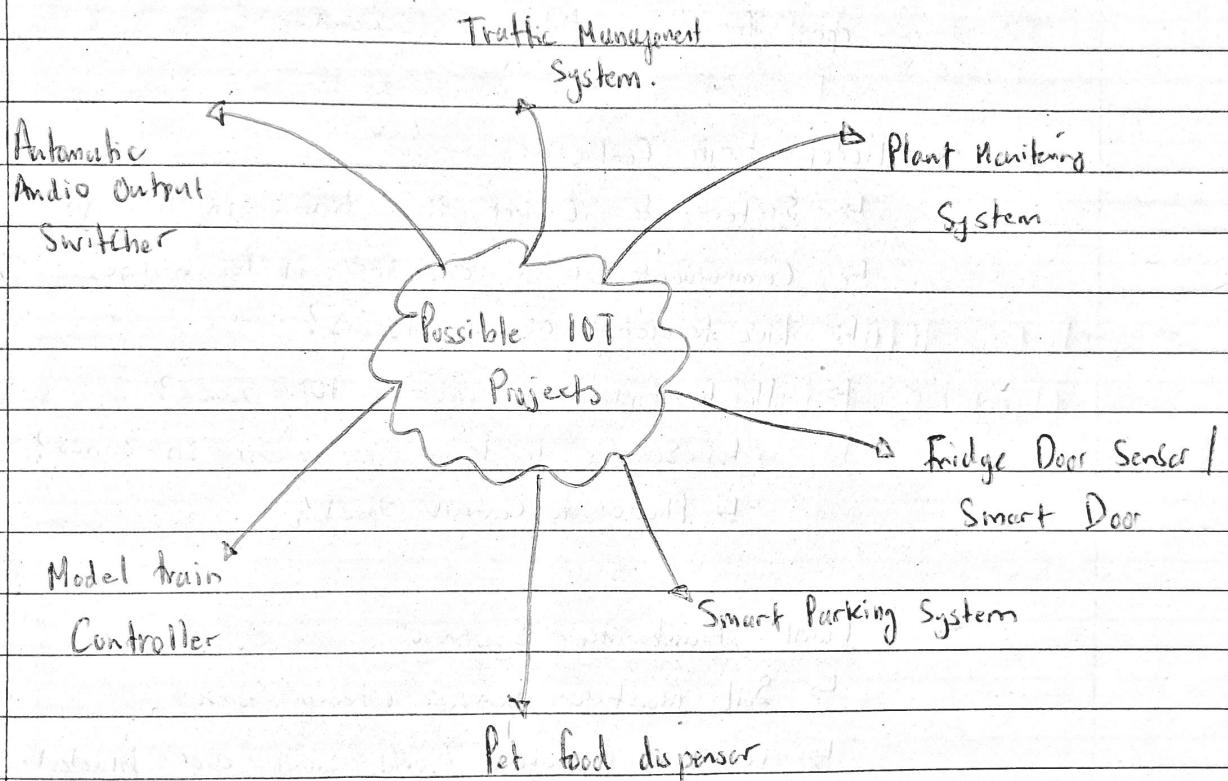


# CYRUS BHARRY IOT LOGBOOK

Date: 27/10

Objectives: Initial Concept ideas completed with ~~an~~ and a final chosen idea to follow through with.



## → Automated Audio Output Switcher

- ↳ Have Audio Switch Seamlessly between bluetooth speakers placed in bedroom and kitchen.
- ↳ IR Sensors or GPS Data to track movement within the flat
- ↳ Music routed to Arduino from phone then to speakers?
- ↳ Directional movement needs to be tracked
- ↳ Device Specific?

### → Fridge Door Sensor

↳ Motion Sensors to see if Fridge door is closed after its opened

↳ Placement issues in the flat?

↳ Power source?

↳ Threshold to see if its open or not

↳ Relay message over Bluetooth or WiFi if door left open for more than x seconds

### → Model train Controller

↳ System to Control the trains in the garden

↳ Communicate with decoders in locomotives

↳ live tracking of the trains?

