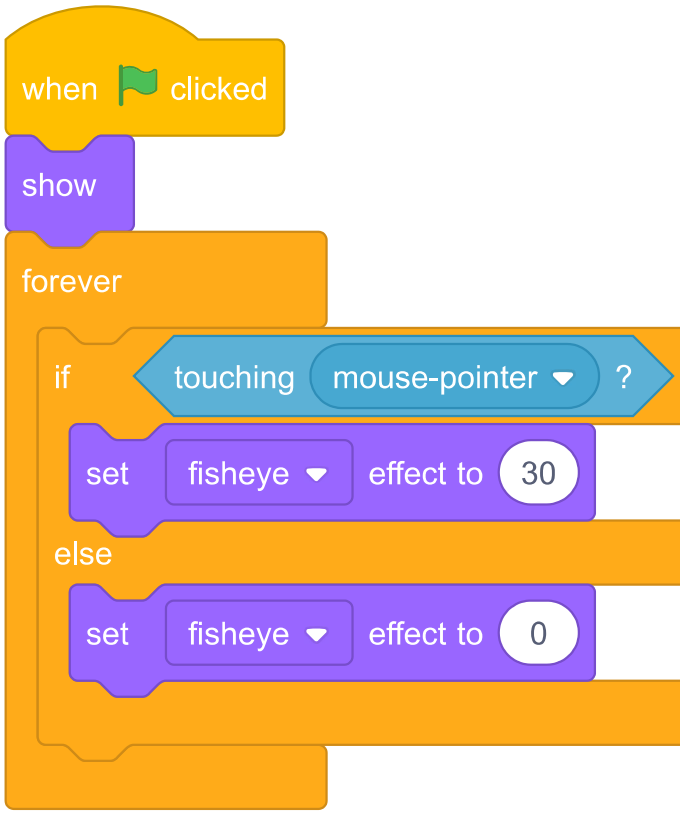


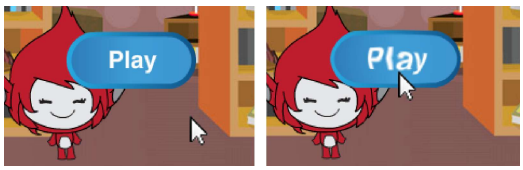
Test the 'Play' button by playing a couple of games. The button should show at the end of each game.

To test the game more quickly, you can change the value of `time` so that each game is only a few seconds long.



You can change how the button looks when the mouse pointer hovers over it.





Challenge!

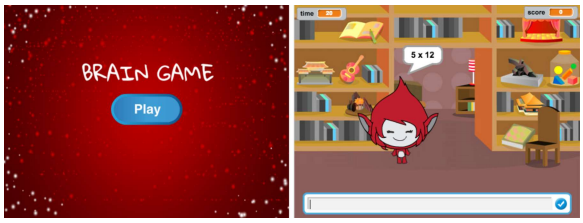
Challenge: create a start screen

Can you add another backdrop that is going to be the start screen for your game?

You can use the `when I receive start` and `when I receive end` blocks to switch between the backdrops.

To show or hide the character when your game switches between backdrops, you can use `show` and `hide` blocks.

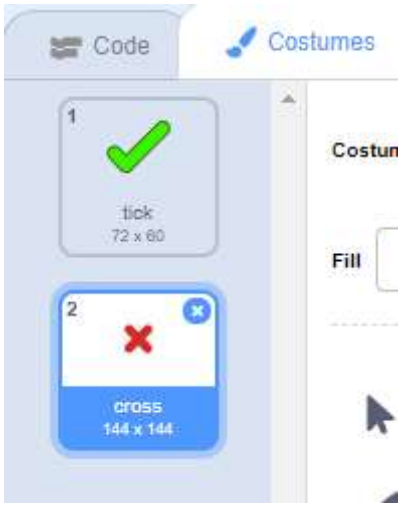
To show or hide the timer and score when your game switches between backdrops, you can use `show variable` and `hide variable` blocks.



