Engineering Practicum: Working with the Temi Robot

By Caleb Ebert

Start 02/09/2024 – End …

Contents

Information about the Temi robot (NOTES)

https://github.com/robotemi/sdk <- this is the link to the Git Hub repository

NOTES: Temi Control Centre (TCC), Temi Script (TS)

Config in Your Application <- On the home page

Currently looking at the Config in

Learning how to use the temi robot

This section will be used to explain how to use the temi robot. Hopefully, as I continue to learn more about the temi robot I can add more information as well as more detailed based on what I learn.

Turning on the temi robot and setting it up

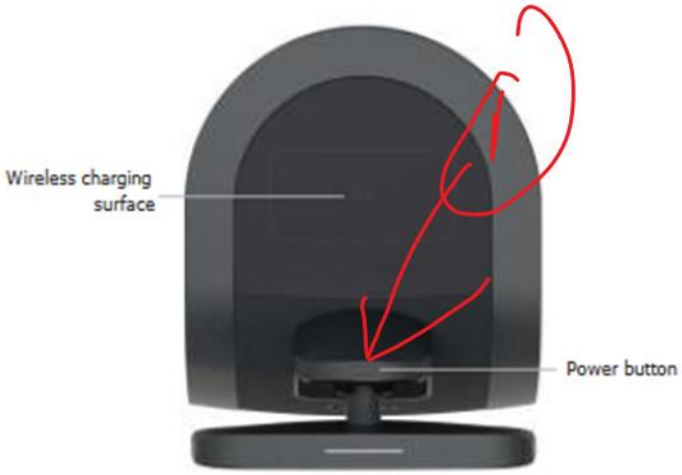


Figure 1 showing where the power button is.

The first challenge I had was figuring out how to power the temi robot. Just press the button shown in Figure 1 to turn on and off the temi robot. Once done you should be able to start controlling the temi robot from the TCC. ~~Make sure to move the temi robot off the home base otherwise it cannot start moving.~~ To get it to move just click on the map where you want it to go (including from home base).

When it is moving, make sure to be with it to ensure it is not going to run into any trouble. Taking it off the home base is extremely easy. All that needs to be done is to pick the robot up and place it just in front of the home base when you need to use it.

Learning about control and patrol in the control panel from the CONTROL page in TCC

The first thing that was looked at was **the positioning** and how it works. There are two modes that can bed used the manual and the automatic mode. When selected it allows the moving of the robot to spot selected on the map. The user is the one that specifies what locations is can go and can use way points to select new spots. To exit this mode, the temi robot needs to be told to go to the home base. Once at the home base, it will need to be moved to allow it to move again (This is slightly annoying).

The **automictic allows** the robot to be sent to predefined positions. For example, you can send the robot to go from one spot back to a defined spot. <=*Not so sure about this now.*

There is another option called patrol that I don't know a whole lot of. I have the option to start the patrol, but I am not sure how to find out more information on it. Not sure where the patrol goes to or how to alter it. It might just cycle through all the points selected on the map.

How to get TemiScript running

You will need to use this link "https://temiscript.robocore.ai/" to get access to the page. There is an application for TemiScript, but I don't think that is what is needed for this task. Once done you will need to input the ID code for the temi that you wish to connect too. To get the ID code, go to the TCC and click the customize button for the robot that you would like to use. Once done, an image of the temi robot should show up, select the settings option. From this screen, you will get a Serial Number which is the temi robot ID needed for the TemiScript. This will open up a webpage that has options on how to control the temi robot. However, currently I am having issues with trying to figure out how to get the temi robot running using this application. I noted the only thing that appeared to be working is asking temi a question. However, when I use the TCC to control the position of the temi robot, it stops working. **Solution to this is still pending.** Current plan is to read more of the GitHub to try and find more information.

****For the V2 temi robot the ID code is: 00121195613****

Learning how to use Android Studio

First thing I did was use the Androids own training courses. The first one that I did was "Android Basics with Compose."

Android Basics with Compose

```
fun main () {
   println("Hello, world!!!")
}
```

Fun <NAME>(<inputs>) {} is how to create function in Kotlin. Println(<TEXT>) will allow the printing of text on a line or new line in the terminal. Using just print will print on the current line on the terminal.

For variables they use the format of var <name>: <data type> = <value>. YOU DO NOT NEED TO DEFINE THE TYPE

```
fun main () {
   val count: Int = 2
   println("You have $count unread messages.")
}
```

The above allows you to add text from a variable into a print command. Use ${} to do more fancy stuff.

Val is used for variables that are static, use var for variables that are dynamic.

Use fun <NAME>(<NAME>: <TYPE>): <RETURN TYPE> {}. Use return to send back an output from a function.

****You cannot change a value from inside a nested function, you must return the value to the parent function to allow for changing of a function. ****

****When you try to use the Android Studio, when you make a new project make sure to not use the NYP internet. It blocks a download that is needed to get it to work. ****

Table 1 Reference code for basic phone application

```
package com.example.greetingcard

import android.os.Bundle
import androidx.activity.ComponentActivity
import androidx.activity.compose.setContent
import androidx.compose.foundation.layout.fillMaxSize
import androidx.compose.foundation.layout.padding
import androidx.compose.material3.MaterialTheme
import androidx.compose.material3.Surface
import androidx.compose.material3.Text
import androidx.compose.runtime.Composable
import androidx.compose.ui.Modifier
import androidx.compose.ui.graphics.Color
import androidx.compose.ui.tooling.preview.Preview
import androidx.compose.ui.unit.dp
import com.example.greetingcard.ui.theme.GreetingCardTheme

class MainActivity : ComponentActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContent {
            GreetingCardTheme {
                // A surface container using the 'background' color from the theme
                Surface(
                    modifier = Modifier.fillMaxSize(),
                    color = MaterialTheme.colorScheme.background
                ) {
                    Greeting("Android")
                }
            }
        }
    }
}

@Composable
fun Greeting(name: String, modifier: Modifier = Modifier) {
    Surface(color = Color.Cyan) {
        Text(
            text = "Hi, my name is $name!",
            modifier = modifier.padding(24.dp)
        )
    }
}

@Preview(showBackground = true)
@Composable
fun GreetingPreview() {
    GreetingCardTheme {
        Greeting("Meghan")
    }
}
```

Open AndroidManifest.xml:

Locate the AndroidManifest.xml file in your Android Studio project. It's usually located in the app/src/main directory.
Find the <application> tag:

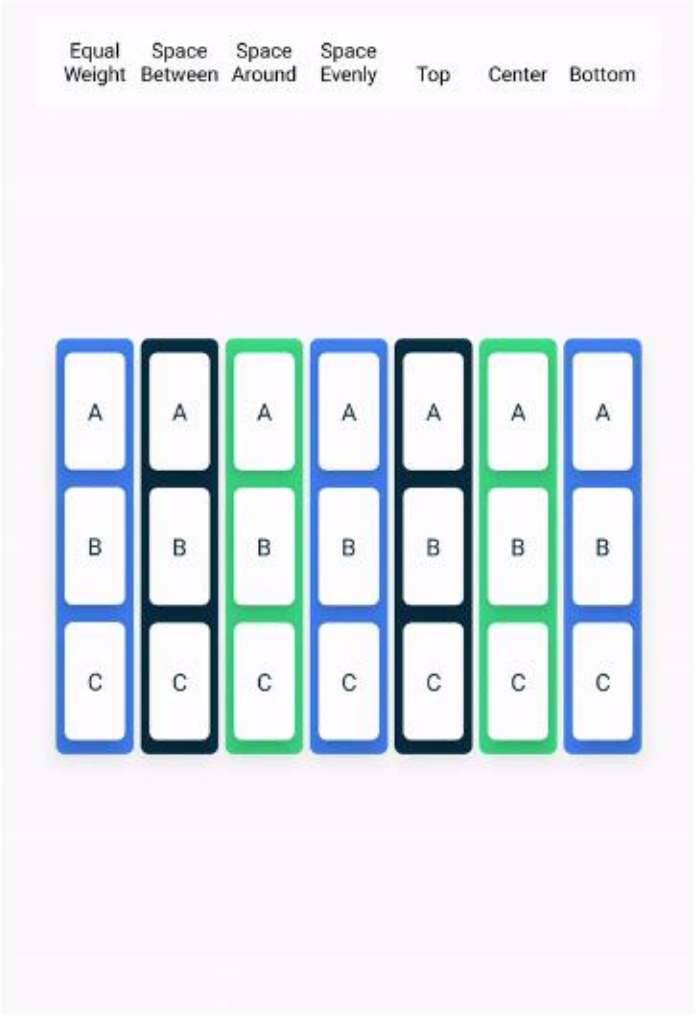
Inside the <manifest> tag, find the <application> tag. This tag contains information about your app's components and global settings.
Add the <meta-data> element:

Within the <application> tag, add the following line:
XML
<meta-data
android:name="com.robotemi.sdk.metadata.SKILL"
android:value="@string/app_name" />
Use code with caution.

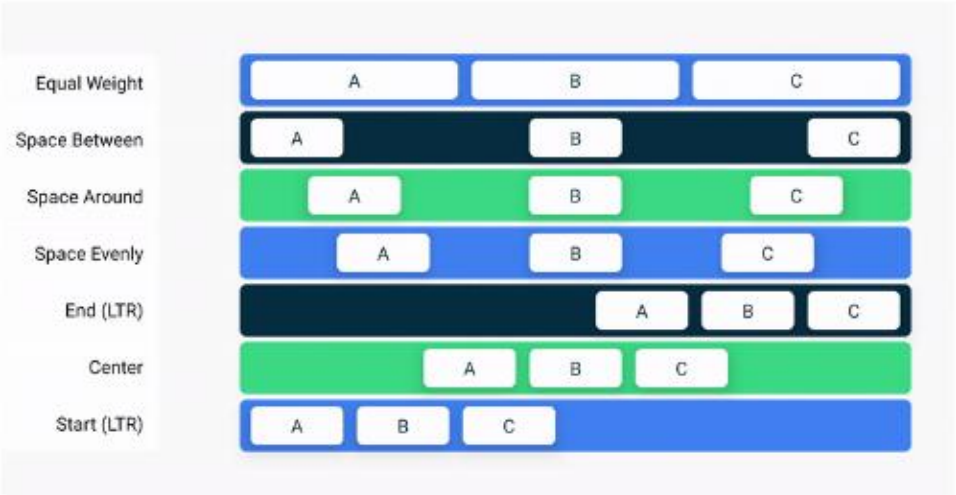
This element tells Temi OS that your app is a skill and provides the name to be displayed in the application selection.
Save and sync:

Save the AndroidManifest.xml file and sync your project with Gradle.

