

## THE MATHS QUIZ

In this App we are going to look at how Scratch can be used to create interactive quizzes. Lots of different quizzes are possible and here we are going to set a Maths Quiz to help people revise their times tables!

Some of the things to look out for in this project are:

- Asking questions and then using the answer given by the player
- Using variables to store numbers.
- Using random numbers
- Using the Operator blocks to do maths calculations
- Joining pieces of text together in speech bubbles

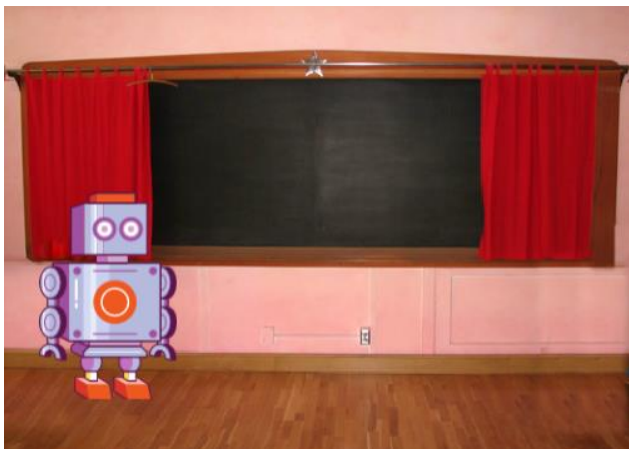
### Let's get coding!

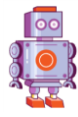
Start a new project in Scratch.

Delete the cat sprite as it is not needed.

Add a new sprite who will be asking the questions in our maths quiz. We are going to use **Retro Rocket** because the quiz is created by computer but you can choose any sprite you like.

And change the backdrop to **Chalkboard** so that the stage looks like a classroom.





## Create the variables

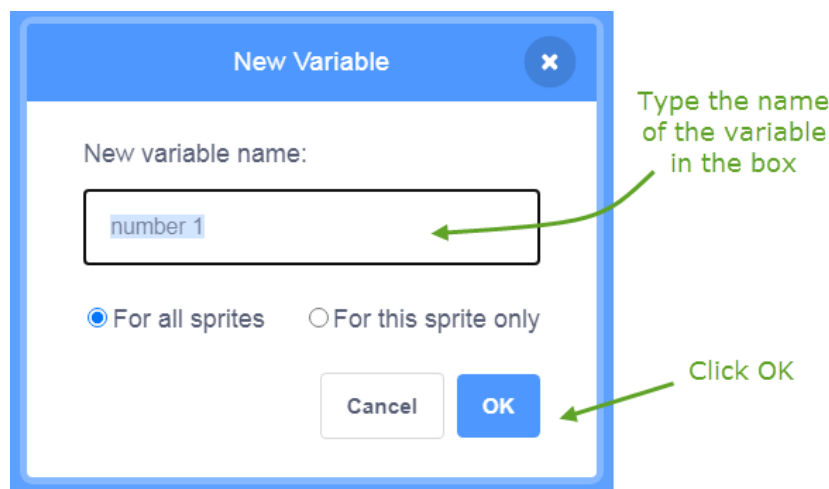
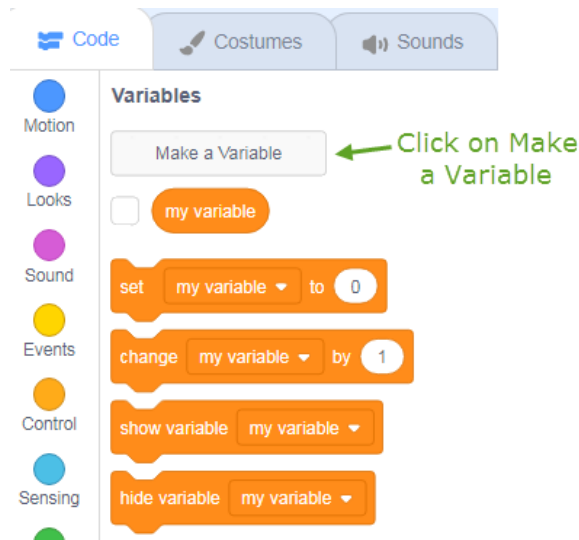
Variables are used in Scratch to store information that we want to use later in our code. You can have lots of variables in a project and they can store numbers or words.

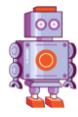
Each question in our Maths Quiz will ask the player to multiply two numbers (between 1 and 12) chosen at random.

We will store one of those random numbers in a variable we will call ***number 1*** and the other in a variable we will call ***number 2***

We will also need a third variable which we will call ***total*** to store the result of multiplying ***number 1*** by ***number 2***.

To create a variable go to the Variables blocks and click on Make a Variable.