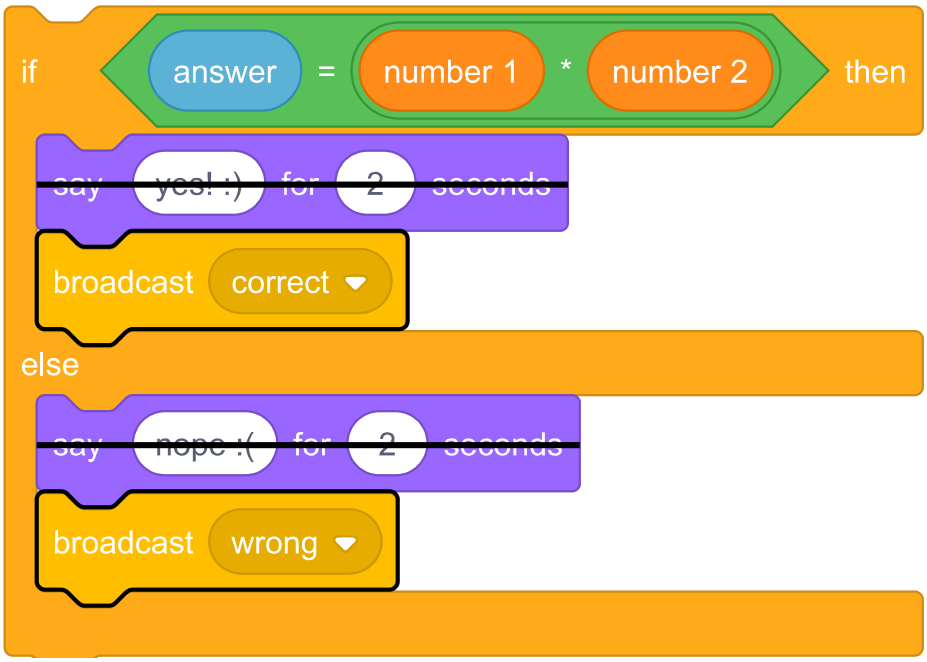
Step 5 Add graphics

At the moment, the character sprite just says `yes! :)` or `no :(` to the player's answers. Add some graphics to let the player know whether their answer is correct or incorrect.

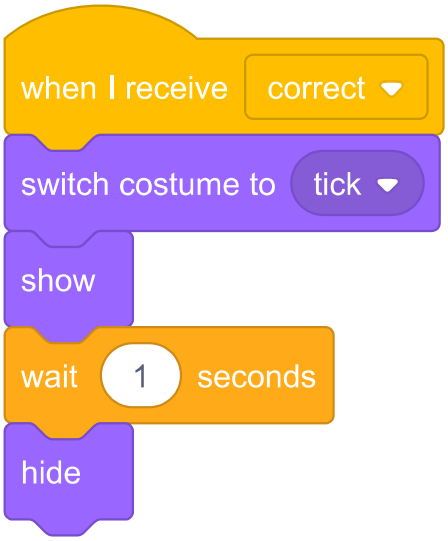
Create a new sprite called 'Result', and give it a 'tick/check' and a 'cross' costume.

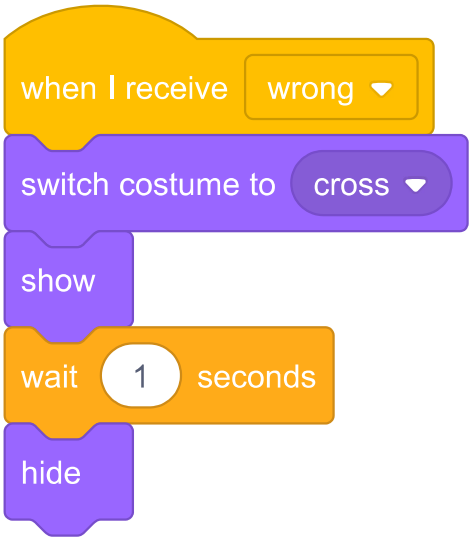


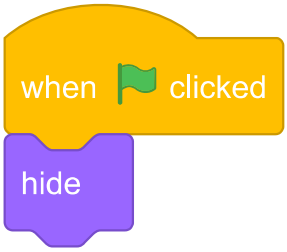
Change your character sprite's code so that, instead of saying something to the player, it `broadcasts` the messages 'correct' or 'wrong'.



