**Investigate, plan and design**

Home automation is when the appliances in your home can do tasks automatically and can send that information to each other all in one network. Our idea is making a smart lightbulb where the temperature can change the colour of the light. Smart light bulbs already exist, and this project took some inspiration from them. The smart light bulbs on the market have a separate remote or can connect to your phone via Bluetooth so you can change the colour. There are no products in the market that represents our idea. Our first idea was to have a separate Microbit act as a remote for the smart lightbulb, we then realized that it broke one of the rules for an automatic, imbedded system. Our other idea was to use a singular LED that changes colours based on temperature, we decided against this because we didn’t have an LED that could change to multiple colours. Our final idea is to use 5 single colour LEDS to represent one lightbulb that changes colour based on the temperature.

**Implementation and testing**

After our research, I started coding using the Microbit blocks. In a ‘Forever’ block, I put an ‘If’ block that checks temperature ranges with five conditions: 5ºC and below, 6-12ºC, 13-19 ºC, 20 -26 ºC and 27 ºC and above, each range triggers a different coloured LED, green, yellow, orange, red and flashing red respectively. After finishing the code, my partner wired up the Microbit with some help being needed, I realized that the wrong LED was lighting up. To find out the exact problem, I replaced the Microbit’s ‘temperature’ variable and made my own ‘temp’ variable to set it at ‘different temperatures’ to see what LEDs were lighting up at the temperatures given. I realized that I put the number first in the ‘comparison’ element instead of the variable, after that fix, everything was working.

**Evaluation**

After fixing the problems we faced, the imbedded system works as intended. The imbedded system will turn on a singular LED dependant on what temperature it detects, and if that temperature changes, the LED that was on will turn off and another will turn on. The code was the easiest part of the project despite having the logic error which was fixed later on. Figuring out on how to connect 5 LEDS to one ‘GND’ pin was the hardest problem to solve. A smart light bulb that changes colour based on temperature was a simple imbedded system that I don’t think there can be much more to add on or do better except for adding more different coloured LEDS to detect more precise ranges of temperature.

A screenshot of a computer

Description automatically generated