↳ How to make this into a IoT Device?

↳ Sensors to track movement in zones?

↳ Phone to control Speed?

### → Plant Monitoring System

↳ Soil moisture sensor / temp Sensor

↳ record information and send over bluetooth or WiFi

↳ Send notifications at certain levels

↳ Possible graph information

### Conclusion :

Automated Audio Output Switcher Selected as the project

→ Next steps : Poster

Date: 29/10

Objectives: Poster feedback + Shed discussion

Meeting with Dan:

- ↳ Talk to the Shed about possible implementation
- ↳ Thinks its feasible however) Concerned about Complexity - A LOT OF WORK!
- ↳ Placement of devices will need to be calculated to ensure Seamless Connectivity
- ↳ Device tracking rather than person tracking as multiple people could be moving around
- ↳ GPS data unreliable inside building
- ↳ Possibly consider another project? ↪

Meeting with Kieran @ the Shed:

- ↳ Struggles to see how this could be an IoT device
- ↳ GPS data would be inaccurate indoors
- ↳ Struggle to see how this project could fulfil all the requirements and achieve a high mark
- ↳ "functionality could be given as an app, not an IoT"
- ↳ Suggested heavily to review the markscheme to ensure i can get marks from it
- ↳ possibly consider switching projects if I can't find a way to maximise marks

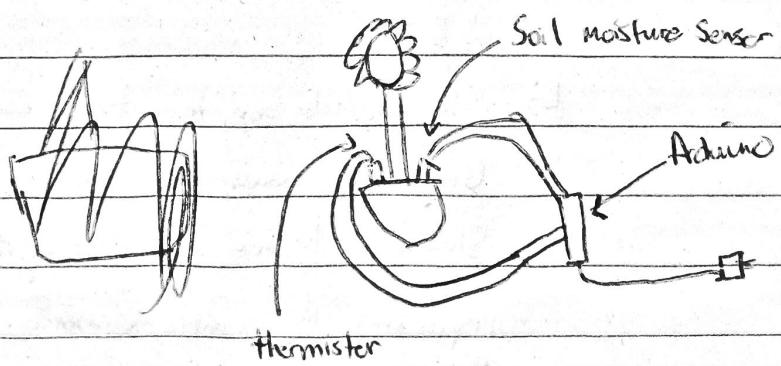
## Conclusion:

- ↳ After reviewing the markscheme and speaking to a few people - the project has been abandoned and switched for a more feasible project
- ↳ Will proceed with the plant monitoring system as that is the simplest project to complete in time + housemates recently bought plants so that has lined up.

Date: 16/11

Objectives: Install Arduino, Connect Soil moisture Sensor and film video.

Diagram of System:



- ↳ moisture from sensor taken as an average of 10.

- ↳ no errors so far.

↳ Video recorded and submitted.

Date: 11/12/21

Objectives: Connect DHT22 sensor for temperature and humidity.

→ Wiring for DHT22

↳ data to pin0

↳ Pin1 (5V), Pin2(data), Pin3(NC), Pin4(GND)

→ Device did not perform as expected when the sensor was plugged in.

↳ after research I found the library for DHT devices "DHT Sensor library" had multiple issues with esp32s

↳ Alternate module "DHT Sensor library for espxx"  
was used which sorted the issue of nan being returned when either the temperature or humidity is recorded.

↳ I was unable to record both temperature and humidity as the esp read nan when both recorded - so ultimately I dropped the humidity recording and will stick to moisture + temperature.

Conclusion + next steps:

↳ temperature and basic moisture detected and recorded successfully.

↳ next steps will be to calculate the threshold for moisture alerts

↳ Sort out alerts for messages

↳ via bluetooth or wifi

Date: 12/12/21

Objectives: Decide on when to send notification, find threshold for dry soil.

