

5 words to remember

abstraction: a process that helps simplify things by identifying what is important and what detail can be hidden or ignored

algorithm: a sequence of precise instructions or steps to achieve a goal

bug: an error or a mistake in a program or algorithm, which stops it running in the correct way

debug: to spot and correct mistakes (bugs) in a computer program or algorithm

logical reasoning: a problem-solving skill that gives a reason for something that others have to accept as correct

People: Admiral Grace Hopper

The word **debugging** is believed to have been first used by Admiral Grace Hopper when she was working on a Mark II computer at Harvard University in the 1940s.

Admiral Hopper and her colleagues discovered a moth stuck in a circuit switch, which stopped the computer from operating. Hopper remarked that they were 'debugging' the system!



Key takeaways

- ❑ When computer programs do not work or could be improved, they need 'debugging'.
- ❑ Did you know that computer programmers spend more time fixing code than writing it!
- ❑ Debugging mistakes needs patience and resilience.
- ❑ When creating programs, it is best to test as you go rather than waiting until the end to check for errors.
- ❑ **Abstraction** helps to simplify code, which can be helpful in making debugging less complex.
- ❑ There are different ways to develop debugging skills, such as:
 - Firstly, identify what the error is by running the program.
 - Next, identify where in the **algorithm** the error or **bug** must be.
 - Reading through the code line by line is very helpful.
 - Working with a partner can also help to spot and work through errors. Explaining each step to someone else also helps develop **logical-reasoning** skills.
 - Once the error is fixed, check whether the program now works.

Knowledge check: Can you spot the bug?

when space key pressed

go to x: 0 y: 0

point in direction 90

erase all

when clicked

pen down

move 100 steps

turn 90 degrees

move 100 steps

turn 90 degrees

move 100 steps

turn 45 degrees

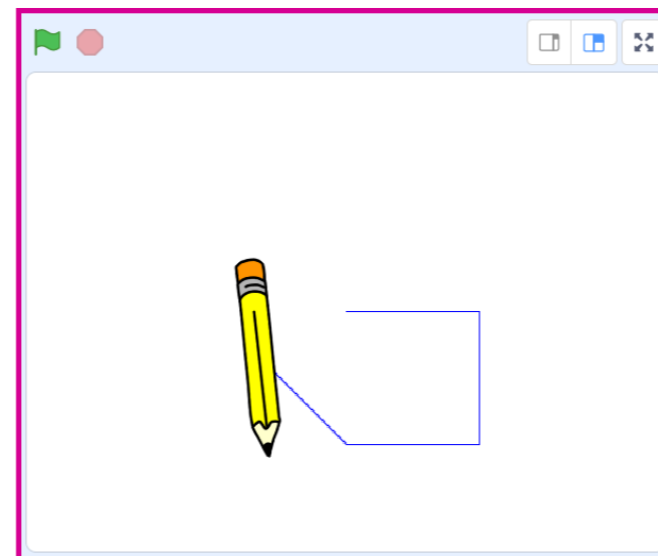
move 100 steps

turn 90 degrees

Top tip: Remember to read through the code line by line.

This Scratch code should draw a square but, as you can see from the drawing below, the program is not running correctly and does not draw a complete square. Can you spot the error?

Hint: The square should have sides of 100 steps in length and vertices (corner angles) of 90°.



Knowledge check: Can you debug this error?

When the green flag is clicked, the question 'What is 5 x 6?' appears. I answer correctly with 30, but a 'Sorry, that's wrong' message appears on screen. Which of the following explains the bug?

- A – The green flag block is in the wrong place.
- B – The answer to 5 x 6 is wrong in the code.
- C – The code blocks are in the wrong order.
- D – The wrong sprite has been used.