For example: when the size of the `Column` is larger than the sum of its children sizes, a `verticalArrangement` ca be specified to define the positioning of the children inside the `Column`. Below is an illustration of different vertica arrangements:



Similarly, when the size of the `Row` is larger than the sum of its children sizes, a `horizontalArrangement` can be specified to define the positioning of the children inside the `Row`. Below is an illustration of different horizontal arrangements:



The alignment property is used to align the child elements at the start, center, or end of layout.

OITP Report Analysis

The main focus is to look at how connection was done by using blue tooth. Looked at it and the documentation are not the best which is going to make things hard.

Notes from using Temi SDK

You call the interface in the class and then add the methods.

Currently looking for an API that will allow Temi to rotate on its current spot to indicate position. This could be done using the turnBy() function.

To add a listener, the first thing that you need to do is add in the import for the listener going to be used. Next, go to the class that the listener will be added to and add it as an Interface. In the init section of the class, add the new listener in and reference add the input as this. Essentially, do robot.add## where the ## is the listener that you would like to add. Create a data class of the listener that you would like to use for the listener that was set up. The input for this data class should match the inputs used in the GitHub. Once done, go to the class and add in a variable that will have default values for the method that can be called upon. This should be done using stateflow to allow it to emit for use elsewhere in the code.

Once done, next implement the methods.

NOTE

Detection mode will only work if dynamic mode is on.

Logbook

Week 1- 02/09/2024

Today's goal is to familiarize myself with how the temi robot works and to get it to do some basic stuff. Essentially, I need to try and get a basic understanding of how it works. The first thing I am looking at is the Temi Control Center (TCC). My goal is to figure out how it all works.

I am in the control panel of the temi-san and looking at its map. It provides an overview of the current state of the temi robot; it provides status, speed, battery, current state and who is controlling it. There is also a basic control panel which seems to allow basic control. I still need to find out how to code the temi and see if I can alter its behavior.

One of the things I want to do is to learn what function can be used in the Temi robot. We should find a repository for this information. Never mind, I just found it. The link to it is "sdk/docs/sdk/com.robotemi.sdk/-robot/index.md at master · robotemi/sdk · GitHub".

TEST 2:

One issue I am looking at is the lost robot problem. Essentially what this is, if someone picks up the robot and places it elsewhere, can the robot find it position. I know that the robot can use the LIDAR to find its position, but I am not sure if the Temi can find itself. After looking into it a bit more I learned that the temi robot is not capable of locating itself if moved. This is an issue that should be noted when working with the temi robot. I may look into trying to solve this issue, the current way is moving the temi robot back to home base. When moving the temi back to home base, make sure to move it until the robot makes a sound. This way, you know that it has reached home successfully and is charging. In cases when this happens there are two ways to learn it has happened. The first is

if the temi robot is not moving in the map even though a move command has been given. The second is that the status of the robot says it is busy.

I was also informed that Temi Script (TS) can be used to program the temi robot. However, I was told that it was very top level. There was another application I was told of that can be used but I didn't catch the name. For now, I think it would be better to look at using TS.

TEST 1: <= have image on my phone that I would like to add.

I want to look into more on how it handles obstacles and how it can get around them. I will do this by placing a chair in the middle of the room and asking the temi robot to move to a location. There are two things I will look at. First is how the temi handles a location where an obstacle is placed. The second is how it handles cases where there is an obstacle in its line of sight.

From the first test, what I found out is it had an issue when there is an obstacle in the position it wants to get too. From observing its actions, it would constantly try and adjust itself to get to the spot. The way to tell that this is occurring from the map is the robot will constantly make adjustment to it UI in the map. The second thing is the speed shown by the status panel may have a speed of 0.1/s. However, that last check didn't seem to be as reliable as the first.

From the second test, I found that temi-san can move around obstacles that are in it way. It seems to be able to move around them. However, in one of the runs I did temi-san did accidently bump into one of the chairs. It would be worth looking into reducing the speed of temi-san when it gets into a condition like that. The reason why I think the collision occurred is because I asked temi-san to move from a position that was close to the chairs and go around it.

From this test, it was it is suggested to find a way that will provide information of the status of the temi-san based on obstacles around it. The second is to try and reduce the speed it used when it runs in these types of conditions.

TEST 3:

I am in the Temiscript and am looking at My Script section. This section is just my testing and what I learned from using that function. In the section, there are layers and buttons that can be used to add programs. My current issue is I make a script and name it, but I cannot add that to a button. And if I add code to a button, I cannot then rename it. This will make organizing the scripts difficult.

When getting temi to move, there is no way to adjust its speed currently. Also, different commands occur instantly. It would be good to find a way to add delay. It would be good to see if I can make conditional statements. Table 2 contains all the action and my findings and notes of what each of them do. There are some things I am still not sure what they do.

Table 2 List of action in TemiScript and what they do

Command	What it does	Notes
Ask GPT	Allows you to ask questions to the robot	ASR option allows the developer to add a prompt if unselected, else it will use text to speech based on what a person tells temi, such as "How is the weather?".

Play audio	Allows you to select what audio to use	More audio files can be uploaded in the upload files section. These can then be accessed later in the action. Will not do anything until audio is done. **could use this to make delays easily.**
Play audio (background)	Allows you to play audio, I assume this option allows you to do other things while this is playing in the background.	Notes from what it does is correct.
End loop	Allows the designation of when a loop should be needed	
Follow a person	Does what it says	It uses the cam on the touch screen. If a person moves too fast or gets behind it temi will lose track of the person. They will need to get back into view of the cam (front) to get Temi's attention again. Has issues with corners, losses people easily.
Display GIF	Allows the showing of GIFs on Temi. Have not tested this.	Allows you to upload and select a GIF file. There is an option to stop audio (not sure if this is for the GIF or audio currently playing on the temi).
Go to location while speaking	Allows me to move the temi robot to a position while it says something. There are a couple of options that need to be explored. These are: Use Variable, select location, say text, backwards and use proximity. **add no text for just go to location.	**Use Variable:** Changes the select location to Say Text. Guess that it will allow me to tell it a location and go to it. I'm not sure how to use this, but currently it skips the action. **could be a condition based on another action** **Select Location:** A preset location to tell the robot to go to. **Say Text:** The text that the robot says when it moves to a new location. **Backwards:** This option will make the Temi robot travel backwards. **Use Proximity:** ~~My guess is how close something can get to it until it flags it. Goes from 0.1 to 4, not~~

		~~sure what the value means through.~~ This is how close the robot needs to be to the target location until it too has completed travel. The value represents in meters how far away from the target location.
Got to location while speaking (multi-language)	Same as above but allows it to say the same thing with different accents. There is also the extra option to change speech rate.	N/A
Go to location	Same as above. However, there is another option called Async. Not sure what this does.	**Async:** No clue
Display Fullscreen image	Allows you to display an image on the screen and close it. The closing needs to be done separately.	**Close Image:** Allows the closing of images.
Launch another app	Allows the launching of another application currently installed on the temi robot.	It would be good to see if this feature can be tied to anything else. Such as having it occur after a certain event or using an application to access a video (like what YouTube could be used for).
Activate Temi's microphone to revive verbal command	Allows a user to talk to temi to do something	You are able to give it command to go to different locations set on the map.
COMMAND_DESC. load_map_description	I'm not sure what this does and doesn't seem to do anything I can see.	
Start loop	Allows setting the start of a loop and how many times it should loop for.	
Move Temi	Allows the fine adjustment for Temi's position	**X (Top):** The up and down movement of the temi. 1 is forward and -1 is backward in relation to the temi. **X (bottom):** The left and right movement of temi. **Steps:** The number of movements it should take before it stops. -1 is right and 1 is left in relation to the robot.
Patrol	Not sure what patrol does, I assume it means to go through all locations that have been set for it.	**Number of times:** Number of times it should patrol before stopping. **Interval:** Time to wait between patrols, not sure how long the duration is.

Take a photo	Allows taking pictures	There are options for sending the photo taken to an email or locally. For email, the developer must add what email it should go to. Both options can be turned on. To take a picture, confirmation is needed on the temi robot.
Play sequence	I'm not sure what sequences, but Ie, I will need to figure this out. I assume they are like functions.	Name available, cannot do anything yet.
Reposition	I assume it allows to change the position of the temi robot but there are no options.	
Return to Temiscript home	This is useful to remove applications on temi once they are not needed. For example, you might open up a YouTube video on temi, use this command to return to the home page.	
Reset temi	Resets the temi, good if it runs into an issue.	
Speak	Allows text to speech while temi stationary	
Speak (multi-language)	Same as above	
Change movement speed	Allows the changing of the speed of the temi robot	Three speed settings: slow medium and fast.
Stop audio/speak command	Does as it says	
Stop Movement	Does as it says	
Stop Telepresence	Not sure	
Display text	It will display text on the screen	There is no option to change the text size but there is an option to hide text. This allows the displaying of text then allows the removal of it.
Initiate video call	Allows the starting of a call to a person in the contact list	Not testing this out as there is no contact that I can get into touch with.
Set Temi's head to specific degree	This allows the changing of Temi's head position.	**Tilt Angle:** Max upwards is 20 degrees and downwards is -15 degrees. **Timeout:** Not sure what this does
Turn Temi to specific degree	This allows the changing of Temi's angle at current position.	**Tilt Angle:** Angle to rotate based on current direction. This is different from the above command as the reference point changes. Positive is Left and

		negative is Right in relation to temi. **Timeout:** Not sure what this does <= it means how long should it go one for before it stops. This means you can end the text mid-sentence.
Turn off Tuya switch		
Turn on Tuya switch		
Play video	Allows the playing of a video on temi	
Delay next command	Add a delay into the system	The delay is in seconds
Go to a webpage	Allows the usage of a URL to open up a page in temi	It takes some time for a page to load, not sure if it will next action before page loaded, might need to add a delay. Don't use the float option, it does not work on the temi and causes issues. When using this, make sure to close it once you are done with it. The best way for this is to add a delay command action then use the return to temiscript home.
Play YouTube video	Same Idea as above but plays a YouTube video.	Couldn't get a video to play.
Bluetooth Lockbox – Lock		
Bluetooth Lockbox - Unlock		

*Stuff highlighted in yellow is things that are not fully understood and need further investigation into functionality.

03/09/2024

Yesterday I almost went through all the commands that the TemiScript provides and analyzed them to see what they can do. What I want to achieve today is to finish going through the rest of the commands, create a basic tour in the building floor I am in, record my observation of the limitations it has, read through the document sent by Edwin Foo and analyze and make notes, add in images from today and yesterday into this document file and explore how to get the android script onto this PC and get it to function on the Temi.

