

# Cracking the code: Simulators in the classroom

## Video transcript for 'Cracking the code: Simulators in the classroom'

Minna Kane: Often computers show us a world, whether it's an imaginary world in a fantastic console game or the real world in a highly accurate racing simulator. So how do we create the virtual world? Well we have to create a computer program that describes how everything works.

I'm here with the pupils from the Elvesley Primary School and we're going to see if we can create a virtual car that can steer itself around a track. But first of all we need to get a track, so let's go guys.

To draw our track and to do our programming we're using Scratch, a free piece of coding software. All the commands you might need are laid out on the left hand side, you then drag commands into the middle to write your program.

On the right of the screen is the stage and this is where we're going to put our car and our track.

Great, so you've drawn your track, now what are you doing?

Child 1: Well you have to get a new sprite, so you have to go onto the file, go to home and choose one of these.

Minna Kane: Ok.

Child 1: And then if you right click, you can re-size it.

Minna Kane: This sprite represents the car. Once we've loaded our sprite, we're going to need a way of steering it round our track. We can tell where the track is because it's a different colour to the background. Before we write our code we're painting different colours on the left and right front corners of the car. We're going to use these colours in our programme to try and stay on the track.

We're writing a simple program using 'IF' conditions and the colours on the front of the car. **IF** the colour on the left side of the car touches the background colour then the program knows that the car is heading off the track onto the background – it's driving too far left. So we need to turn the car to steer it back onto the track.

If the colour on the right of the car touches the background, then we need to turn the other way, so we stay on the track.

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Minna Kane: Now that looks awesome, but what is the code, what are you doing?

Child 2: Well what you have to do is put these colours in, this is the background here.

Minna Kane: Oh, ok.

Child 2: And then this is my left side of the car, so if it goes close to here, it should turn 15 degrees that way.

Minna Kane: Ok, so the lights are acting like sensors really which help navigate the car round.

To get all the way round the track we repeat these commands over and over again. So we've placed them inside a '**FOREVER**' loop.

In this program we're using a variable to store the speed of our car. We can change how fast the car moves by changing the value of our variable.

What do we do now?

Child 2: Well we need to put speed in, and set the speed to...

Minna Kane: A value.

Child 2: Ten.

Minna Kane: Ten, ok.

Child 2: And then when I press the flag it should go round.

Minna Kane: Oh yeah.

Whoops – looks like this car is having trouble staying on the track. How come it's going off?

Child 2: Not sure.

Minna Kane: Shall we try it a slower speed so we've just got a bit more time to see it.

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Child 2: So let's try five.

Minna Kane: Yeah. Cool. Oh it can handle it a bit better now.

Child 2: Yeah.

Minna Kane: Ok, that's great.

Well that's crazy. What's happened to your car?

Child 3: I don't know.

Minna Kane: You don't know. Why don't you try changing it to a lower speed, then it may work.

Ok guys, your time's up. I want to know who has the best speed. So what did you get?

Child 4: Seven.

Minna Kane: Seven. Anyone got higher than seven?

Child 5: Me.

Minna Kane: You. What did you get then?

Child 5: I got 12.

Minna Kane: 12. Let's see. Oh wow, yeah you did. That's fantastic. But you do have a rather simple oval track. Do you reckon if it was a bit complicated, with more twists and turns it would still be able to go 12?

Child 5: Yeah.

Minna Kane: Yeah? I think you should give it a go.

Everyone's computer model was pretty similar. But by changing a parameter such as the speed, we're able to change how things work.

I wonder if there are any other changes we could make to our program to make the car behave differently. Why doesn't our program work at high speeds? And is there a way of making it work better? Perhaps you could try experimenting yourself.