Crafting the Temperature Probe's Arduino Code:
What came to my mind to check for when troubleshooting:

- Could be the resistor was connected in the wrong orientation
- Could be the wires on breadboard were not fully plugged in or connected
- Could be wires were connected in wrong orientations
- Could be that wiring is loose (only discovered this issue when I inspected the temperature probe after I realised that my code suddenly failed to display values onto the serial monitor despite working well previously. This had made me think that I overheated the temperature probe however in disbelief as I had watched many other videos attempt heating and I scurried onto the datasheet of the model name DS18B20 to check its information

https://www.analog.com/media/en/technical-documentation/data-sheets/ds18b20.pdf

Resistors have no polarity.
Remember to check that negatives are connected to ground and positives are connected to power.

Hyperlinks that I used for this code:
https://www.youtube.com/watch?v=qxEclOy6jpI
https://www.youtube.com/watch?v=IIpgGru2Wv0
https://www.youtube.com/watch?v=Y1__vmkr8-g

I learned that as product designers, we have to consider the system working together as a whole. To look at a design from a functionality perspective.
Where individual components are well thought of to work to perform the task.
As a consumer, I would want a product to simplify my life hence I use it rather than doing the process by myself.

I learned that programming is basically directing instructions to a technician that does exactly what you ask them and it has to be specific instructions.
I have come to realise that coding is telling a very efficient machine to perform tasks and it likes to complain when your code does not make sense in the language that it understands as it runs through the code string by string like a checklist at non-human speeds.

I think a few essential tools for me were the arduino.cc community website that has users sharing what each code string means as well as the resources provided by lecturers and blogs shared by seniors on bright space helped me understand much more about programming as well as being able to implement various coding language strings into my product.

Looking back, I should not have used a lighter for the code testing as it was dangerous and charred the temperature sensor. I could have instead used cold water or hot water to test it. Furthermore, the temperature sensor DS18B20 is designed for temperatures -55 to 125 only. While lighters can produce heat up to 1000s of degrees!

Overall, the series of chemical product design modules have taught me the basics of prototyping and how much effort it takes to come up with a working model product.
Spoilers, it is not easy and rarely can it be done alone. I have learned to be comfortable with seeking help from my team and communicating with them when I have troubles.

Through the modelling of the code, I felt that I almost had it and worked it out when I made a breakthrough, and could showcase myself as a reliable member of my team. However, the code that I worked on had troubles.

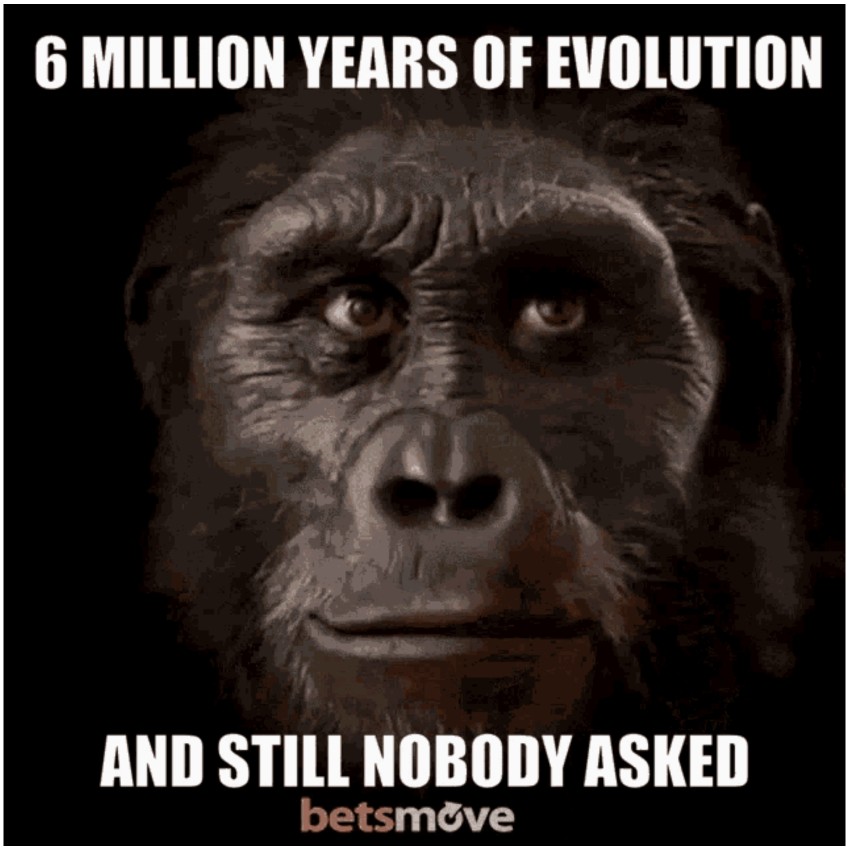
Hence, I felt so let down and placed all the blame on myself that my team could not complete our work by our decided deadline. I then passed on the electronics to my teammate Ruba to help me with troubleshooting the rest of the code. With ample time at home, Ruba managed to fix the code and get the electronic program function the way we wanted it to.

