

Maths Quiz Activity

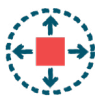
Using selection in programs

Duration: **1 hour**

Concepts and approaches covered



Selection



Programming



Debugging



Collaborating

Overview

In this activity pupils create a maths quiz in Scratch and learn about selection. In this activity selection allows the flow of the program to be altered depending on the player's answers to questions. Initially pupils will use an 'If... then...' selection command to make their quiz respond 'well done' when the player answers correctly. Pupils then move on to using an 'If...then... else...' command so the program will also give the correct answer when the player gets an answer wrong.

Pupil objectives

- I can explain what selection is
- I can write a program using selection

Resources

- Maths quiz presentation
- Scratch commands help sheet (up to one per pair if required)
- Pupil access to the Scratch resources. Either in the downloads folder or within the Scratch 3.0 online editor from these links: [Maths Quiz](#), [Maths Quiz Extension](#)
- Pupils' exercise books for writing their algorithm in (Note - pupils will need these for the [KS2: Work with variables activity](#))

Introduction **5 minutes**

Ask the class several maths questions. After you have asked each question, make a point of saying 'well done that's the correct answer' to pupils who have answered correctly.

After a few minutes, explain that in this lesson pupils are going to create a maths quiz program in Scratch which will ask questions just as you have. Ask pupils what they can recall about programming in Scratch.

Add that in this lesson pupils will learn about a new concept called selection. Explain that pupils will learn what selection is, and how in this activity selection will allow us to write a program that responds to the player when they get the answer correct.

Algorithm design **5 minutes**

Explain to pupils that before we program our maths quiz in Scratch we need to plan the algorithm for the steps in the quiz. (If required, quickly recap what an algorithm is).

Ask pupils to work in pairs to write the algorithm for the maths quiz in their exercise books. Emphasise that they should include the step in which if the answer was correct then you said 'well done'.

If pupils require support - model starting to write the first steps in the algorithm, for example:

- Think of a question to ask
- Ask the question
- Allow the player to respond

Ask a few pupils to share their algorithms and ensure pupils have included the step in which a message is given if the answer is correct (e.g. 'well done'). Take a moment to explain that when we come to implement our algorithms as a program we will use a selection command to achieve this.

Note - When pupils write their algorithms they may use different language to describe each step. This doesn't matter. An algorithm is a set of instructions for a human to follow, so as long as the instructions are clear this is fine

Main activity **40 minutes**

Introducing the 'If...then...' selection command

Open the 'Maths Quiz' Scratch file so it is displaying on the interactive whiteboard (either using the web links if using Scratch online, or using the downloaded version if using Scratch on the desktop). Pupils should also open the 'Maths Quiz' Scratch file.

Once pupils have opened the file they should save their own copy to an appropriate area on the school network.

Explain that the commands that have loaded will help them to write their maths quiz program.

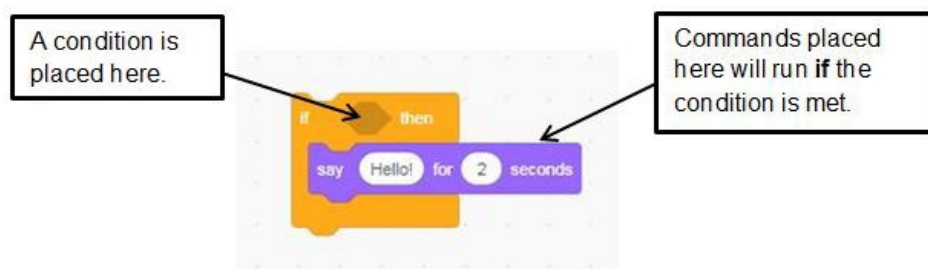


The commands which load in the Maths Quiz project

Ask pupils to discuss how some of the commands might work.

Depending on pupils' level of understanding of the commands, lead a brief discussion to explain the following commands:

- If...then...: Highlight to pupils that this is a selection command. Illustrate that other commands, such as the 'Say' command can be placed within this. Explain that the commands placed within a selection command only run if the condition which is placed in the irregular hexagon is met, as shown below.



Explaining the selection block 'if... then...'

You may wish to use the large selection block on **slide 4** to explain further. Use examples from the world to illustrate the concept of selection. For example, if 'it starts to rain' then 'You put an umbrella up'.

Invite pupils to come up with other examples.

If pupils need an explanation of the other commands, briefly talk through the descriptions below. Alternatively, allow pupils a few minutes to tinker with the commands and share what they have learnt.

