

# Colour Sensing Robot for use in Warehouse Automation

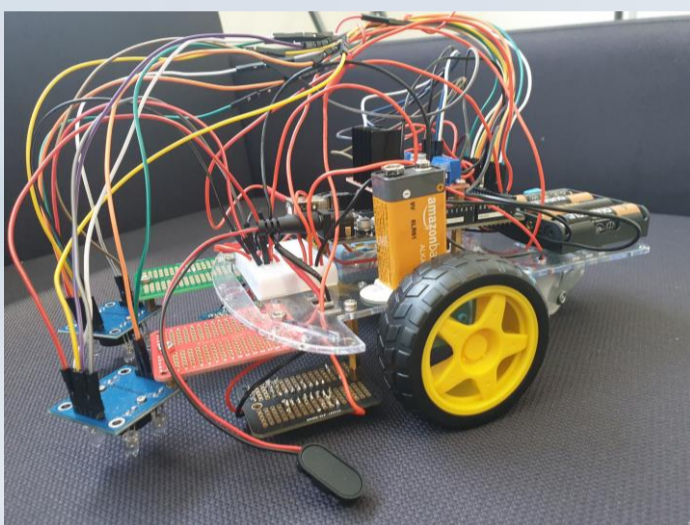
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## Why is this needed?

Need for low cost automation warehouse automation is becoming imperative for smaller businesses which lack the necessary funds to implement the automation solutions researched in the project. This project aimed to create a low cost variant of this technology.

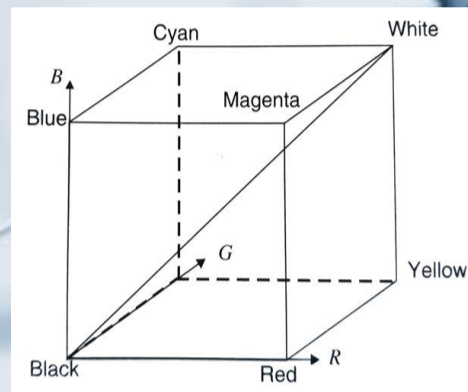
## How was this achieved?

To realise this prototype, a great amount of research was done into different methods of line following and colour sensing and evaluated on their applicability to the problem at hand, the most suited solutions were then adapted and used to produce a functioning prototype that can be seen in the picture below.



## How does the robot see colour?

The colour sensors are calibrated to see colour using the RGB model using values of red, green and blue within any colour, in this model white has the highest value in each colour and black the lowest. This model can be represented by a cube as seen to the right.

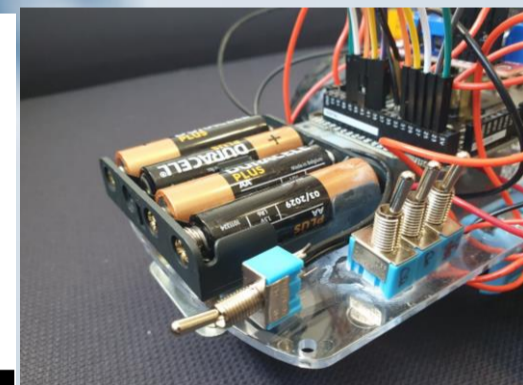
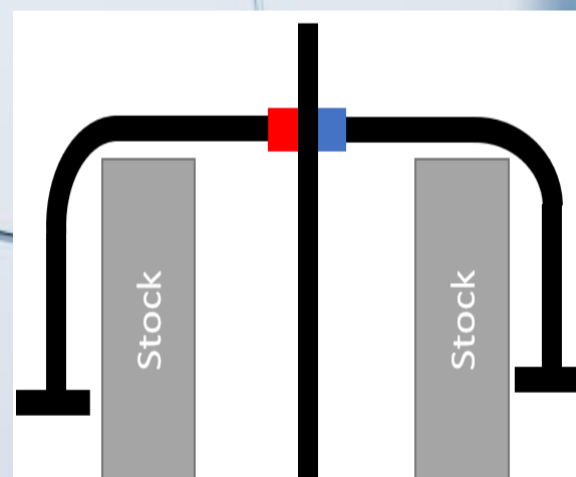


## What does it do?

The user tells the robot which colour route they want it to follow, the robot then follows the selected route. The picture below shows an example of the routes the robot can follow.