At around 10:00pm I have an issue that causes the TemiScript URL not to connect to the temi. The cause of this is unknown, but it caused a delay in the mini tour's creation. Talking to Edwin, he said there was a way to upload script to Temi without having to use the TemiScript. From using it, there are a couple issues that can be noted with this method of programming temi. The main issue is that action needs to be done in sequential order. This means that it is not possible to move actions or

add action between others. This limits the ability to create scripts to use for the temi robot. The alternate method will be the direct uploading of scripts to temi. The software I was informed that could be used is called “Putty”. Unfortunately, at the point of writing this I have not been provided with a lot of information that can be used to implement this. I may look at this after trying to implement the android script.

During the day, an issue happened with the servers that TemiScript uses. This meant I was unable to use that application for coding. To solve this issue, WinSCP was used to allow manual uploading of script onto the temi. One of the things to note is that both the PC the code is being uploaded from and the temi need to have the same internet. The person I was with had that issue, but it was quickly solved. One issue I found when using this approach was that I could not figure out how to run separate code. My understanding is that code needs to be uploaded onto temi, then using temi to activate the code. To solve this issue, the temi has buttons which when pressed will run a particular text file name. Hence, this allowed me to create text files and link them to the buttons to get it to run. I found that using the text files was much easier than using the TemiScript as it allowed editing a lot easier, as well as making changes. I know that I would not have been able to get as much done as I did if I had used the TemiScript application. The dot point was the guide I was using to program temi. However, with the issue of the server it was no longer necessary. The code for it has been added in the appendices as Table 3.

Mini tour outline:

1. Go to Home Base <= Have as a separate command
2. Clear text <= Hopefully this will stop text from showing up, it doesn’t
3. Delay 10 sec
4. Speak, “Hello there, I'm Temi. Could you be so kind as to show me the way to the tour?"
5. Delay 1 sec
6. Speak, “From there I will be just fine.”
7. Change speed to medium
8. Follow
9. Delay 20 sec <=changed from 30 to 10 due to delay being too long
10. Go to r410 <= Testing Proximity
11. Turn left 90 degrees <= face the person temi was following
12. Tilt screen upwards to 20 degrees <= look up to the person following
13. Speak, “Thanks for that.”
14. Delay 1 sec
15. Turn to the right by 110
16. Tile screen to 0 degree <= should face tour members
17. Delay 1 sec
18. Use URL of the map
19. Add delay of 3 sec
20. Speak, “Hello everyone, I’m temi and welcome to NYP. You are currently on level 4 of block R. I will be happy to show you around.”
21. Delay 1 sec
22. Speak, “Add more text here for more information of the current spot.”
23. Delay 1 sec
24. Remove URL
25. Go to r412

The rest was done in another format due to issues that were encountered. See text above for more information.

04/09/2024

From the previous day, I was not able to read through the document provided by Edwin Foo (My Supervisor) and did not start on getting the android script set up on this PC to be able to program the temi. Yesterday though I was able to program the robot for a system for a tour. I have a better understanding of how it works, and I can use it as a baseline to replicate when using Android Studio. By using the temi script there are a couple things I could still work on. The first is figuring out how to run script without the use of buttons using WinSCP. It is not so important, but it would be useful to know. The second is how to edit the robocore page on temi. Apart from that, I have a fairly good understanding of how temi work and how to program them with the action available.

****NOTE** With the lost robot problem, Edwin Foo said that they plan to put on an alarm on temi to play when he gets picked up. However, I have noted that temi can get stuck at the door to this room which provides a situation where someone may pick temi up. They would do this to help him rather than for malicious intent. It might be worth looking at having a system where when temi is picked up it will play and audio cue saying to put temi down and to give him a gently push to get of the obstacle. If he is moved from his location, then play the alarm. **NOTE****

I will start today by trying to figure out how to use the Android Studio. From talking with Edwin Foo yesterday, I know that I need to get Android Studio. However, the temi robot will only work for a certain version of it. This is something I will have to look into to figure out.

I have been provided with a GitHub repository with, I assume, information on how to set things up. The system I believe I am looking to implement is called the Temi SDK. I have provided a link to the page https://github.com/robotemi/sdk/wiki. Just read the first paragraph, it has information on the V3 (PRO) temi as well. Looking at the repository, since I am using a temi V2 tablet I need to get Android 6.0.1 (SDK Level 23 <= not sure what this means). The first thing I did was try to figure out exactly what I am meant to install. The Android 6.0.1 and the SDK Level 23 are the same thing. They are different ways of referring to the same system. Note that Application Programming Interface (API) and Software Development Kit (SDK) are also the same thing, just a different way of referring to them. Don't get spooked by it. Another thing to keep in mind is that Android also uses silly names to refence different versions of the API. For the version that temi V2 needs, the API is also called Marshmallow.

At this point, here is what I think I need to do. I need to attach the Temi SKD onto the android studio. https://github.com/robotemi/sdk provided the lines of code needed to download the temi SDK into the project. My main issue is that I do not know how to use the android studio at all. As such, my next cause of action is figuring out how to use it. Once done, I will see about getting the temi SDK implemented, creating basic software then finally trying to run it in the temi. I will add my notes above about what I learned from how to use android studio.

I tried to get the Android Studio to work with them on the temi, but didn't end up making any progress. I am having trouble understanding exactly what I am meant to be doing to get it to work. It seems that there is a lot of assumed knowledge that I do not have as of yet. I think I should message Edwin about my issue with progressing with temi and inform him I am currently going through tutorials to learn android script.

I may have found another way to this to work under https://github.com/eunsungc/temi_sdk. I will be following the section under the heading "Installing Applications". I assume this will allow me to

make an application on the PC and then port it over to the temi once done. Not sure how to do this yet. Still need the other process with the android then. This process here might be void as there could be other methods to do this.

Installing Applications

You can begin by downloading ADB (Android Debug Bridge) on the computer you wish to develop for temi. Please follow this tutorial (https://www.xda-developers.com/install-adb-windows-macos-linux/) on how to download and set up ADB on your computer.

Once you have ADB set up on your computer, you can run your code on temi by:

Step 1: Make sure you are connected to the same Wi-Fi network as your robot.

Step 2: On temi - go to Settings -> temi Developer Tools -> tap on ADB Port Opening.

Step 3: On computer - Using the IP address on the top right of Temi's screen you can connect to the robot and test your code. In order to establish a connection with the robot, type ". / adb connect <IP_ADDRESS>:5555" in Terminal on Mac or Command Prompt on Windows.

To install Android APIs on your PC, you'll need to use the Android Studio development environment. Here's a step-by-step guide:
Once you have ADB set up on your computer, you can uninstall your app on temi by:

Step 1: Make sure you are connected to the same Wi-Fi network as your robot.

Step 2: On temi - go to Settings -> temi Developer Tools -> tap on ADB Port Opening.

Step 3: On computer - Using the IP address on the top right of Temi's screen you can connect to the robot and uninstall your app. In order to establish a connection with the robot, type ". / adb connect <IP_ADDRESS>:5555" in Terminal/Command Prompt.

Step 4: Type "adb uninstall PACKAGE_NAME" in Terminal/Command Prompt. If you are not sure what your package name is, you can check from within your Android Project.

1. **Download and Install Android Studio:**

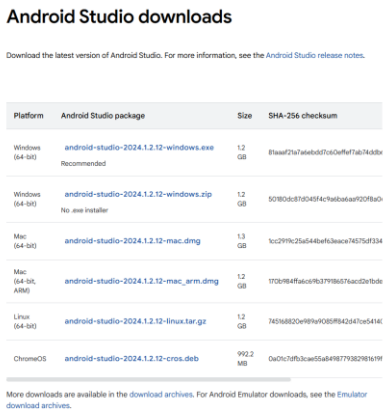


Figure 2 Image of window to install Android Studio

- Visit the official Android Studio website (https://developer.android.com/studio) and download the latest version for your operating system (Windows, macOS, or Linux). The download section can be found as of the 04/09/2024 by scrolling down until you see Figure 2.
- Follow the on-screen instructions to install Android Studio. For my purposes, I will be using the top option for windows. I did not use the No .exe installer. It shouldn't take too long to install.

2. Open Android Studio and Configure Settings:

- Once finished installing, go to the downloads and Launch Android Studio. This will begin the installation process. Keep everything as is and move through the prompts until installation beings.
- Once done, just clock finished. If this is your first time using it, you'll be prompted to configure your settings. At this point, I did not have any setting that I needed so I just clicked Ok on the prompt to move on.
- Next there is a set up wizard, just move through the prompt. There will be a window asking you to add a proxy. I am not sure what this does, so I closed it and moved on.
- Next is the license agreement, just except them and move on. There are two that need to be expected. There will be red * on the right-hand side if there are any licence agreements not checked.
- Once done, it will start installing. For me it took a while before anything happened. Be patient and wait. If it doesn't do anything in five minutes, close it and restart. I don't know if this will help as I didn't run into this issue so you may have to look for other solutions if it still does not work. Click finish once done. It should now be installed

2. Download the Android SDK:

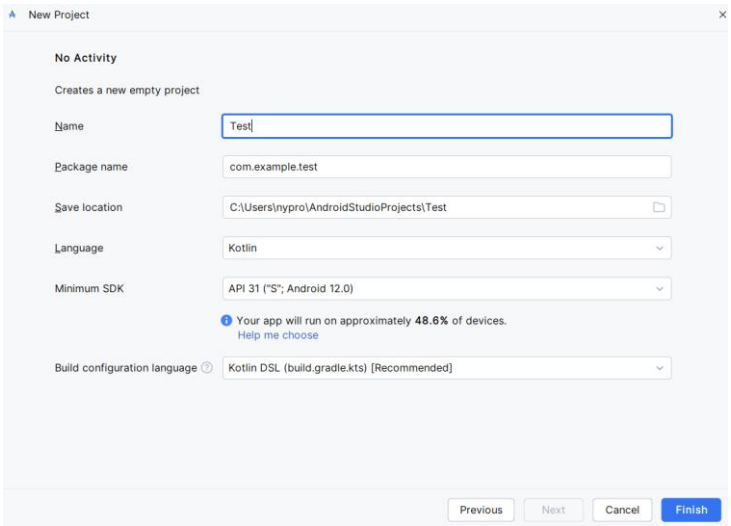


Figure 3 panel for adding project details

- Once Android Studio is open, click new project and then pick an empty project (This is called No activity). This will open up a prompt for you to put in the project details. Change the Minimum SDK (second from bottom option) too API 23.
- In the **SDK Platforms** tab, select the Android API level you want to install (e.g., Android 6.0.1, which is API level 23).
- In the **SDK Tools** tab, make sure the following components are selected:

    - Android SDK Platform-Tools
    - Android SDK Build-Tools (select the latest version)
    - Android SDK Command-line Tools (optional, but recommended)
- Click **Apply** and then **OK** to start the download and installation process.

4. Verify Installation:

- After the installation is complete, you can verify that the API level is installed by going to **Tools** > **SDK Manager** again and checking if it's listed under **SDK Platforms**.

