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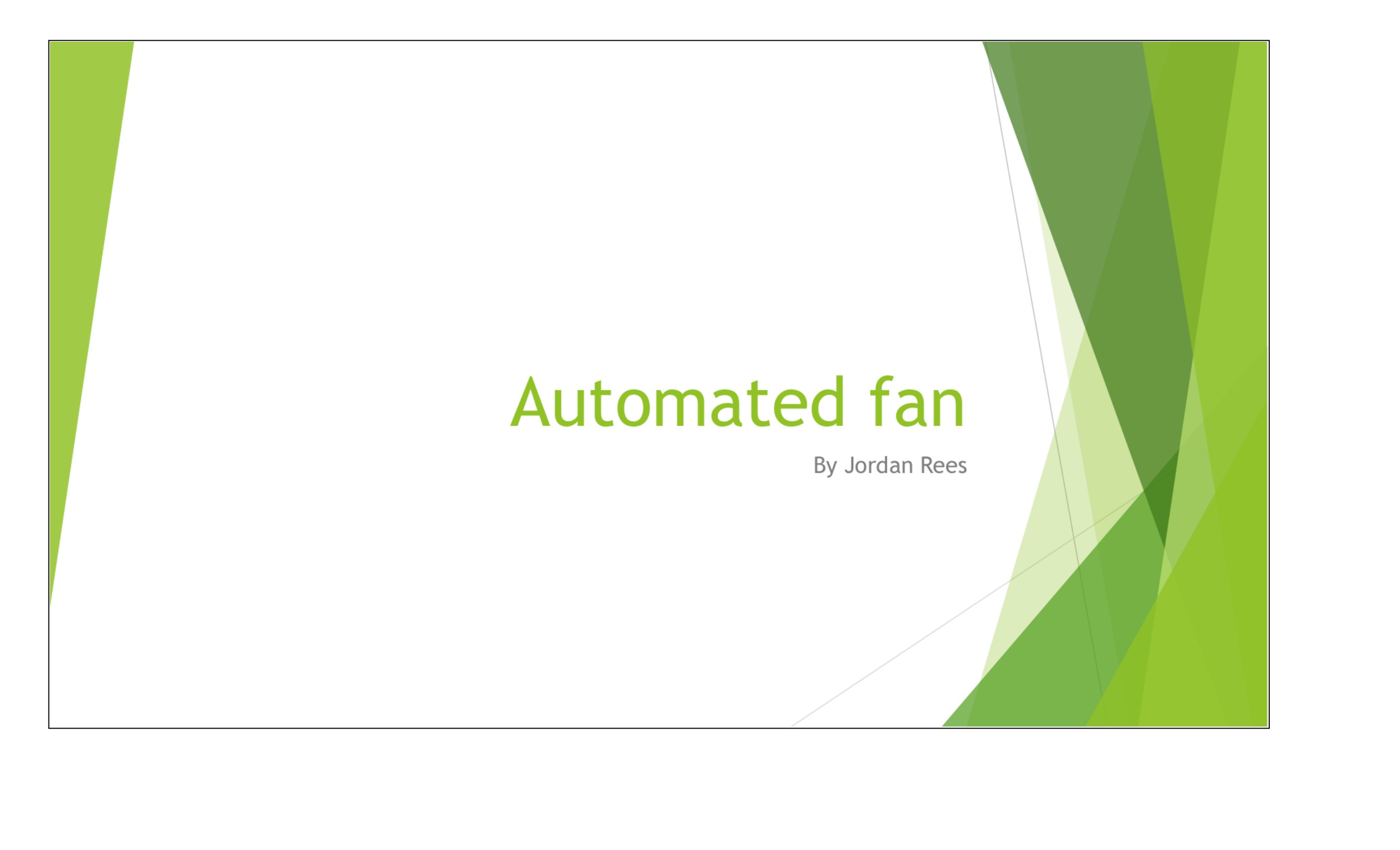
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1909752

by Jordan Rees

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CHARACTER COUNT	2065

The background of the slide is white with abstract green geometric shapes on the left and right sides. These shapes are composed of various shades of green, from light to dark, creating a layered, polygonal effect. The shapes on the left are more vertical, while the ones on the right are more diagonal and complex.