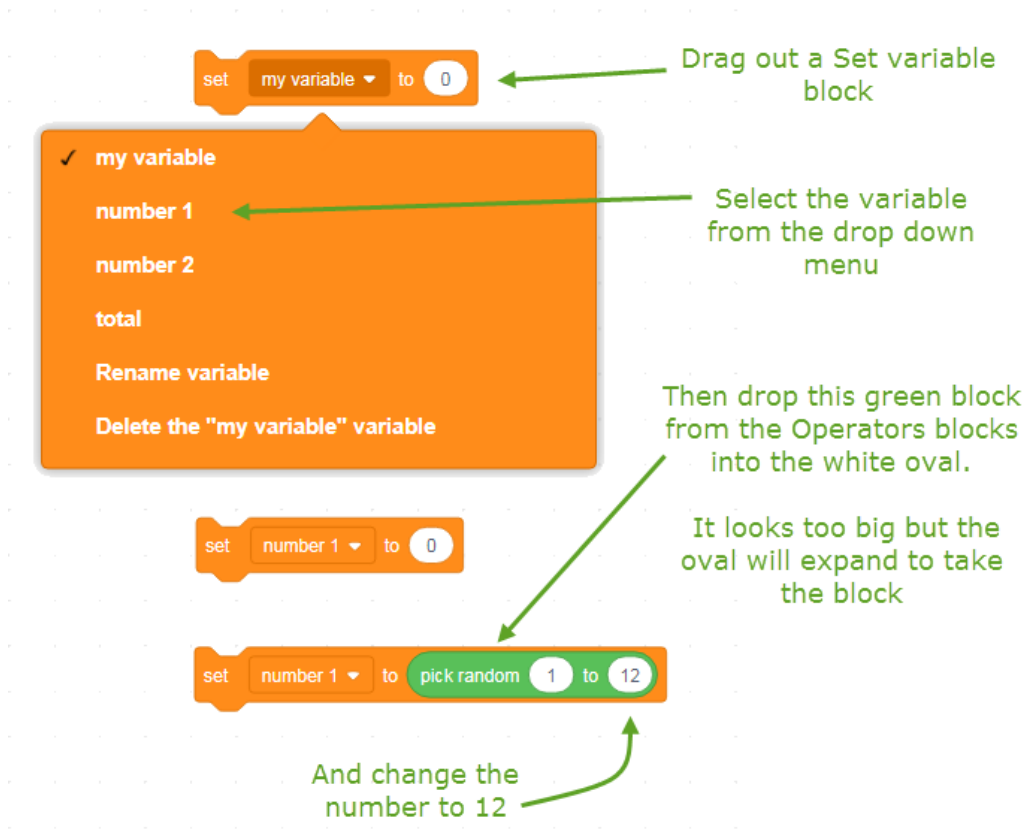




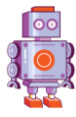
Repeat this for **number 2** and **total** so that you have three new variables like this:



We want our App to select a random number between 1 and 12 and store it in variable **number 1**. Then do the same for variable **number 2**. We do this using **set variable** blocks.



Repeat this for the **number 2** variable.




Next we use another set variable block to set the **total** variable to be **number 1** times **number 2** (Remember we use the \* key in computing code for times or multiplication).

Select **total** from the drop down menu

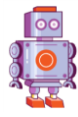
Insert this green multiplication block from the Operators blocks

Drop the **number 1** variable block from the Variables blocks into the first white oval

And then the **number 2** variable block into the second oval

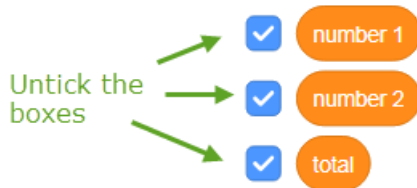
Put a  as the first block of our code so that the player will be able to start the quiz.

And just to check, at this stage our code should look like this:



Check that you do NOT have blue tick boxes by your variables.

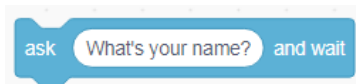
When these boxes are ticked Scratch shows the value of the variable on the Stage. Often this is really useful but not in this project because it would mean the answer to the question would be shown on the Stage and ruin the quiz! So if they are ticked – untick them.




## Asking the questions

Now we are going to build the code that asks the Quiz questions, for example “What is 5 times 6?”

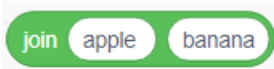
Scratch has two Sensing blocks to deal with asking questions and storing the answer given by the player.




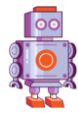
When you use this block two things appear on the Stage; a speech bubble showing the question and a box ready for the player to type their answer.

The player can submit their answer by clicking  or by pressing Enter on the

keyboard. When the player has given their answer it is stored in the  block.