Additional Notes:

- You may need to accept the Android SDK license agreement during the installation process.
- If you encounter any issues or require further assistance, refer to the Android Studio documentation (https://developer.android.com/develop) or search online for specific troubleshooting guides.

By following these steps, you should have the Android 6.0.1 API (SDK level 23) installed on your PC, ready for use in your Android development projects.

05/09/2024

Yesterday I tried to learn more on how to Android Studio. I am going through tutorial provided by android to learn how to use it better. At this moment, I do not know how to get application from Android Studio onto temi. I have a rough idea through, and I am hoping that learning more on Android Studio will help me understand how to solve this problem.

Here are some of the notes that I made yesterday. When downloading Android Studio, make sure to use the Non-School Wi-Fi as it will block the download of Gradle. This will prevent the application from working properly and should be kept in mind. Once done, it should be fine to switch back to the school Wi-Fi.

In android studio, when you make a new application there are a couple function already present. The first is the onCreate(); this acts as the entry point kind of like the main () function. The setContents() function is used to define the UI of the application. This function is supported with nested functions known as @Composable functions that allow the creation of UI elements. With @Composable, there are modifiers that allow the decoration of UI elements. There is a class called Modifier that has these types of functions already present with in Android studio.

The next thing is my log on my attempt to get an application from Android Studio too temi. There are two main steps I identified that are needed to achieve this goal. The first is to create and format the application in Android. What this means is setting up an application from Android Studio so that it can be run on temi. My current idea of how to get this done is to add the lines of code from AndroidManifest.xml into the manifest folder in a project. This can be done simply by going (based on android studio from this time of this log) to the left most panel and clicking project (the little icon that looks like a folder). Once done, to the right should be a series of folder that can be expanded and compacted. If the app folder is compacted, expand it to show more folders. Once done, just underneath the app folder should be one called the manifests. Expanding this folder will show the file AndroidManifest.xml. Double clicking on this will open up a script, which from my understanding is exactly where you want to be. This is where the code from GitHub should be added.

From this step onwards, I am not really sure how to go about making an application for temi. Apparently, it has functions that I can use to code temi, but once again no clue what I am doing. For installing an application onto temi, there is a process that can be followed that I believe will allow the application created to be added onto temi. I manage to get it working the first time, but the second attempt I made had an issue and did not work. I may look more into this to see if I can get it to work more consistently or at least understand how to fix the problem. The file is also in java which is interesting as the applications on android studio default too Kotlin. I wonder if I can just use Kotlin or if it has to be in java. The process of installing and uninstalling should be present in the last log I did.

****Temi does not seem to have issues of getting lost if he is manually rolled to a different spot. ****

****I think I know why temi did not work for the application download yesterday. I think it was because temi was not on the same network as the PC I used. ****

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">

    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.TemiTestApplication"
        tools:targetApi="31">
        <activity
            android:name=".MainActivity"
            android:exported="true"
            android:label="@string/app_name"
            android:theme="@style/Theme.TemiTestApplication">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <meta-data
            android:name="com.robotemi.sdk.metadata.SKILL"
            android:value="@string/app_name" />
    </application>

</manifest>
```

06/09/2024

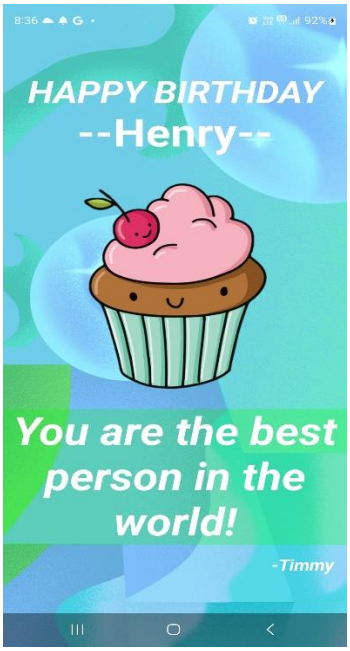


Figure 4 image of mobile application

Yesterday I managed to get a basic application of a birthday card running on my phone as shown in Figure 4. For today there is list of task order in priority that I would like to get done. I will most likely be unable to get them all done today, but I will certainly try my best. First task it to restructure my current application code to a format that Is easier to develop as well as to better understand the code. At this point of time, adding feature into the application is time consuming and tedious and requires a lot of effort to implement new features. My goal is to go through the code and restructure the format, so it is better. After that, I will see if I can add text boxes where a user and input text and have it saved onto the application. Once done, I want to have a feature that will the email out the input to when a button is pressed. After that, I want to complete the rest of the android tutorial, go through the document sent be Edwin Foo then, if possible, try and get an application to work on the temi. Currently I am reformatting my code to improve read amiability and integration of new features.

Week 2 - 09/09/2024

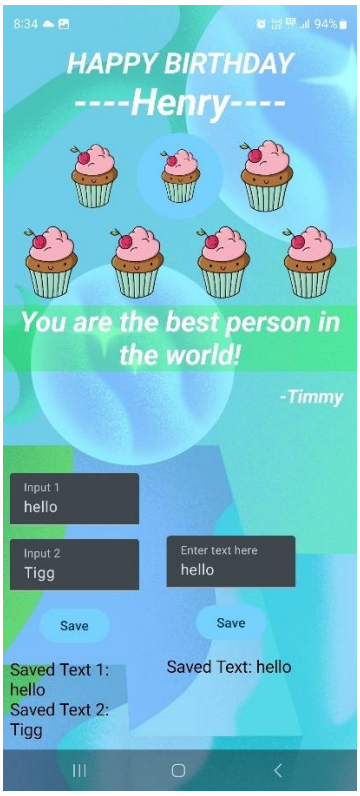


Figure 5 image of the mobile application that was developed on the 06/09/2024.

Quite a few things were done on the 06/09/2024. As can be seen on Figure 5, the application was improved as add multiple new features. The first thing that was done was to re-structure the code to improve the ease of use. The current plan for the structure is use the setContent() as the main page of the application. This is where changing between the different application within the main application will be done. At this current point, testing on how to reset the current page to another has not been done, but this will be needed at some point. With the sub-application with in the setContent(), the @Composable will be used to dictate the structure of the page. To simplify the page further, instead of using function that contain the text and buttons, function have been created to allow the use of minimal text within the page creation functions. I have also provided lots of comments that should hopefully cover what most of the code does.

The application shown in Figure 5 has the same features as in Figure 4. What is new is the seven different cupcakes present. All the cupcakes (except one that is an image) are different types of buttons. All the buttons have the same function; however, they are a slightly different press animation. Also, using an audio player class that was developed, a few of the buttons play music. One button will only play the song and only play it again once it has stopped. Another will reset the song each time it is pressed and the last will stop the song that is playing. One the bottom half of the screen in Figure 5, three text boxes can be seen. Within these text boxes it is possible to add text that can be saved. This allows the application to be closed without the risk of losing the data. There was then a button that was created that attaches a system to be able to email out the result. While the implantation is simple, it can be expanded to improve functionality. Overall, those were all the features that were added, done so in a way to make the implantation and use of them as simply as possible.

Some side notes that were made based on what was learned is the private type. This is often used in classes to make it so that the variables within a class cannot not be returned and are only retained by it. This is useful if the class is using variables that are only important to it, or if you do not want it to exit the class. Classes are used as libraries of functions and can be useful for organising code. Multiple classes can be created using the same template. Also worked with object but not 100% sure what they do, I will need to look into this at some point.

On the day of the last logbook, I manage to get an application on the temi using the help of someone else. So, I can current make a quiz on temi. More information on this be added later, just note that it is a task that I need to get done for this placement. However, I do not know how to utilize the current function on temi to get it to do stuff. This is something I want to figure out how to do and will be one of the main tasks for today.

What is wanted for me to develop.

From talking with Edwin Foo, the following function are desired to be developed. Creation of a manual on how to set up a station to program temi, how to use android studio and direct to resources and overall explain how each feature within the application was made. Create high order function that can be used to program Temi. My assumption is to create something similar to TemiScript, but a lot more practical. Allow for blue tooth connectivity. Add a chocolate dispense to function with temi, essentially it will be utilized alongsidethe quiz function (which is something else that is wanted.) They also want the ability to make temi sound an alarm if it is picked up. The last thing is to get a plugin from ChatGPT working on temi to replace the current text to speech function.

List of tasks today:

1. ~~Learn what an object is and how to use it~~
2. ~~Break down how the save and email functions work within current application.~~
3. Send the result of application to Georgia so she and analyse the code.
4. Learn how to run temi function.
5. Learn how to create multiple different activities with the android software (This will be very helpful for organising code.)
6. Create a work plan on how the quiz will work and what functionalities will be added to it.
7. Learn how to make version in Android Studio (This will make it more convenient to make updates to the software while retaining old version if I need to go back.)
8. Send the plan for the quiz to Edwin Foo so that he can provided input for anything that he wants within the quiz application.

Information about classes and objects:

In Android Studio (or any Java/Kotlin-based development environment), understanding objects and classes is fundamental to programming. They are key concepts in object-oriented programming (OOP), which is the paradigm that Java and Kotlin, the primary languages for Android development, follow.

Classes

A class is essentially a blueprint or template for creating objects. It defines a type of object by specifying the data (attributes) and the methods (functions) that operate on the data. Think of a

class as a blueprint for a house—just as the blueprint outlines the design of the house, a class outlines the structure and behaviors of objects created from it.

Here's a simple example in Java:

java

Copy code

```
public class Car {
    // Attributes (fields)
    String color;
    String model;
    int year;

    // Method
    void startEngine() {
        System.out.println("Engine started");
    }
}
```

And in Kotlin:

kotlin

Copy code

```
class Car (val color: String, val model: String, val year: Int) {
    fun startEngine() {
        println("Engine started")
    }
}
```

Objects

An object is an instance of a class. When you create an object from a class, you're essentially creating a specific instance of that class with its own distinct data. Using the house blueprint analogy, an object would be a specific house built from that blueprint.

Here’s how you create and use an object in Java:

java

Copy code

```
public class Main {
   public static void main (String [] args) {
      // Creating an object of the Car class
      Car myCar = new Car ();

      // Setting attributes
      myCar.color = "Red";
      myCar.model = "Toyota";
      myCar.year = 2020;

      // Calling a method
      myCar.startEngine();