## How does it do it?

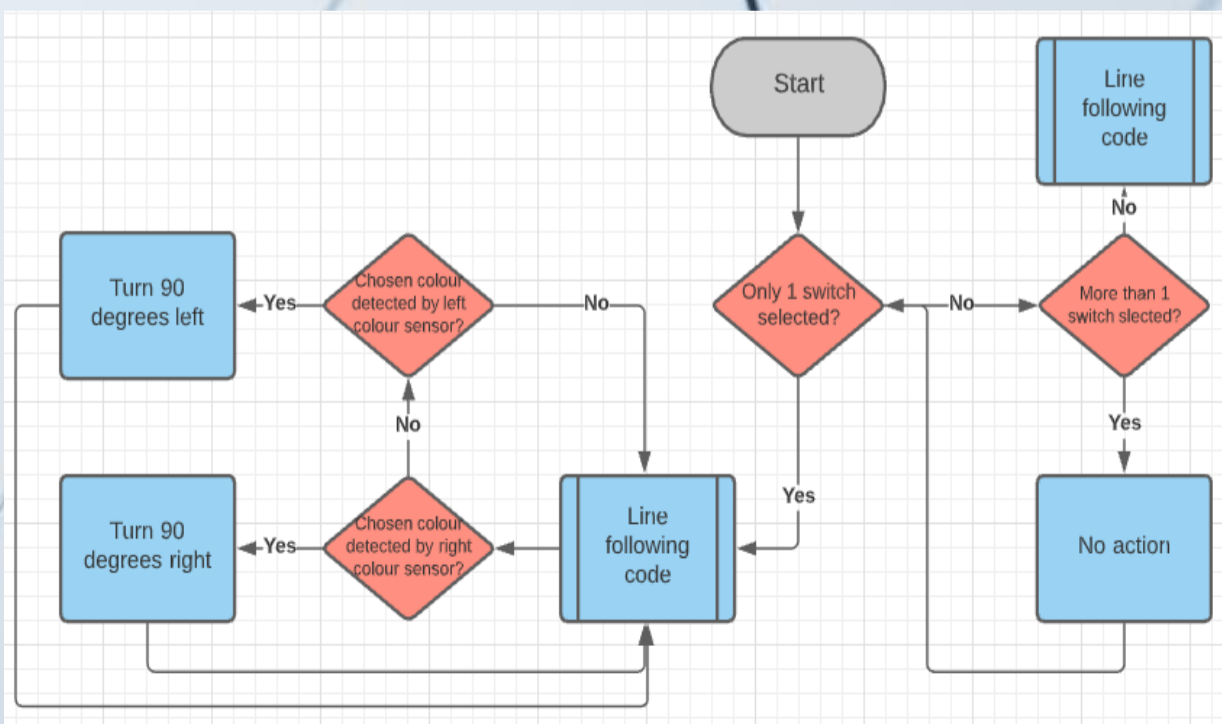
The robot is based around the use of an Arduino mega and equipped with 2 TCS3200 colour sensor modules and 2 LED/LDR based line sensors, the microcontroller is programmed to allow the robot to use the sensors to locate and navigate the chosen route, which is selected using switches.



Close up of colour selecting switches

## How does the code work?

The robot initially checks which route has been selected, then follows the black using the written line following algorithm. When the chosen colour block appears on either side of the robot, the colour sensor detects it and turns 90 degrees in the appropriate direction. The flowchart below shows the code flow.



## The line sensors

The LED/LDR based sensors were custom made on mini solderable breadboards using the LM324 comparator chip, as can be seen below.