Now you can use these messages to show the ‘tick’ or ‘cross’ costume. Add the following code to the ‘Result’ sprite:





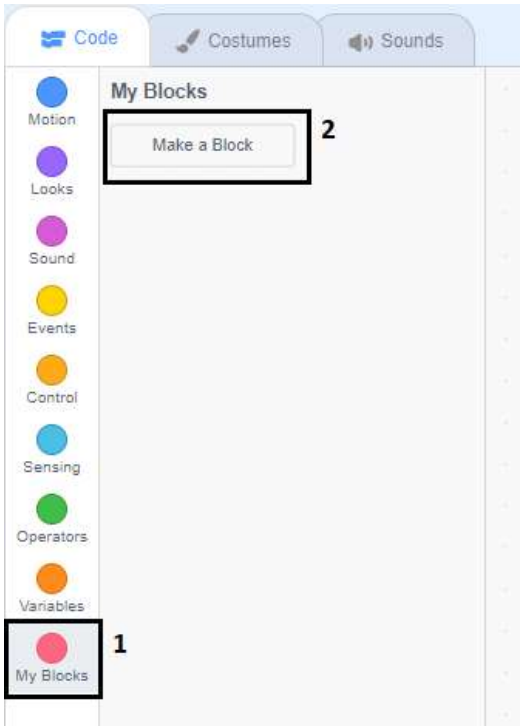


Test your game again. You should see the tick whenever you answer a question correctly, and the cross whenever you answer incorrectly!

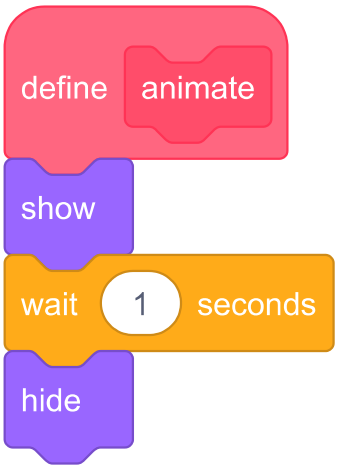
Can you see that the code for `when I receive correct` and `when I receive wrong` is nearly identical?

So you can change your code more easily, you are going to create a custom block.

Select the 'Result' sprite. Then click on `My Blocks`, and then on **Make a Block**. Create a new block and call it `animate`.

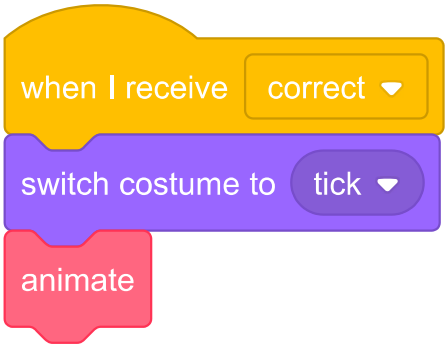


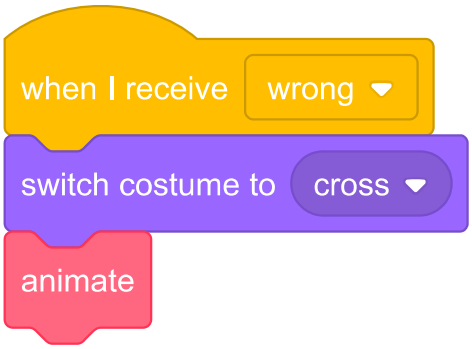
Move the code to `show` and `hide` the 'Result' sprite into the `animate` block:



Make sure you have removed the `show` and `hide` blocks below **both** of the `switch costume` blocks.