      // Displaying attributes
      System.out.println("My car is a " + myCar.color + " " + myCar.model + " from " + myCar.year);
   }
}
```

Another way of looking at object and classes.

Classes and Objects: Refined Analogy

Classes as Blueprints:

Analogy: Think of a class as a detailed blueprint for a specific type of entity in a game, like a "Player" or "Enemy."

Role: The class defines the attributes (properties) and behaviors (methods) that all entities of this type will have. For example, a Player class might define attributes like health, score, and methods like attack () or move ().

Objects as Instances:

Analogy: An object is like a specific instance of an entity created using that blueprint. If the class is the blueprint, each object is a unique instance of that blueprint.

Role: Objects are individual entities in the game world that have their own values for the attributes defined by the class. For instance, if you have a Player class, you can create multiple player objects, each with its own health value, score, etc.

Functions and Behavior

Functions (Methods) as Actions:

Analogy: In a game, functions (or methods) are like the actions or interactions that entities can perform. They define what an entity can do, such as moving, attacking, or collecting items.

Role: Methods are defined in the class and can be invoked on objects of that class. For example, a Player object might use the attack () method to interact with other objects in the game.

10/09/2024 and 11/09/2024 QUIZ

Unfortunately, on the 10/09/2024 I forgot to make a log. To make up for it, this log will contain information about what occurred on the 10th and the 11th. On the 10th a decision was made to focus on developing the quiz without understanding how to run function on the temi robot. At the time of writing this log, a start menu and a system for integrating quiz question has been developed. The next phase is to develop the system for the quiz format, including integrating the ability to save information on quiz results and being able to email them out. So far things are progressing, and the system is shaping up very nicely. For today what is hopped to be achieved is to finish improving the background for the quiz question format as right now it is not the best. A system to put an image in the background has been done, but this can cause text on the screen to be obscured which is not the best. The quiz question format has been set up to allow for single or multiple-choice answers, has an adaptive method for laying out the questions. The system needs to have a way to have a command sent to confirm the submission of the question and to show the results of it. This will be the main focus of the day. If that gets done a system for storing the results of the quiz and being able to email them out will then be developed. For the developing of the quiz, an isolated system within the application was created that can only be accessed from the code. The allows for easier creation of new features within the environment. As the goal is to make the quiz question a modular system, allowing them to just be placed into the main code with minimal effort, this works the best.

12/09/2024 and 13/09/2024 QUIZ

At this point more development for the application has been done. The current version as of typing this log is functional. Quizzes are able to be played on the temi without too many issues; a trail run was done. Based on observations and feedback from users of the test here are the following changes that will be made: a translation mode will be added to allow for the easy translation of text within the application, move the previous and next button locations to their respective sides of the screen. Add question number unto the question. Move the submit button to the bottom of the screen.

Apart from those changes, the following are features that are still desired to be added in. Score results and total score are shown, thank you message at the end of the quiz, prompt to check if user want to submit when nothing has been selected are move to the next unanswered question, have the selected prompt be saved (This one in particular is a maybe) and finally had a system to save results and email them.

The goal of today is to try and get the rest of the feature completed for the quiz application. After that is done there is still further development that can done in the form of introducing new quiz types (text input, drag and drop or ranking). However, priority will be given to trying to implement temi functions as this still has not been figured out as of yet.

Week 3 - 16/09/2024 QUIZ

On the Friday (13/09/2024) I had managed to almost get everything done for the first version of the Quiz Application. The only features that were not implemented was the saving and emailing system. However, a system was developed just at the end on the Friday for saving features, so that should be pretty much good to go. Once done the email system will be attached to a button on the Quiz Home page to email the results. I will make it, so a password needs to be inputted to be able to email out results. It would also be useful to have a system to delete all memory on the system.

For this week there are a couple goals that could be pursued. The first one that will be done is completing the saving and emailing system for the quiz. After that, there are three goals that can be done. The first is to develop new question modes for the quiz, second is to start developing a dev mode to create new quizzes and the last is to work on trying to get the temi function working on the robot. Out of these, I want to try and get the functions working on the robot. The last to be done would be the developing a dev mode. I want to do this once I have every feature included in the main quiz so that way I don't have to keep going back and forth with developing the quiz then the dev mode. Before that step though, I want to do a code analysis to better understand and reinforce how the code works. This will be documented in detail so that others will be able to understand how the system works. At this point, I will also try to organise and comment the code to the best of my abilities.

I have gotten a better idea of how android studio work; I am hoping this will better aid me in trying to get the temi functions working. I hope I have better luck then last time.

Currently trying to get the Android Studio to run temi function. Have grabbed an SDK (I think) provided by the temi team. I opened this doc in Android Studio and let the Gradle Script to sync. Note that when this is happening it is necessary to switch from the school to a private network to be able to properly install required files. Once done, I got a prompt to update the Gradle version from 7.2.2 to 7.4.2, which hopefully should make everything work as intended and not cause any issues. After doing more testing and experimenting, I still have not manage to get very far.

17/09/2024 QUIZ

Unfortunately, I was not able to get a lot done as I had an interview early in the morning. As a consequence, I was only able to start working at 11am. However, I did get to meet up with Tom and David to go through what I have currently done. It was mostly showing them the quiz that I have been developing since week 2. Both ran through the quiz and gave some comment on quality-of-life feature as well as potential new features that could be added to improve the overall design. The following notes the feedback that was provided. As of yesterday, there is a system that is able to store and retain the data from quizzes. To add more appeal to the quiz, it has been suggested to add a ranking system to it. Essentially, this will output all the current attempt and order them based on score. This means a new page in the application is needed to be made to display this information. I have also added on a thankyou page from yesterday that thanks a person for doing this quiz. On this page is a score is presented with a different message depending on how good a person did. I plan to change this be adding a user input area so that they can put a name to attach to the score. That way when the score is displayed, a name can be displayed with it. Along with this, a system for blacklisting inappropriate names will be created. The idea is to all a .txt file to be used to add the

blacklist. The finial feature to the score board suggestion is to add a feature that allows the blocking out of names in case an inappropriate name is added to the score board that was not on the blacklist.

The next suggestion was to add a progress bar into the quiz that shows the current position of the quiz as well as a total score. This was completed yesterday and has been implemented. The last features are being able to add a setting system to change the current language mode, add a system to allow using a .txt file to add in question to the quiz and add in an email server to be able to email out results.

I have also been informed that I will be able to go to the manufacture on the 1st of October. This will hopefully solve me inability to use any temi functions within my code. Apart from that, my current goals are to try and get done all the feedback that was provided.

19/09/2024

Yesterday, the score board feature was completed. This included adjusting the previous data format to store information to store names. The was an existing thank you pop up that shows at the end of a quiz. This has been reworked to allow a user input that will then be used as the name in the new data format. Along with this feature was the added .txt file of blacklisted words. The blacklist was created using three different repositories on GitHub. Hence, at briefly looking at the list, there are double up and possible even triple ups on some words. It is recommended to copy the list into a word document and using the feature to organise values into alphabetical order for organising the list. Note that “control + a” will allow the selecting of everything within a document. To help with comparing the user input to the blacklist, the user input is temporarily reduced to lowercase, no spaces are allowed and a total number of 20 characters are allowed. An idea to ban numbers and special character was also thought of, but this will need to be discussed with my supervisor.

A small test was done were another user (this not being me) inputted the word “pee” which was not present on the list. Hence, the name was able to be stored on the score board. From my understanding, the blacklist only has very inappropriate words. So, words that are still a little inappropriate will most likely pass. The list will need to be developed as words that should be blacklisted pop up. The rank, name and score are displayed on the score board with a scroll down feature to allow an indefinite number of scores. Each result on the score board is a button that can be pressed 5 times to trigger a prompt to put in a password. If the password is put it, the name will be changed to empty and any other names that are the same will be also removed. Comparison with the username is done in lowercase. For example, the usernames of ‘Timmy’ and ‘timmy’ will be seen as the same name by the system I have made. So, if I want to remove ‘timmy’ both of those names would be removes. However, I still need to test if this system will work. It may be useful to add a system that will auto add words that have been manually removed to the blacklist.

With all those features done, the scoreboard is currently a usable state that could have some minor features added to it. The next step was to convert the method for adding questions (This is via code) to being able to use a .txt file. While work on this was done yesterday, it is not yet complete. What has been done is a format of the .txt has been developed the system adapted to use the .txt file. The current issue is while it does work, not all the commands possible with the previous method have been implemented yet. This will be done today. A sample of the formatting of questions for the .txt file can be seen in the table below. There will also be a need to develop a manual to teach someone how to make changes to the system.