- **ask...and wait:** this command will ask the user the questions you have entered into the text field and store their response in a temporary variable called 'answer'
- **operator:** the green hexagonal block can be used to compare two things - to check if they are equal
- **say...for...secs:** this command can be used to make the sprite say things in a speech bubble for the duration of time entered
- **when green flag clicked:** this block is used to start program when the green flag is clicked

Pupil activity 15 minutes

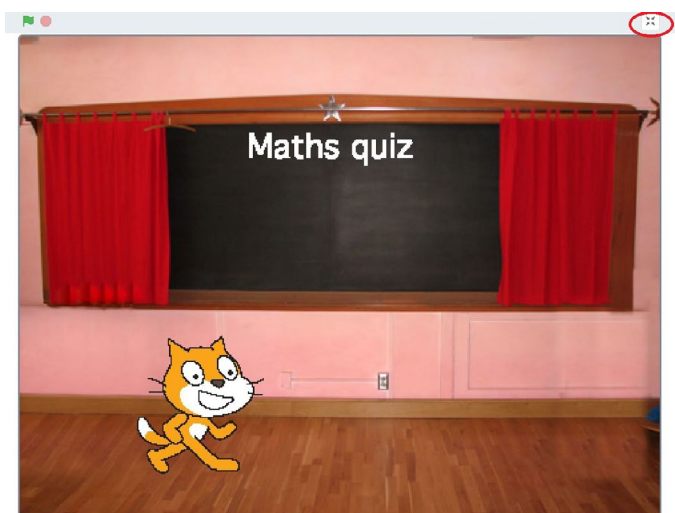
Working with a partner, pupils should use their algorithm to code their maths quiz program. Remind pupils that the commands that have loaded should help them to write a program that asks one question. This is summarised for pupils on **slide 5**.

Offer support to pupils that require it. The Scratch commands help sheet (see 'Resources') can be provided to pupils that require additional support.

Remind pupils to run their program as they are writing it to check it matches their algorithm design. Suggest pupils code their first question and then test and debug it.

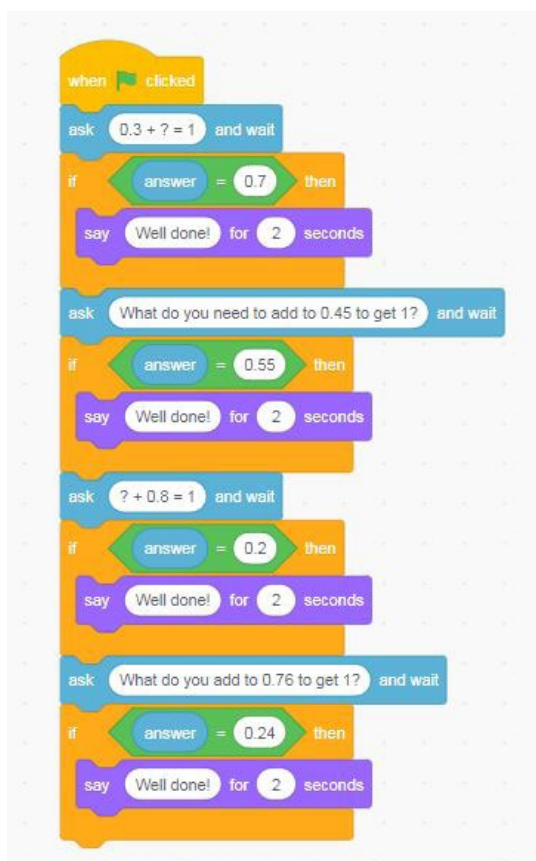
Once pupils' first questions are functioning correctly, they can then use the duplicate tool (a button that looks like a stamp above the stage) to create further questions.

Invite pupils to demonstrate their quiz program to the class. When they run their programs they should display the stage in full screen, as shown below, so the code with the correct answers is hidden! Ask pupils to explain how their code works line- by-line, so they use logical reasoning to think through the input, process and output of each command.



Select full screen when running the maths quiz to hide the code with the correct answers, as circled

Guide a class discussion with pupils using some of the questions on **slide 6**



One example of the code for the quiz which uses the selection command to respond 'Well done!' to the correct answer

Introducing the 'If...then...' selection command

Ask pupils to discuss with their partner ways they could improve their quiz. Feedback ideas as a class and guide a discussion to conclude that it would be good for the player to be told the correct answer if they got the answer wrong - as this will help them improve their maths.

Give pupils a few minutes to discuss with their partner what the programming command might be to do this, share ideas and drag a copy of an 'If...then... else...' command block into the script area. Explain this is a different type of selection command and that it could be used within our quiz so the player is told the correct answer if they get the answer incorrect.