Automated fan

By Jordan Rees

Project background

- ▶ Fans are used in industry to keep room temperatures cool, for example in a meat industry to keep the meat at a low temperature to prevent the meat from going off.
- ▶ In industry if these are kept on constantly a lot of energy will be used which will cost the company money.
- ▶ An automated fan will reduce the amount of energy used

Problem

- ▶ Cooling fans waste energy,
- ▶ they run at speeds which are not needed
- ▶ they run when not needed at all.

Solution

- ▶ The objective of the automated fan is to save energy and reduce the running costs.
- ▶ It aims to do this by changing speeds depending on the temperature.

Functional design

- ▶ The automated fan will change speed depending on the temperature.
- ▶ The fan can be adjusted to reach set temperatures.
- ▶ When the fan nears the temperature it will slow down or stop to ensure the room stays at the same temperature.

Project risks

- ▶ When building the project there will be a risk of electrocution due to electrical wiring. This will be minimized by using insulated tools and also making sure that wiring is done with no live wires.
- ▶ The blade of the fan could cut your fingers since it will have a sharp edge and will have a high rotation speed.
- ▶ There is a risk of the project going wrong for example the programme not working correctly. Therefore there is an alternate method that can be used to build the project.

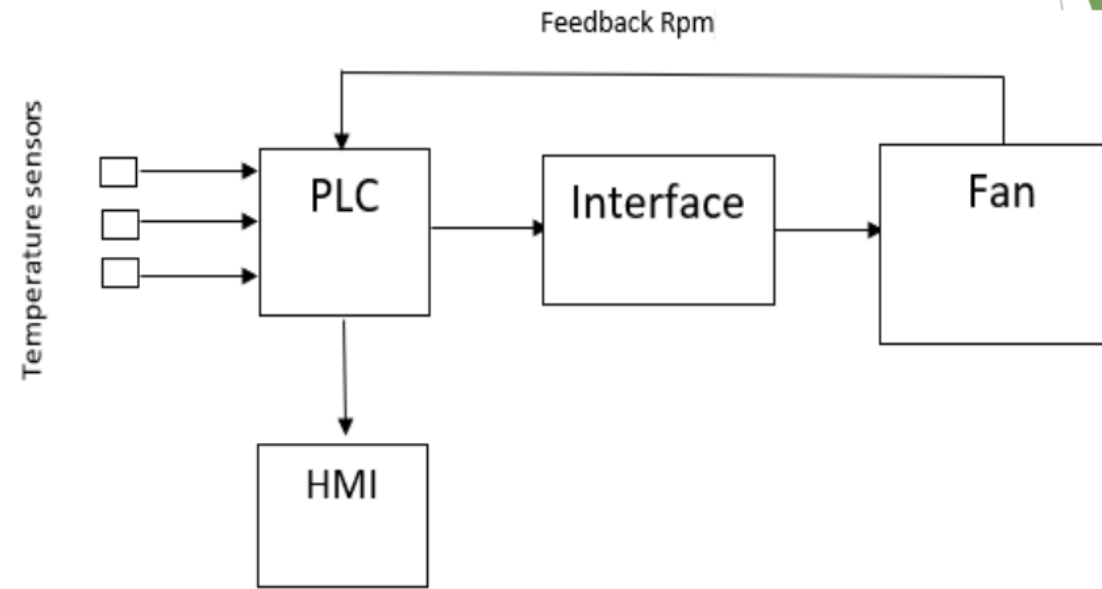
Test plan

Below is the test plan used for the fan to ensure it is working correctly

Expected	Actual	Did it meet the specification
Does the fan change speed depending on temperature		
Are the temperature readings accurate		
Does the manual control work.		

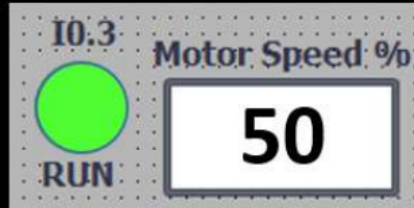
Solution 1 PLC

- ▶ Temperature sensors detect temperature
- ▶ Fan speed controlled automatically
- ▶ PWM controls speed