### Methods to Send Noti

Wifi

Bluetooth

↳ Send to devices connected to

Wifi

→ Bluetooth notification

↳ Email Client?

↳ Can only send to connected

↳ Could send to

device

multiple people

→ BLE?

↳

→ Decided upon using email over wifi to send notifications as anyone can receive the email. Makes most sense in the use case that I have.

→ Can use Service like thingspeak or  
Setup SMTP Server on arduino

→ Steps to do:

- find minimum threshold for dry soil
- Create new Sender email account
- Install email Client library
- Gather information
- Send email.

→ Device won't connect to network at home due to  
further authentication errors. As a result Phone's hotspot  
will be used.

→ Only errors reported during setup of the wifi was  
incorrect spelling on some variables and incorrect  
Arduino libraries imported.

→ Test email to my account successful.

→ Dry Soil moisture: 3400 - 3990 roughly

→ Wet Soil moisture: 1330 - 1450

↳ wetter the soil, higher the humidity, lower the value

↳ drier the soil, lower the humidity: higher the value

↳ boolean value used to see if an email is  
already sent

↳ email sent out when moisture is greater than  
3400.

↳ Testing with 2 plants. One wet one dry.

↳ Wet Soil

↳ no email sent → Success.

↳ Dry Soil

↳ NO email sent.

↳ threshold value too high

↳ Change to 3000.

↳ Dry Soil attempt 2

↳ email Sent only once

↳ no values were shown

↳ Dry Soil attempt 3

↳ Email Sent

↳ moisture value is showing 0

↳ temperature is normal.

↳ Dry Soil attempt 4

↳ Concentration error

↳ retry using sprintf

↳ Dry Soil attempt 5

↳ temperature reads nan

↳ Delay to allow value to be read

as Sensor is slow.

↳ Dry Soil attempt 6

↳ both values read successfully

↳ only one email sent

↳ Success!

Conclusion: Project works as intended, will trial run overnight to see deployment results.

Date: 13/12

Objectives: Reflection on project

↳ ran project overnight, received email when

Soil moisture reached threshold and didn't

receive any others.

↳ Device has to be connected to mobile hotspot

as won't connect to CRM's Askey wireless router.

↳ Device needs reboot from button after water

has been dispensed.

Evaluation of project as a whole:

→ I approached this piece of work with the idea of Simplicity in mind. I didn't want to overcomplicate it as I had many other things on my plate at the time. However the Simplicity of the project allowed it to be completed on time and made it so my non CompSci flatmates can use the system as well.

→ During development I found the box wiring of the device fairly easy, which was something I thought I was going to struggle with. In addition to this I found connecting

the arduino to wifi Simple which again I thought I would have much more trouble with.

→ What I found most difficult was getting the data from the Sensors and building a email body with variables from those readings. Frequently the sensor readings from the DHT22 would be "nan" and solutions for that was to install a different library and sensor readed values correctly. Also a lot of trouble came when building the body of the email. The DHT22 read "nan" for the first <sup>few</sup> pass of the loop but then normally after, so a workaround had to be found for that which was a counter of how many loops had happened and after X times then build the email body.

→ If I was to do the project differently, I would find an alternative to the DHT22 as that was the root of a large portion of my issues. Also I would have liked to perhaps graph data over a 24 hour period to see water consumption trends over time. I'd also like to explore the ability to dispense water automatically, automating the entire process completely. I'd also add more recipients for the emails so that every house mate gets one.

→ Throughout the project I learnt the many different ways Arduino can be used for projects. Also discovered a wide array of web apps that work with Arduino that can increase complexity and functionality. I also learnt that as a language I prefer Java and python over C/C++.

→ I'd like specific feedback on how I could have made the project more complex. Or is there anything worthwhile I could have done with the data collected other than simply relay that to a device.

→ Overall, I felt that the work was a success. I achieved what I wanted to achieve. Perhaps if I didn't leave things late and didn't have other projects for other modules I could have developed the project further into something more complex.