```
<Quiz2>
text:-> Single Answer: Who painted the Mona Lisa?
```

```
image:-> R.drawable.image4
background:-> R.drawable.image3
textQuestion:-> true
imageQuestion:-> true
singleOn:-> true
OnCorrect:-> false
surveyOn:-> false
columnLength:-> 3
scoreType:-> s
texts:->
* Leonardo da Vinci ; true
* Vincent van Gogh ; false
* Pablo Picasso ; false
* Claude Monet ; false
* Salvador Dalí ; false
* Michelangelo ; false
<end>
```

As of now, the current list of tasks that need to be done are as follows:

1. Finish the implementation of .txt questions
2. Add in the different languages.
3. Add in an email server to allow the emailing of result from the temi
4. Talk to Edwin Foo about any other features adjustments he may want.

20/09/2024 QUIZ

From the list of tasks that were stated that need to be done, task 1 and 2 (Finish the implementation of .txt questions and add in the different languages. The previous system for creating quiz questions was removes and replaced with a .txt file that can be used to add questions. An important thing to note is the format used needs to be kept the same as that is how the system will interpret the data. A data sheet will be created to outline what each of the features of the current quiz format can do. The second feature was to add in support for different language features. When creating this I was thinking whether it was worth creating a dynamic or static system. The dynamic system would allow the ability to add and remove languages. However, I thought this might not be a necessary feature to include. NYP would only need to have a handful of languages, meaning a more static method can be used as long as I include all the languages that they desire. Currently there is only support for English and Japanese. Adding in more languages will be possible. An attempt was made to create an email server, but research I did gave me the impression that is could be beyond my abilities.

At this point I think it might be worth to start developing documentation of the current system. The principal areas I want to document is how to add new question types into the system, how to use the .txt to add question, how to add another language and a general overview of what each of the functions and systems within the code do. I also want to do some organisation with the code so that way everything is in a logical order.

As of now, the current list of tasks that need to be done are as follows:

1. Add in an email server to allow the emailing of result from the temi (This task may be pended.)
2. Talk to Edwin Foo about any other feature adjustments he may want.
3. Being creating the spec report and other documentation that is listed in the last paragraph.

Week 4 - 23/09/2024 REPORT

Last week Friday, the task that was set out was to start work on the spec report. As on the October 1st I should hopefully go out to the factor to learn more about how to program temi. Hence, I want to try and get as much done the report to maximise my time being able to work on the temi. One feature that could be added to the code is an auto-black list feature. The main issue with this is a .txt file is used to contain all the blacklisted word. On the software, it is not possible to make alteration to this file. Hence, the original idea might not work as well as I thought it would. Based on what got done on Friday was focused on the report. Unfortunately, I was on the Friday which led to things being less productive than I would have liked. So, only the synopsis, introduction and background were done. An issue I am having is understanding the scope of the task that I am meant to be doing. The task sheet says to use the tools provided during the engineering topic, combine with the lack of detail of each section it makes it quite hard to determine the amount of detail needed for the spec report.

For today, the main goal is to try and get the project overview done, and if possible, the assumptions and constraint, analysis of options and stakeholders. For the project overview, here is what is planned to get done:

1. Project Title
2. Project Objective
3. Context Diagram
4. Requirements
5. Define scope table
6. SWOT analysis

If the above tasks are completed, I will then begin with the next steps. What I plan to do will be outlined in this section. I do not expect to get everything that I want to do today and expect that it may take todays to complete.

24/09/2024 REPORT

The task that got done yesterday were based on the spec report and a user guide that is in the process of being made. For the report, the list of tasks that was planned to get done was completed. This means that the project title, project objective, context diagram, requirements, define scope table and SWOT analysis was all done. What ended up happening was the creation of a scope statement table was created. Within this table the project objective and context diagram were added. Along this, some other parts for the spec report were done. The section for assumptions and constraints was done. This was amazingly simple and requiring a few hundred words for each sub-section. My concern is if that was all that needed to be done for it. The last part was the stakeholders. For this section two subsection were added. One was a list of stakeholders and the other the communication plan. However, after having some time to think about it, it might be worth adding in documentation for the stakeholder engagement.

Time was also spent creating documentation for a user guide. So far, the guide is only code analysis of the quiz application and a look up table on how to use the text file-based quiz system. Only a few of the function were done and a guide of how to change and add new questions into the system. The main reason this was started when the spec report still needs to be done is to give a bit more flavour in the workday. It was getting kind of stale just doing the spec report.

The last thing that was done on that day was to create a workflow on what task will need to be done on the next few days. This is only in consideration to the spec report.

For today:

- ~~Add recommended changes to the stakeholder section~~
- ~~Complete the Analysis of options~~
- All sub-parts in the work plan

For 26/09/2024

- Implementation strategies
- Project Management Framework
- RACI Chart
- Risk Management
- Risk Chart
- Probability / Impact matrix

25/09/2024 REPORT

Based on Yesterday, the following tasks got done (They have been crossed out for reference:

For Yesterday:

- ~~Add recommended changes to the stakeholder section~~
- ~~Complete the Analysis of options~~
- All sub-parts in the work plan

The section for all sub-parts in the work plan is taking a lot longer than expected. It is taking a long time to break down the project goals into and add them to the table. All the project goals have been broken down, the main issue is formatting all the information into a table. A portion of it has been done but it will require more work today to get done. One important thing to note is that the work plane should be delayed until closer to the data. This will allow me to edit and adjust the work plan as a I get a better idea of what. I am assuming for the Deliverables & Timetable section in the work plan what I need to do is: a precedence diagram, a precedence Diagram look up table, Beta probability distribution and finally a Gantt chart. I will try and make it clear in the tables and figure generated what belongs to what deliverable.

For today there are two things that I want to get done, the first is to complete the table for the WBS. The WBS itself will still need to be created, but another task has popped up that has taken a higher priority. On Thursday, 26/09/2024, students from NYP will be coming to the lab to work on the Temi. On of my project goals is to create documentation to help the next line of developers to programming on temi. This provides a good opportunity to test it out. Hence, I will need to invest today to try and get a more finalised version to give them for testing.

26/09/2024 REPORT

The table of the WBS was finished and all the documentation needed for the developer's handbook was completed. The only thing that still needs to be done for the developer's handbook is to analyse the rest of the quiz code and write about it in the handbook. Things are coming along very nicely. I am going to back pedal what I said yesterday and try and get the work plan section done today. I am hoping that I will be able to get the spec report and the handbook done by this week. However, there may some overflow into next week to get them all done. I will also be spending some time working with the NYP's temi enthusiast team. The handbook will be used on them to try and set up a PC for getting Android Studio applications onto it.

27/09/2024 REPORT

Yesterday, the sections for the deliverables and timeline just got completed. There was someone who came in to test the User Handbook. The manual was effective at what it did with some minor oversite in some areas that was corrected in the manual. The first issue was the document references an application without specifying where access to it can be gained. The second was with hoe the adding questions in text file worked. Th document never specified that that the system needs at lead two questions. The last question should always be a survey question, hence there needs to be one question and one survey question. Apart from that, nothing else was done. Most of the time was taken in trying to create tables and graphs for the deliverables and timeline section. For what should be done today, the hope is to get done the project management and risk management sections today. There is the implementation strategy and previous project sections. I am not sure what to do for those section, I will investigate them when I need to.

Week 5 – 30/09/2024 REPORT

From last week Friday, the risk assessment and the project management framework were completed. For the current documentation, that leaves the implementation strategy for the spec report as well as the code analysis and restructure for the user manual There are some adjustments and changes that also need to be done to the code: **alter the current system to allow for random to be turned off as well as change how many questions at the end should be static if any, add a feature that allows the adding of blacklist words to a temporary memory (Unfortunately after looking into it, there is no way to get the new blacklist words added to the text file.)** I also need to add in the user manual how to add new languages to the code. Everything that was listed needs to be done. Completing the documentation will be set to highest priority and then adding changes to the code will be done. Changes to the code will be done along code analysis

I should be also going to the manufacture today or tomorrow to figure out how to get the SDK working to allow for Temi functions. However, as of 8:46am this is still pending.

01/10/2024 – 02/10/2024 ROBOSOLUTION

On the 01/10/2024, I went into Robosolutions to try and learn more about how to use the Temi SDK. Currently, there is a project there where they are trying to get Temi to detect a person and turn to a set angle to show them to go towards a direction. This is what I will be developing to get a better understanding on how to use he SDK. I did manage to figure it out and am now exploring how to use the listeners, how to use the Temi Center Map in the code, how to use UI and Temi functions as the same time and how to create schedules and sequences.

Currently, with the project that was noted above there is issues in getting the Temi to turn constantly to its old position. A system has been created to try and adjust this.

Things that should be investigated:

- Android Develops documentation
- Nav Controller
- Data Preference <- more robust way of storing information

How the system should work is if the Temi detects someone, it should turn to indicate a direction for the use to go. Before that, if the robot has completed talking, it should then say a line. Once done saying that line, the robot should turn wait a little bit then turn back. With a bit of tinkering, a system was able to be developed to get the temi to turn when it is need. A general rule of thumb is to ensure that there is at a 0.1 second delay between calls of the same type. For example, if you

want to call the motion detection listener until a certain state is experienced have a delay of 0.1 sec after each call. The next step is to change the UI to have a background image. I am thinking of adding my image cycler system that was used in the quiz application.

03/10/2024 – 04/10/2024 ROBOSOLUTIONS

The first thing that will be done is to record all the notes that I made in a physical book into this document. For the user handbook, there is a couple of things that I would like to add, first is how to implement listeners, next is how to use Enums, how to add listeners in code using separate threads and how to add in GIFs. It was also noted that there was a bug in the Quiz application on the V3 but not on the V2. The audio on the V3 cuts out during the question answering section. It appears to trigger when the question is cycled through too quickly. A system was added to add delay in the question cycling which appeared to help solve the bug or at least reduce the likelihood of it occurring. Also made some notes on how to add the temi SDK into the quiz app. Unfortunately, with the way the application was developed, it makes it extremely hard to add listeners to get the temi to do stuff when a person is detected. The issue is the composable that prevent certain functions from being used. Need a few models to be able to effectively use the SDK.

NOTE

Need to do something in the dynamics mode to get the temi to functions to work properly.

New Information to investigate:

Look into a view, view model and model.

Look into a Parent Class and Child Class

Important stuff to not is android studios android developers' documents, nav controller and method for using a data base (This method is more persistent and robust then the method that is used in the Quiz Application).

Tried to look at getting permissions on the temi working but had issues setting it up. Apart from that, looked at way to set up the code to allow for the system to work most optimally.

Week 6 – 07/10/2024 QUIZ and TOUR

Last week was about exploring methods to best organise and design the SDK. From Heng Junxiang, I was given a template that can be used to create temi scripts with SDK. This was the file used to create the application for Kajima. By removing all necessary parts, it was possible to create a new folder that can be used as a template. Someone could take this folder and begin working on it. I want to figure out other ways to getting this to work so I have a better understanding of how the SDK works. With the format file, it is necessary to have to change the name of the project. This does take some time but will be added into the user handbook so they can use it in the future. On last week Friday, I went through the process of exploring the different the speech functions provided by the Temi SDK. One issue that was noted is the need to get access to the permission. Some functions need permission to exploration into how to get this to work was done. However, nothing was gained, and further exploration is needed.

For this week, there are a couple of things I want to get done. The first is to expand upon the tour guide that I am currently developing. Second, is to try and reformate my Quiz Application code so I can get the detection feature working and be able to use other SDK listeners. However, functions do

work. The Third is to figure out how to get the blue tooth working. The last is to consolidate learning into the user handbook.

08/10/2024 TOUR