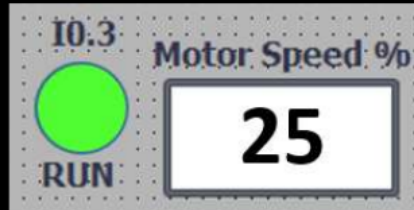


PWM speed control

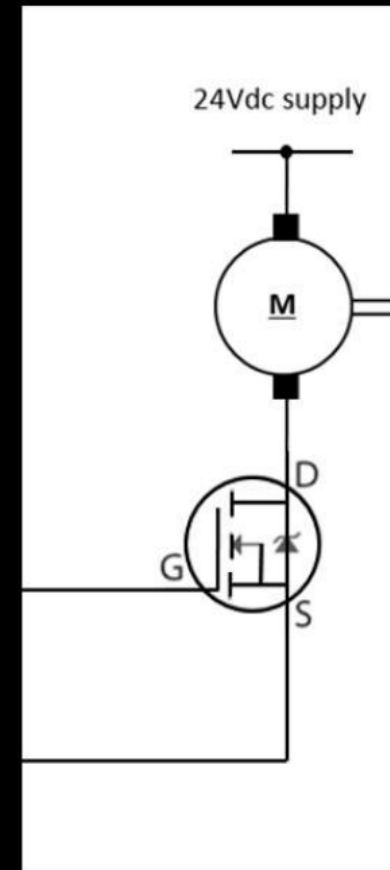
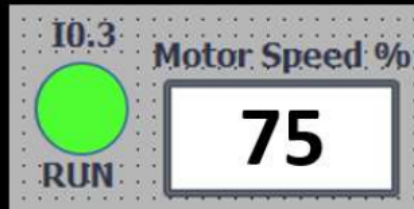
50% duty cycle
 $\frac{1}{2}$ voltage =
 $\frac{1}{2}$ speed



25% duty cycle
 $\frac{1}{4}$ voltage =
 $\frac{1}{4}$ speed

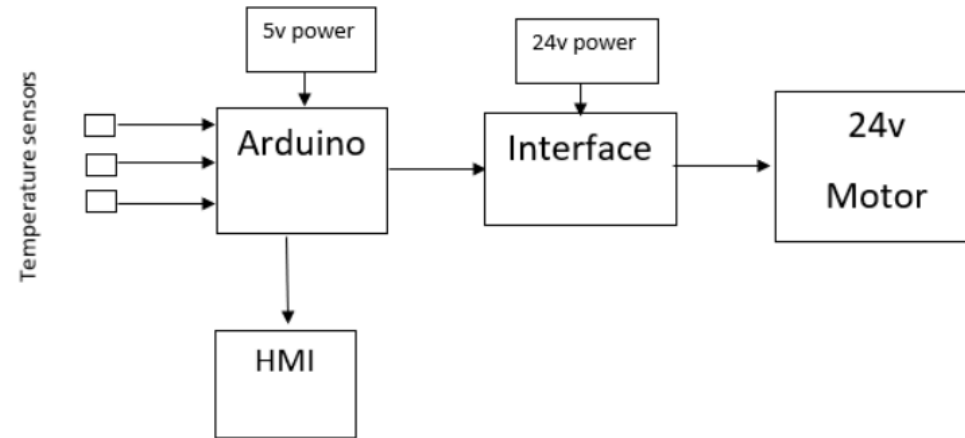


75% duty cycle
 $\frac{3}{4}$ voltage =
 $\frac{3}{4}$ speed



Solution 2 Arduino

- ▶ Voltage regulator to vary the speed of the fan.
- ▶ By using a voltage regulator the speed of the fan will be varied and by using sensors to detect temperature it will be able to change the speed according to the temperature of the room.