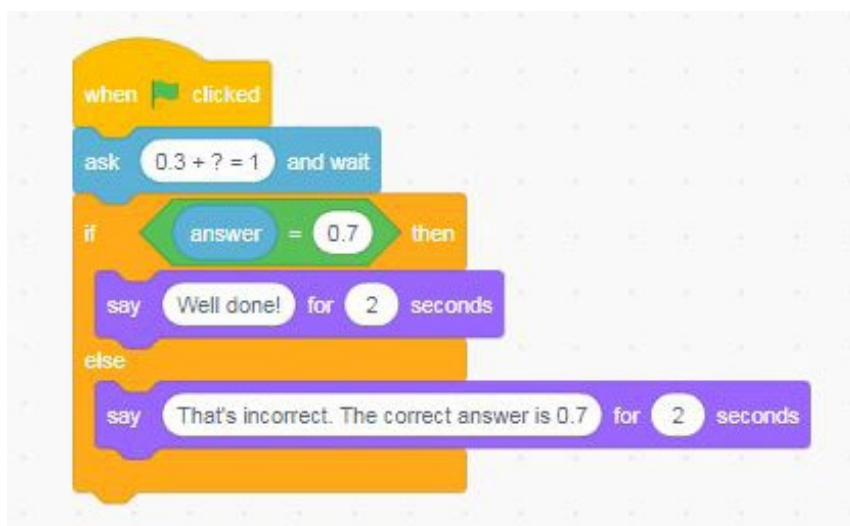
Pupil activity **15 minutes**

Pupils should explore how they can use an 'If...then...else...' command instead of the 'If...then...' so their quiz tells a player the correct answer if they get the answer incorrect as well as still saying 'well done' if they answer correctly.

Support pupils where required during this task. The Scratch commands help sheet (see 'Resources') offers guidance on using the 'If...then...else' command.

After pupils have had time to tackle the task, allow time for pupils to play each other's quizzes.

Pupils who are playing another pair's game could be asked to predict what programming commands have been used and to suggest improvements.



One example of the code for the quiz which uses the selection command to respond 'Well done!' to the correct answer

Plenary 5 minutes

Note - ensure that pupils save their maths quiz programs onto the school network or the

Scratch website in an appropriate location - these are used as the starting point for the KS2: work with variables activity

Ask pupils to work with a partner to think of other examples where they would use selection in a program. Can pupils also say what type of selection command might be used for each of their examples? If pupils need support, provide examples to help them think of more, such as: A character loses a life if they are caught by a monster in a game (If...then...); A character might switch to costume 'falling' if moving downwards else switch to costume 'standing' (If...then...else...)

Differentiation

Support

Mixed ability pairing could be used to ensure less confident pupils are encouraged by their peers. The Scratch commands help sheet can also be provided to those pupils that require it during the main tasks

Stretch and Challenge

An additional Scratch file has been provided with this activity called 'maths quiz extension'. This program uses a random number command block within Scratch to generate questions instead of having the questions set when the program is created. It also uses a forever loop to ask question after question after question. However the program has a couple of bugs in it so isn't currently working as it should. Challenge pupils to see if they can use logical reasoning to debug the program so it works correctly

Assessment opportunities

- Informal teacher assessment of progress during main task, class discussions and plenary. Focus on pupil understanding of the concept of selection and the correct use of the two types selection commands in their program
- Formal, summative assessment of Scratch projects if required (note however these are completed in pairs)

Teaching notes

Concepts and approaches



Selection

Pupils use selection commands so their programs execute different commands depending on whether the player answers correctly or not



Programming

In this activity pupils program a maths quiz in Scratch



Debugging

In this activity pupils debug their code when it is not working correctly



Collaborating

This activity requires pupils to collaborate in pairs

Curriculum links

Please refer to the resource overview page on the website, to understand how the learning objectives covered in this lesson relate to the curriculum in your country.

Related activities

This activity is used as the starting point for the KS2 'Work with variables' activity in which pupils enhance their quiz by adding in a scoring and lives system

[KS2 Use repetition in programs](#)

[KS2 Work with variables](#)

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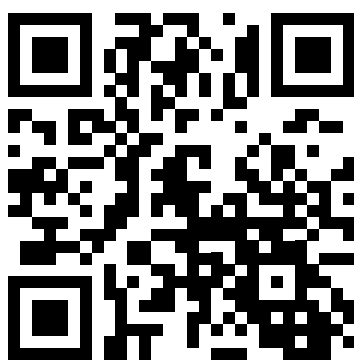


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