From yesterday, I started making systems and methods to allow for better control over Temi. It is just finding out the kinks to ensure that the functions made in temi run as intended. Currently, there is a state control in the viewmodel that has an Enum state that can be altered to change the state of the temi. The first state is a talk state. In this state there is a method using stateflow that will get the temi to talk once a person is detected. The system will only run if there is a change in the detection state. Within this state are two main things, the first is a speak function followed by a condition gate then same thing again. The condition gate is a system that was made to ensure that a process is done (such as talking) before going onto the next step.

The second system is a method used to get the distance of the sensors. The main difference is there is a system in place that will allow the code to repeat even a person is detected. At this point, the system is hard coded, but I want to design it a bit more to allow control of the timer, use a condition trigger to repeat or a trigger condition with a delayed timer.

As for the rest of the day, I will be working on creating a system for detecting different distance and providing response, have temi turn towards a person that it detects and the last is to make a system that can detect if a person is walking past temi or towards him.

09/10/2024 TOUR

From yesterday, I am currently trying to develop a system that will allow the temi to track the user from a constrained position. There is a function in place for it, however the function to set it on and off seems to not be present in the library. I managed to turn it one, but I ended up creating my own version. The reason is creating my own version it will allow me far greater control over how the turn behaviour work. I can have the temi go to a default position if it does not detect anyone and have it so it will only track over a certain angle before going to default. I also want to try and a system to allow the temi to determine if a person is walking past or is in front/going to temi.

What was develop yesterday was method to allow controlling how the detection state works. There are three modes I developed. One mode will only trigger once, and the detection state will need to be retriggered before doing action again. Second mode will repeat action once done while detected. The last will repeat action after a delay timer that can be interrupted if the detect state is deactivated. I tried to go about this in two ways, one is much similar and ended up keeping that version. The other version I ended up scrapping.

While working on the system, I ran into an issue. After going to lunch and going back to the temi v3 the detection system stopped working. I could tell this as there is an indicator on temi to tell you if it has detected someone. The next day the system was working again. I think the issue might have been caused by a low battery and a system is in place to prevent using applications when it is in that state. I tried using the temi v2 and noted that the system may have a bug. The bug is when in greet mode and all functions in the temi centre are turned off it still has the off chance of turning. I investigated this on the GitHub and saw an issue that was submitted that was exactly like what I was experiencing. I plan to resubmit the request and see what can be done. With the bug, it is not possible to create complex systems on the temi V2.

For today, the main action is to try and develop the track user system. If that gets completed my new plan is to try and develop systems for getting temi to move around using the temi centre map.

Also noted that using the condition gate on the system requires an abort state to be included for it to work properly.

10/10/2024 – 11/10/2024 TOUR

On the 10th, the day started off with getting the system for detecting x-movement complete. The adjustment of thresholds to change sensitivity has yet to be done as the room at robosolutions. His will need to be done at NYP at some point. What ended up happening most of the day was trying to develop the system for emotional detection. While it was working, the main issue was the frame rate of the camera was at 1 frame per second. Most of the day was exploring options to try and increase performance. One solution was derived to reduce the area that the facial detection occurs. This was done by cutting the restricted version down then passing it into the facial detection system before finally overlaying into the unchanged version. The method allowed an increase of frame rates between 3 to 4 frames per second. While not the best, it is still a notable improvement then from before.

The 11th was designated into trying to find method to improve a reliability of the emotional detection system. One method that was implemented was based on the facial recognition system. It was noted that false positives would on occasion will appear. The first idea was to add a system that would only allow positives if the detected face were larger than a certain area. This prevents small pop ups of false positives from occurring. The second system used the corner of the facial recognition region and compared them to previous ones. By doing this, if the corners of one box were not a valid region of another then it was determined the box is invalid. This help solves an issue where a facial recognition box would briefly appear above another valid box. Multiple generations of valid box detection were set up to make sure the box is valid. On issue this method has is it does not follow faces if the move to fast. This is due to the corners of the box leaving the range and the multiple generation system implemented. The next goal is to try and make sampling system to check the emotion of a facial recognition and to display the most common result to prevent fluctuation in the emotion.

Week 7 - 14/10/2024 – 15/10/2024 POSTER

The work that was done was regarding the creation of the poster and slides for presentation. A draft was completed and sent to my academic supervisor to review and am currently waiting for a reply. I also got the quiz application converted to be better suited for use in temi functions. This was done by duplicating the framework for the temi and copying and pasting my code for the quiz into the view. Managed to get the talking system working with a detection trigger. For the 15th, I will be looking at trying to and more features from the temi into the system.

16/10/2024 - 18/10/2024 QUIZ

On the 16th, work was done to improve the quiz application on the temi. One issue that was discover was how the constraint follow system worked. I noted that it was not working as intended when the default angle was set to 15 degrees and the boundaries +- 90 degrees. After looking into it, it was discovered to be an oversight on how the tracking system was designed. The issue is due to the overlap occurring between the 0-degree point. This condition was not taken into consideration and lead to instances where the logic of the code could not handle the condition. This was patched out. However, I still need to do some trial testing to ensure that the temi constraint follow system can still function well in a crowd of people. Work was also done on the text system that produces text when answering a question. The precious system would generate a number from 1 to 5 (the number of options of dialogue) use that to pick a dialogue option. The problem with this is that it can lead to replication of dialogue options. I did not like that, so I switched it out with another system. What this

system does is generate an array and fill it randomly with numbers of 1 to 5. The system would then go through all options. Once the last options are done, the array will them be randomised again. However, before use the last option from the previous array and the first option of the current array are compared. If they are the same, then the current arrays first option is switched out with another number from a random spot. I also got a system implemented for temi saying lines of dialogue based on the position of the user in view of temi. I might want to work on this system in the future to make it more interesting. The last thing that was done was implementing a system for an anti-drag and lifting system. What the system does is goes through a line of dialogue to warn the use to stop that action. If the dialogue sequence is completed and the user is still tampering, then an alarm will blare. I have made it so that the volume is increased to maximum when this happens. It has not been fully implemented yet. So, this will need to be done. I was also informed to decrease the volume of the songs playing to that the temi speaking is more predominate. This should not be too hard of a fix.

The 17th and the 18th will be treated as the same log as it deals with the same features. These days were spent trying to get Bluetooth working. There was an issue with the Arduino that was given, it does not seem to be sending out a signal that I can connect too. However, I do have a system that can pick up Bluetooth signals and connect devices. However, I think there may be an issue with connecting devices that have already been paired. I need another system to do that. Apart from that not much happened. The Bluetooth is more annoying than it seems. Testing was done only on the phone.

Week 8 – 21/10/2024 - 23/10/2024 QUIZ

These two days was spent trying to get the Bluetooth system working and connecting. From working on it, the method for doing connection was changed from Bluetooth classic to Bluetooth low energy. For both, there are systems in place for connecting devices. However, with the Bluetooth classic I am not sure how to transfer data. I do not have access to a device that will allow transfer using this method, so it is hard to develop an effective system. Hence, the pivot to BLE. I have a system set up to connect and transfer data between the temi and my mouse. However, it is a bit Janky and trying to get a battery read from the mouse provides 100% which I know is not correct. For now, I plan to shift my focus on trying to get the Arduino working with its Bluetooth. Currently, when it is powered on my system is not able to pick up it signal. This will need to be worked on.

24/10/2024 - 25/10/2024 QUIZ

Main thing that got done on these days was the completion of the connection between the temi and the Bluetooth module. What I manged to get done was to have the Arduino with the Bluetooth module be detected by the temi scan, connect to it and be able to transmit and receive information between the two. One main issue I bumped into was the fact that the receiver and transmitter codes from the blue fruit module (Bluetooth module) is in the perspective of the temi. Hence, to get data received from the module, the temi need to look at the receiver and not the transmitter. This is the mistake that I was doing before. With this, I was able to wire up a servo motor onto the Arduino and have a signal from the temi that I created at the point of connecting the two devices. However, I did run into an issue with this. The servo motor had the tendency to twitch. After looking into the cause, it was discovered it was found that the libraries for the servo and the Ble module used the same timer. To solve this, the timing for the servo was switched to a software method which solves the twitching. However, the range is restricted to a 255-bit number that has a restricted range which still needs to be solved. This should be easy to do just by looking into the code.

Week 9 – 28/10/2024 - 29/10/2024 QUIZ

The job of those two days was to try and implement the Bluetooth and emotional detection system as well as fix known bugs and add quality of life features into the quiz application. The system for the Bluetooth was completed on the Monday. The issue before was the servo was not able to go through the full range of motion of the servo. The twitching is solved. This was an easy fix. All that needed to be done was go through the library of the soft servo and then find were the write function takes place (this changes the speed). Once done, I just needed to change the pulse duration for the lowest function. By doing this the pulse width would be shrunk for the lower allowing for a greater range of motion. Once done the next step was to add the improvement to the quiz application. This involved completing the anti-misuse system, make the temi stop moving when someone is close, have the screen tilt be movable after going to a preset spot when a user is close. Have a feature to auto exit out of the scoreboard or the quiz when open for too. The only feature that still needs to be added is a translation method for the temi to speak in different languages. There was also a bug that occurred on the quiz main page. For some reason, when the application is on the quiz page the volume of temi speaking does not increase when the anti-misuse system is initiated. Time was spent looking into this issue, but no fix was found. It is a mild bug.

The next the thing that was done was the blue tooth system was implemented. This was done with minimal difficulty. The next thing was the emotional detection system. On the Tuesday, the system was implemented into the overall system. However, it is not properly implemented. The current issue is the camera for the emotional detection system is overlaying the quiz. This makes it so it is not possible to do the quiz. There is also no method to collect the data from the emotion detection system. What is happening is that the quiz and the emotion detection system are running side by side. This is what will be worked on tomorrow.

30/10/2024 and 1/11/2024 QUIZ

On these days, a vast majority of the time was spent trying to find a method of integrating the application into the quiz app. A few methods were looked at over those days. One thing to keep in note is that android studios does not like it when you try to use the camera without it being displayed. This is to keep personal privacy. Hence, most of the attempts to try and do this failed. This included for the frame layer in the layout xml to turn the camera invisible or alter the transparency of the image. The methods led to the data from the camera no longer being collected which prevented the emotion detection to not work. The also would leave a white background which overlayed the main quiz application. The next approach was to try and change the class in charge of the emotion detection from a camera activity to a service. This is theory would have allowed it to run in the background. While it did get to the point where frames were received (from what I understood) I failed in trying to display the frames. The reason this was necessary was due to the method and data format of the frames being different. I need to alter the current code to work. Not being able to see the frames made it difficult to verify if anything was working. Hence, this method was scrapped. The last method was to try and see if it was possible to overlay a composable over an element in the layout xml. Testing found it was possible to add composable in this way. Android studio would not allow for this to occur. Hence, this method was also scrapped. The last method, and the successful method, was to have the quiz and emotion detection be separate apps. The idea is to have them both running and have them be able to share information. To be able to do this, you need to set the permissions in the receiver app to be able to see the transmitter app. By doing this it is possible to launch the transmitter app and to use a broadcaster to receiver signals from the transmitter app. This is done be using intents and allows the sending of strings as messages.

With this, the next step is to create a system to process the received information. It also needs to process it to decide actions. This will be what is done next week.

Week 10 – 5/11/2024 - 6/11/2024 TOUR