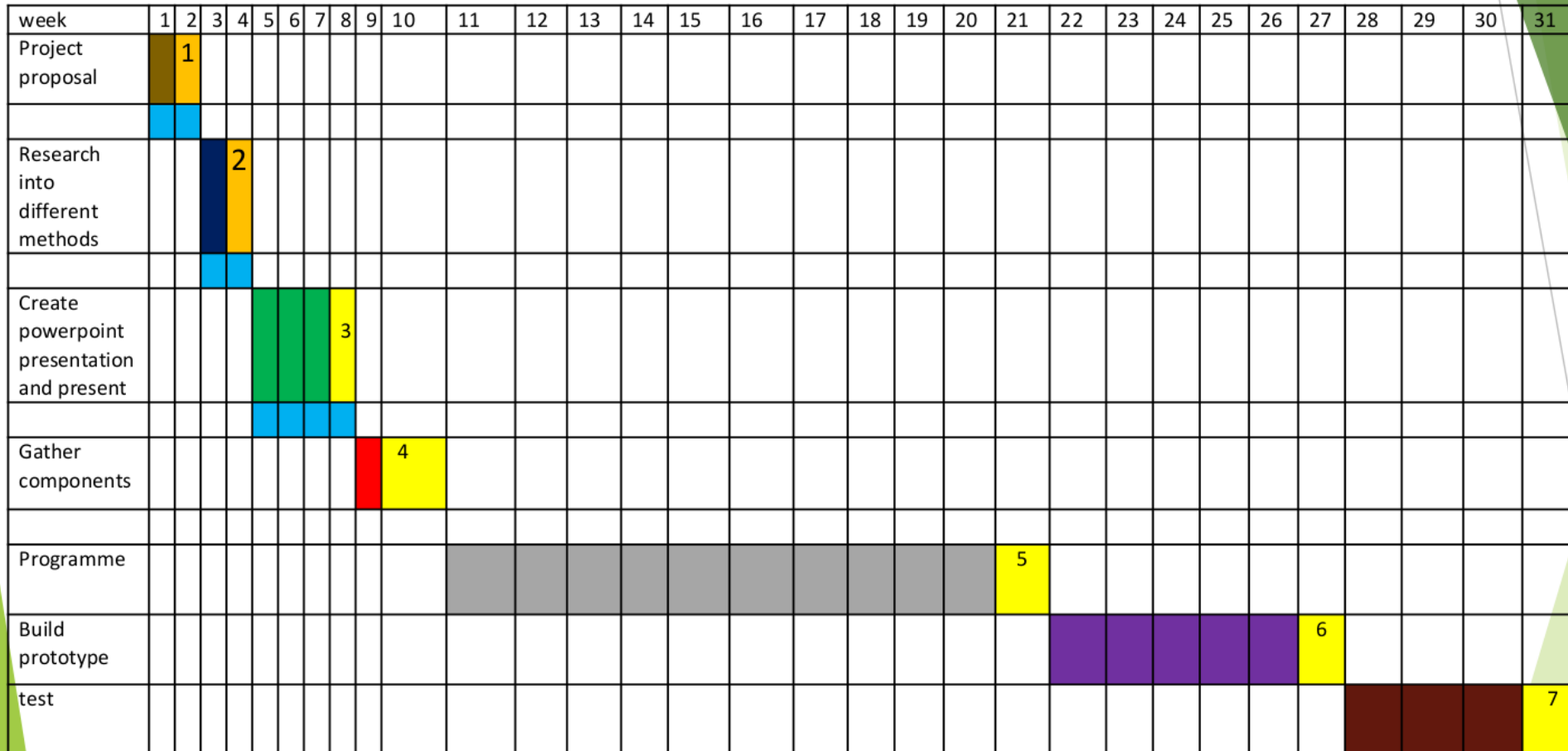


Critical choice

- The solution chosen is using a PLC. This is because of its ease of use.

	PLC	Arduino
Budget	£500	£250
Screen	HMI screen	Interface
Software	TIA portal	Arduino IDE
Speed control	Signal from the temperature sensors	Voltage regulator

Gantt chart



FINAL GRADE

GENERAL COMMENTS

54/100

Instructor

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JORDAN REES

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RESEARCH-INFORMED LITERATURE

 Project background was reasonably well explained but did lack details. 5/10 Evidence of research was limited. 5/10

10/20

KNOWLEDGE AND UNDERSTANDING

 The project purpose is identified and explained. More detail should have been included. 2.5/5 Project constraints and risks were mentioned with codes of practice and standards explained with questioning. 2.5/5 Environmental and sustainability were covered adequately with questioning. 3/5 Functional design was explained with a good block diagram. 3/5 Response to questions was adequate. 5/10

16/30

ANALYSIS

 Problem was defined and a reasonable argument was given. 3/5 Functional design specification should have included more detail resulting from research. 5.5/10 No real argument was given for the

11/20

choice of final solution. 2.5/5

PRACTICAL APPLICATION AND DEP.

 Design specification did include some detail and there was a good block diagram. 3.5/5 Argument for critical choice of final solution was weak and should have been better explained. 5/10 The Gantt chart did contain a work breakdown but the project plan needs to be amended to represent the true timeline. 3.5/5

12/20

SKILLS FOR PROFESSIONAL PRAC.

 The slides could have included more identifiable data for the solutions and specification. 2.5/5 Delivery needed more clear details. 2.5/5

5/10