From this experience, I learned that I should put down my ego in team projects and communicate together with my team so that everyone understands their roles and responsibilities well and execute them. At times, mistakes are made and everyone will be unhappy. However, as students, we learn and hope to not make similar mistakes ongoingly.

Afterall, a team works together to make the dream goal work out! Without each working member, the system designed will fall apart. Although some members of the team may be stronger, only when we come together in unison and combine our wide range of skills acquired, can we produce a beautiful artwork.

Here is the datasheet for the DS18B20 temperature sensor that no one asked for…
https://www.analog.com/media/en/technical-documentation/data-sheets/ds18b20.pdf

I also acted as a consultant for other teams for their Laser Cutting files after learning how to prepare the files myself.
The actual laser cutting was slightly different compared to what we were taught in our certification course. However, it was manageable.



From this project development module,
I have learned how to troubleshoot an arduino uno maker.
I have learned how to differentiate and will know whether the problem is with the circuit or the code.
In retrospect, circuit making is rather simple and we just need to ensure that all polarities and connections are accounted for and DO NOT try connecting the Ground wires to the voltage ports!
I did this accidentally and my circuit board produced heat!
My classmate did this accidentally and his infrared sensor exploded/overheated.
Just ensure:
Signal/Data wires are connected to Signal/Data ports
-/Ground wires are connected to Ground ports
+/VCC wires are connected to 5V/3.5V ports

` ``

Main problem when coding:
I couldnt get my temperature “if, else” code to work as I didnt know what was the variable integer to use to define my temperature. After browsing through multiple forums and websites

as well as tutorial videos, I finally narrowed down my problem and got my basic void loop code to work.

The temperature sensor will be employed to first read and report temperature readings to the serial monitor.

This is the hyperlink that I used for the function:
https://core-electronics.com.au/projects/arduino-cooking-alarm-with-ds18b20-sensor/

IF:
Temperature sensed is >30 degrees, the arduino informs the servo motor to begin moving from 150 degrees to 50 degrees downwards. It holds the position at 50 degrees for 3 minutes with delay. During this period, the other functions are asleep; stop working. Then after 3 minutes, the servo motor moves back up to 150 degrees.

ELSE:
It moves back up or maintains its position at 150 degrees

I learned soldering:
Compared to what I was taught in D&T in lower secondary school, this soldering was a notch harder than what I learned.

Set Solder iron temperature to 200 degrees to preheat
Wet the solder iron sponge with water and apply some solder solution

First, strip and expose the metal filament within the wires.
Next, take a new jumper wire then expose one side of its ending as well.
Then attach both wire ends together like attaching 2 ropes together but make the connection tight.
Afterwards, apply the soldering glue ‘Flux” onto the exposed metal filaments like painting it.
Application of flux is used to allow the soldering parts to stick together much better like butter.
Without flux, the soldering effect will not be of much use.
Now, turn on the solder iron to a 290 degrees
Ensure that the solder iron’s head is shiny with solder and not charred black.
If it is charred black, using solder, we melt some onto the head slowly to cover it in solder.
Then, we apply solder using the soldering iron slowly across the exposed wiring.

Then, when done, we need to use shrink tubes to cover the soldered parts from the elements.
To attach it, we need to use a heated air gun; similar to a hairdryer.
Set the temperature of air gun to 200 to preheat
Then turn on its air pressure to a low but desirable level setting.
Apply the heat over the shrink tube until it shrinks to the shape of the wires.

We are done!
This information will be valuable if ever I need to solder parts of wiring together in my FYP.

Steps for connecting the arduino components

1. Attach Arduino uno board to the computer/power bank (power supply)
2. Upload the code

I guess as chemical engineers we are always faced with challenges and feel so frustrated and at our lowest when we have problems and we just try our best but fail over and over again. It gets so painful for me.

I looked at MAD students and saw that the process is so easy and they are just masters of film. However, as chemical engineers, we are tasked to just learn so much and be jack of all trades. As the team leader, I felt so discouraged and stressed out when my team's progress did not meet expectations.