



PROGRESS OUTCOME 2

Superhero robot

Annotation

Through developing and trialling their robot, Caitlin and Mereana show that they can:

- draw on their knowledge of how components function and work together to transform inputs into outputs
- connect input sensors (colour and ultrasonic) to their processing device (NXT brick)
- control the output devices (motors) by writing and downloading programs
- test that their system works
- identify malfunctions and failures within the system and fix errors.

Background

The students have been learning about robotics and the input-process-output cycle within a basic digital system.

Task

The students are given a brief by their teacher. It includes working collaboratively in small groups to develop, build, and test a Superhero Robot for a search and rescue competition. They are instructed to take photos at key stages of the development process and to upload these to the class blog. After finalising their building and testing, each group must create a poster that communicates the attributes (superpowers) of their robot.

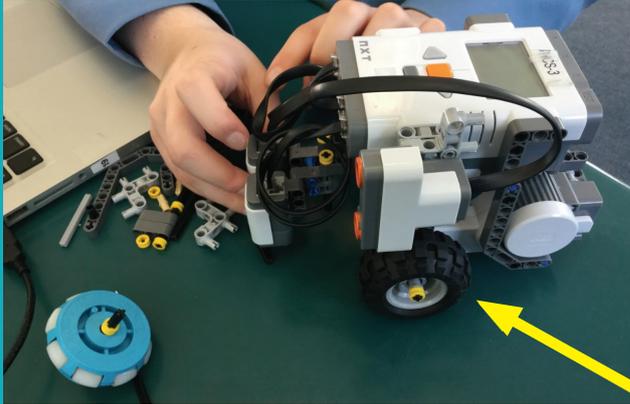
In the class blog and the poster, the group should identify and describe:

- the inputs into the system and why and how they used them
- the processing part of the system and its role in the system
- the outputs of the system and why and how they used them
- how they controlled the system, including examples of how they controlled what the robot did using inputs
- the types of testing they used to make sure the robot system worked
- the malfunctions and failures that occurred and what they had to refine to overcome them.

Student response

Caitlin and Mereana use LEGO MINDSTORMS® to develop, build and test a Superhero Robot for the search and rescue competition. The following images and notes are taken from their contribution to the class blog.

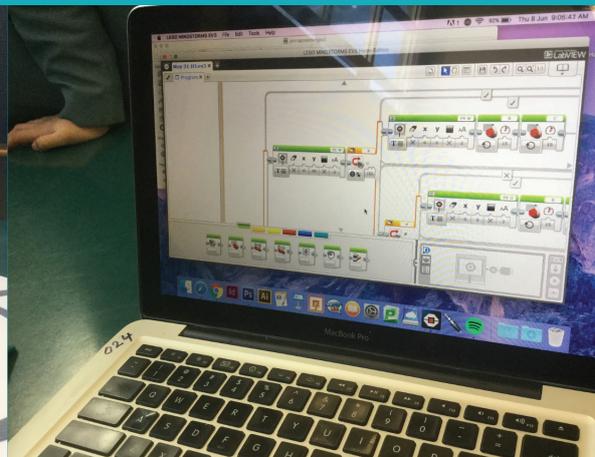
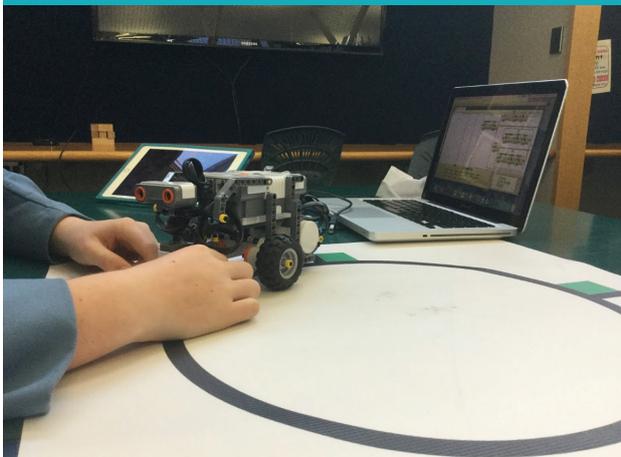
Building our robot - connecting colour and ultrasonic input sensors



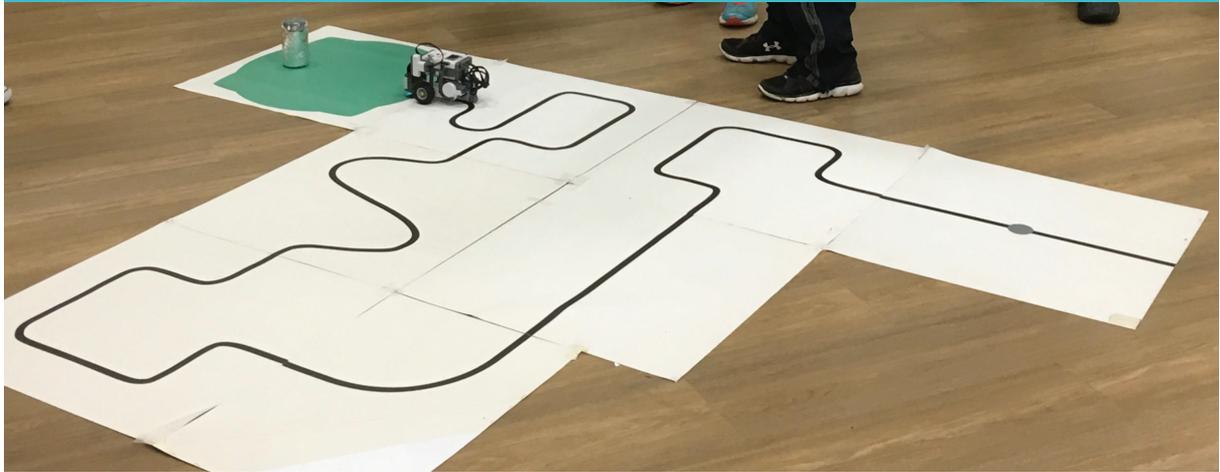
We moved the ultrasonic sensor to the side because the robot was too long to turn well and was 5 cm over the length allowed in the rules.

Programming and testing our robot to follow lines

The robot reads the colour from the input sensors and sends output to the motors. We changed the power levels in our program to control the motors.



Back on track - success at RoboCup :-)



Caitlin and Mereana create a poster about their Superhero Robot.

Superhero Robot

Inputs:

Inputs that we used are colour sensor to follow the black line, ultrasonic sensor to make it get the can out of the green by telling it that when it is less than 30 cm go really fast to rescue it out of the green, the buttons on the brick to tell it when to play the program and when to stop the program. We told the motors what to do by putting numbers into the program and telling it what speed to go and how fast.

Process:

Our process was the program telling the output what to do from what we told it from the inputs to do. It will follow the input and come out in the output.

Output:

One of the outputs is when it follows the black line and tells it to switch when it sees black. From the process the output will always do what it is told but will change when the process has told it to switch or make a decision. When the process has told the ultrasonic sensor to charge at the can the output will do that but it will search for the can first.

Testing:

The main things that we tested were what colour it was reading so it can move forward carefully and also how close the can was from the robot.

Transform:



Our process was the program telling the output what to do from what we told it from the inputs to do. It will follow the input and come out in the output.

Our robot... Wall-E:



Downloaded from <http://technology.tki.org.nz>

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