The other blocks we are going to need are  blocks from the green Operator blocks. These blocks let us join numbers, words or other blocks together to make a sentence.

And our  variable blocks



## Coding with Scratch – The Maths Quiz

The coding for this section of our code is a little bit complicated the first time you try it so we will go through it step by step.

Drag out **ask question block** from the Sensing blocks

Drop a green **Join block** from the Operators blocks into the white oval

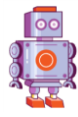
Drop a second green **Join block** into the second white oval

So the blocks look like this



Drop a **number 1** variable block into the white oval

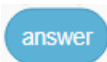

Type the word **times** with a space at the beginning and a space at the end

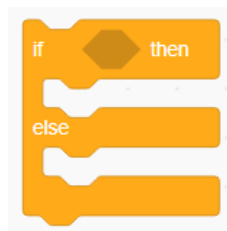
Drop a **number 2** variable block into the third white oval



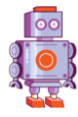
## Checking whether the answer given by the player is correct

The **answer** given by the player is automatically stored in the  block and will be correct if it is the same as the **total** calculated by computer which is stored in the  variable block.

So we need some code that checks **if**  equals  **then** show a message that says correct **else** (otherwise) show a message saying wrong and giving the correct answer.



To do this we need an  block from the control blocks.



# Coding with Scratch – The Maths Quiz

Build the code like this:

Drag out an *if.. then.. else* block from the Control blocks

And drop a green *equals* block from the Operator blocks into the diamond shaped hole

Drop the blue *answer* block from the Sensing blocks in the first oval.

And a *total* variable block into the second oval

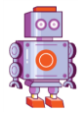
Add a Say block from the Looks block, and change the words to say *Correct! Well done.* This message will show if the answer given by the player is correct

Add a Say block from the Looks blocks and then drop in a green Join block from the Operator blocks

Drop in a *total* block from the Variables blocks

Type the message in here for when the answer is wrong





## Check your code

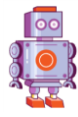
So now your code should look like this:

```
when green flag clicked
  set number 1 to pick random 1 to 12
  set number 2 to pick random 1 to 12
  set total to number 1 * number 2
  ask join number 1 join times number 2 and wait
  if answer = total then
    say Correct! Well done. for 2 seconds
  else
    say join Wrong! The correct answer is total for 2 seconds
```

Run the code to check it works. Answer the question correctly so you get the *Correct Well done message*

And then run the code again but deliberately answer wrongly so you get the *Wrong! The correct answer is .. message.*

If there is a problem check each part of the code carefully to see if you have a bug.



## Adding more questions

Just asking one question isn't a very good quiz is it? So let's repeat the code 10 times so we get 10 different questions.

We can do this by putting a



Control block around the code we want to repeat.

Drag the repeat block into position

Watch for the grey outline to appear around all the code you want to repeat

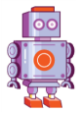
Then release the repeat block and it will snap into place.

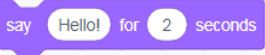
The image shows a Scratch script starting with a 'when green flag clicked' block. A 'repeat 10' block is being positioned around the following code: 'pick random 1 to 12' (number 1), 'pick random 1 to 12' (number 2), 'set total to number 1 \* number 2', 'ask join number 1 join times number 2 and wait', 'if answer = total then say Correct! Well done. for 2 seconds else say join Wrong! The correct answer is total for 2 seconds'. A grey outline is visible around the code to be repeated.

## Welcome and End of Quiz messages

Finally we can include some welcome information at the start of the quiz.

And a message at the end to tell the player they have finished the quiz.



Add a  from the Looks blocks at the start of the code immediately after the Green Flag block and another one right at the end of the code. Be careful not to include either block inside the repeat loop.

Then type in messages saying:

*Hello! Welcome to the Maths quiz. There are 10 questions*

and

*End of Quiz*

**Your final code should look like this:**



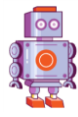
```
when clicked
say Hello! Welcome to the Maths quiz. There are 10 questions. for 5 seconds
repeat 10
  set number 1 to pick random 1 to 12
  set number 2 to pick random 1 to 12
  set total to number 1 * number 2
  ask join number 1 join times number 2 and wait
  if answer = total then
    say Correct! Well done. for 2 seconds
  else
    say join Wrong! The correct answer is total for 2 seconds
say End of Quiz for 2 seconds
```

### Challenge!

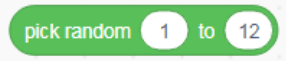
What if the person playing your quiz wanted to practice just one of the times tables?

Can you change the code so that all the questions are about the seven times table?

If you need help there is a suggested solution at the end of this project.



## Answer to Challenge

One way to change the code is to change the numbers in one of the  blocks

so that the number picked by the computer is always 7, like this