Then add the `animate` block below both of the `switch costume` blocks. Your code should now look like this:



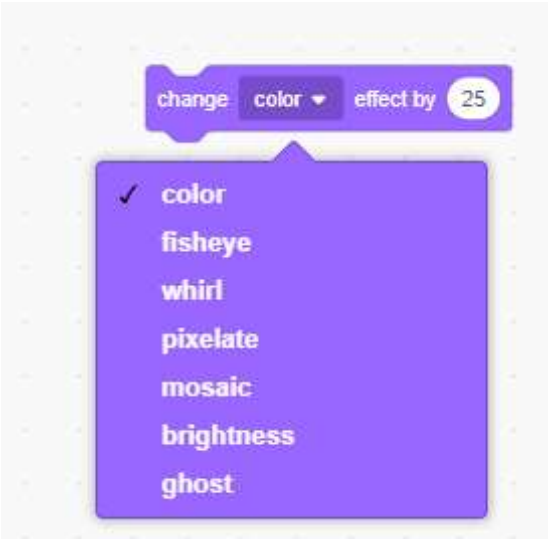


Because of the custom `animate` block, you now only need to make one change to your code if you want to show the 'Result' sprite's costumes a longer or shorter time.

Change your code so that the 'tick' or 'cross' costumes display for 2 seconds.

Instead of `showing` and `hiding` the 'tick' or 'cross' costumes, you could change your `animate` block so that the costumes fade in.

Can you improve the animation of the 'tick' or 'cross' graphics? You could add code to make the costumes fade out as well, or you could use other cool effects:

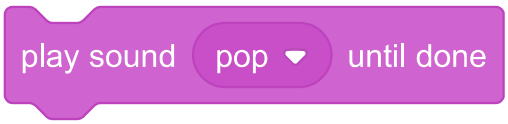


Challenge!

Challenge: sound and music

Can you add sound effects and music to your game? For example, you could have your game:

- Play a sound when the player gives a correct or incorrect answer
- Play a ticking sound as the countdown timer runs
- Play a sound when the player's time is up



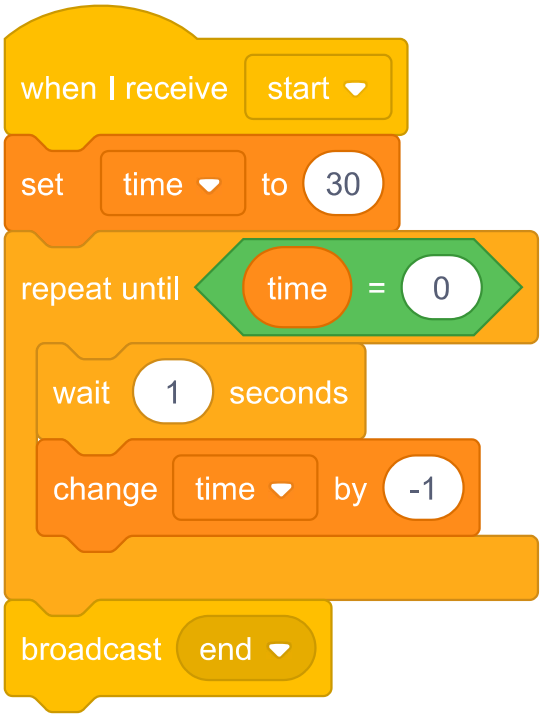
Your game could also constantly play background music on a loop.

Challenge!

Challenge: race to 10 points

Can you change your game so that the player, instead of answering as many questions as possible in 30 seconds, answer 10 questions as quickly as possible.

To make this change, you only need to change your timer code. Can you see which blocks need to be different?



Challenge!

Challenge: instruction screen

Can you add an instructions screen that tells the player how to play the game? For this, you need an 'Instructions' button, and another Stage backdrop.

You may also need to add a 'Back' button that lets the player go back to the start screen.

Step 6 What next?

Try the **Catch the dots** (https://projects.raspberrypi.org/en/projects/catch-the-dots?utm_source=pathway&utm_medium=whatnext&utm_campaign=projects) project to create a reaction game! In that project, you're going to learn how to make clones of sprites, and how to use a variable to gradually speed up the game.