This week marks the start of the development of the temi tour application. What has been done as of now is the creation of a basic plan for the tour. The goal of the tour is to make it as interactive as possible. This means I want to try and get users to talk to the temi and use its abilities to detect its surroundings. Currently most of the set up for development has been done. This means the listener and basic function need are ready to be used. The method for developing the tour is to use a state machine. This will allow me to create section of the tour and easily add and remove section as needed. Along with the code, I am creating a flow diagram to better visuals how the system works. I am currently running into issues where the tour application is performing in consistently. I am trying to work out the bugs as I receive them. One of my biggest plans is to set up communication between the temi v2 and the temi v3. The exact plan for them interacting has not been decided, but understand the set up needed it an important application.

7/11/2024 - 8/11/2024 TOUR

These days were spent trying to further develop the tour. The main issue that was faced was trying to re-due the system to get user speech. The previous system was flawed and would only work on the first decision tree. The decision tree is a dialogue option that will respond differently depending on what the user says. What was happening is the decision (dialogue from the first tree) would still be present in the second. This led to incorrect behaviour in the decision tree. This was corrected and the new system should work better now. Apart from that, I was informed that someone else will be working with me. They are not deeply knowledgeable in coding. Hence, my plan is to create a document that outlines the functions of the application, highlighting functions, variables and what section of the code should be focused on. This should allow me to create one tour while the other person creates a second tour. This is good as it allows me to develop the applications in such a way to allow beginners to be able to easily create tours while being able to learn more about the system. Apart from that, nothing else was done. The next plans are to further develop the tour, create documentation for it and expand upon the functions that it can perform.

Week 11 – 11/11/2024 - 13/11/2024 TOUR

The focus of this week is to try and get as much of the tour application done as possible. On the Monday, the day started out with outlining the goals that need to be met. These goals are as follows: create temi tour documentation develop misuse and close to system, early breakout system and complete initial stage of the tour. From starting the day, three phases of the tour (the ones talked about in the previous log) were created. The start location and the Idle stages work as intended. The phase that needed to be checked is the phase that ask people to start the tout when they are in front of the temi.

After confirming that the start location was working as intended, the next step was to develop a part to ask questions. It when all right, with only a slight issue with trying to get the temi to go to the start location at the end of the loop. This has been fixed. I was also informed that there will be a tour at 4:10pm taking place. The temi can be used to take this tour. I need to create a system to show the tour. For this, I wanted to be able to show of how temi can follow someone. To do this, I created a system where the top of Temi's head can be touched. Once done, this will make temi follow a person. I confirmation that the phase worked is done by temi saying, “I am following someone”. One this is said, it is fine to lead the temi to the tour spot. It is annoying to lead the temi to the tour spot, but that is fine. To start the tour sequence, all that is needed is for the top of Temi's head to be pat

again. This will stop the follow mode and start the next sequence. I noted that on some occasion people will try to touch the top of Temi's head. This is done to “pat” the temi. The main issue with this is that the follow button is located at the top of Temi's head. This means that people can unknowingly break the tour cycle. To fix this, the button has been coded to deactivate when the follow mode sequence is completed. Once a basic start routine was created, the next goal was to have temi go to all the spot required for the tour. Essentially, temi will be programmed to go to a location and say a line.

On the Tuesday, some process was done. I outlined the goals that I need to get done for the tour. These are: testing to ensure current phases work as intended, update this logbook, create a temi pulling sequence to show everyone what the temi misuse system is, add a system for screen tilting, current method for turning needs to be improved, add method for getting the temi to communicate with another temi, report issues to the GitHub (issues with the camera needing to be displayed, Janky method for getting text from temi talking and the bug from the temi v2), create a handbook to explain how the tour code works and finally, create a method for re-locating.

One aspect of the tour is temi needing to go up a ramp. However, to do this there is an issue. Currently, there are black lines on the ramp. The detection system uses IR light to detect sudden drops in the floor. The black lines on the ramp absorb IR light more compared to other colours. This can lead to temi thinking that there is a greater drop on the floor then there actually is. Hence, these false positives cause temi to think it is not safe to go up when it is. Hence, this leads to temi trying to take another path apart from the ramp. To fix this, a system for hard forcing the temi up the ramp was created. This allows the temi to get to a sufficient part in the ramp where it can, with some difficulty, get up the ramp by itself. Apart from this, the other stages where refined and a script for the tour locations added. The script was sourced from previous tours present in the temi centre. There where images for the different tour spots, but I decided not to use them. Instead, I replaced them with AI generated images that suited the spot.

Wednesday was all about creating a system to allow for the interrupting of the tour when a person get too far. This took the entire day. There were some bugs in the code that will need to be patched out during the next day. Apart from that, everything is going very well right now. Yay.

14/11/2024 TOUR

PS. I ran out of paper to make a physical log

The goal that needs to get done is the following:

1. ~~Debug the interrupt system. (Current issues is having an interrupt be trigged, the temi gets to a new spot and is now longer able to progress. When this happens, the screen tilts up and down. This informs me that the temi is switching between go to location and finish location. Could be due to the system for repeat not working as intended. The second issue is the temi tilts it screen at a 40 degree angle when going to a location. This the hard coded method provided by the SDK. The issue with this is the temi relies on the screen to be able to detect people. If the screen is tilted to high, then as the temi moves from one spot to another, the temi will not be able to detect people Infront of it effectively.)~~
2. Update the user handbook on how to use the tour system.
3. Create sequence for showing the drag system of the temi.
4. Add system for turning the temi and tilting the screen
5. ~~Add in the gif showing how to talk.~~
6. Add system for getting two Temi's to communicate with each other.

7. ~~Fix Temi's ability to return~~ <- Still has issues on the return (getting through the door).
8. The go to location without the interrupt system seems to be having issues.
9. Q&A <- ChatGPT (Elevator Music for when it is processing)

--7--

Should be fixed. For some reason, the v3 wanted to go to the v2's charging bay. All I did was moved the v2 to the v3 bay and let he v3 have the v2 charging bay. Everything is working, so happy days ahead.

--1--

First part of the day will be spent looking at fixing the bug for the interrupt system. The probable reason has been outlined in the goals section.

~~**TODO:** There is a section in the thread that handles conditions when the trigger for interrupt needs to be set. What happens is there is a delay when a trigger is first detected. After a set amount of time, it checks again before setting flags. The second check only looks at if a person is missing. Need to add for if a person is close or if a person is misusing the temi.~~ <- should have fixed this, need to test to make sure I did not cause more problems. Tested and seems to be no issues

For the bug with the interrupt system, I think it could be caused by the speech system. I had a set up in the lab to try and trigger the bug, but it never triggered. This may be since when temi gets to the end point, it no longer is talking. I will test this out and see if I can replicate the bug. After testing it out, I can confirm that the temi speaking when it gets to a location does cause the bug to occur. I do not know if the bug is caused when an interrupt occurs or if it is just when temi speaks and gets to a point. Further testing found that the temi only has the bug when there is an interrupt and temi gets to a spot while still talking. If the temi is talking and going to a location with no interrupt, it will be able to get to that spot and complete talking without no issues. At this point, the rough area of what might be causing the bug has been identified. I will not begin to try and fix this bug.

The speech works by breaking the sentences into separate speech operations. This allows them to be interrupted and then have the sentence be repeated once it is done. The main issue is that this method needs to be run by itself to work. It is not possible to do this while having the robot move to a location. The location also needs a system to handle cases when it gets aborted. To deal with this, the speaking system was chucked into a separated thread in the cases when it is needed. However, the previous method did not have anything to prevent another thread from being opened while a speak thread is still in place. There is a flag used to tell the system if the thread is still talking. This flag is checked before creating another speak. Hopefully, this will fix the bug. However, I am not confident that it will. Bug still is happening.

The issue is that temi gets to its spot, but because it cannot see anyone it is forced to go back to that spot. The reason the screen keeps tilting is since moving is a 40-Degree angle and at spot is 20 degrees. I will add a system to prevent temi from trying to go to location if it already is at a location. The system that I added checks if the system has completed. If it has completed a flag will be set. This flag will then allow the temi to break out of the go to as long as the repeat go to flag (which is set if there is an interrupt) is not raised. This system did fix the issue with the Temi's head going up and down. This also fixed the issue where the temi would get stuck at the location once done. The breakout of the go to loop was controlled by whether the temi has aborted. But the issue with (Now that I know what the issue is) this is that their interrupt causes a state of abort. That means when the temi does successfully complete the trip, if an interrupt is trigger it would override that

complete. Hence, the bug I was seeing. This should be patched out now. More trails and testing are needed to ensure of this, but the issue does not seem to be coming from the test bay area. Thank goodness this is fixed; it was killing me very slowly from the inside. <- Never mind, there was still a small issue with the system get stuck at spot with the same situation. Issue was not too hard to find. The repeat flag was not being controlled in the way I thought it was. I had a system that did !repeat_flag. This was causing the flag not to be deactivated when it should. Changed it so the flag was repeat_flag = false. This fixed the issue. Hopefully no more bugs pop up. But that is being to hopeful.

--5--

Added in the Gif into the quiz. Tested it and looked fairly good. Not though that there is no system to get the Gif to work alongside the yes and no user check. Should be easy to implement, just have not done it and do not think it is worth doing yet.

--1--

Next goal is to try and fix an issue with the go to method. The go to method uses a function provided by the temi SDK. This mean it is not possible to alter their code (From what I know). The problem comes from when the temi moves backwards, the screen is tilted at an angle of 40 degrees. This makes it so that the temi can only detect people remarkably close. This makes the interrupt system that I have made useless. I need to try and patch it out. I tried to use a tilt screen command before and after temi uses the SDK go to command, but this did not see, to do anything. I will try another method. My current idea is to create a thread that runs when the go to is run. What it will do is continually use the tilt screen command. My hope is this will override the go to method and fix my slight problem.

--8--

The temi seems to be having issues with using the go to without the interrupt. This will need to be fixed. Not sure what the use is, but the Temi's head keep jittering and the temi says there is something in the way. Not sure what I did, but it is now working again.

The temi got stuck at the tour end. It was repeating the thank you line multiple times. It should only do thus once. Will need to investigate the issue of this. The issue is caused by the repeat flag not being able to be closed when the if the interrupt system is not set. While this should not be an issue, due to the multi-thread nature of the application it could run into an instance where this is an issue. Made an else if statement to allow the closing of the repeat. This should patch this problem. There should be no other reason the dialogue repeats unless the repeat system is not being closed. (Temi is low on battery, will need to test this tomorrow).

--9--

Will try a look into how I can get a chat GPT plugin to work. I do not have a lot of time, so I do not expect to get much done today. What bad luck.

15/11/2024 tour

1. Update the user handbook on how to use the tour system.
2. Create sequence for showing the drag system of the temi.
3. Add system for turning the temi and tilting the screen
4. Add system for getting two Temi's to communicate with each other.
5. ~~Fix Temi's ability to return~~ <- Still has issues on the return (getting through the door).

6. The go to location without the interrupt system seems to be having issues. (Head does not tilt an Idle angle for detecting users.)
7. ~~Q&A <- ChatGPT (Elevator Music for when it is processing)~~ <- Need to collect data to answer these questions.

--7--

Continuing off from yesterday, I am trying to implement a Q&A system into the temi using the OpenAI Plugin. I have found a YouTube video that I will use as reference to try and teach me how to set it up. ~~URL to the video is this: https://www.youtube.com/watch?v=Szo2X4IMl8Y.~~ The video was useless, I ended up looking up Open AI and looked at the libraries they suggest. There is one for Kotlin that I ended up using. https://github.com/aallam/openai-kotlin/blob/main/guides/GettingStarted.md#retrieve-message. Did not what the video so much but used a link from the video description that to a GitHub page that had sample code that I could use. Managed to get the model working and is responses as intended. Also, made it so that elevator music plays, and GIF shows up when it is thinking. Overall, I am happy with the outcome. The last thing that would be needed is to collect data to be passed to the model so it can use it to answer questions.

Week 12 – 18/11/2024 TOUR

1. Update the user handbook on how to use the tour system.
2. Create sequence for showing the drag system of the temi.
3. Add system for turning the temi and tilting the screen
4. Add system for getting two Temi's to communicate with each other.
5. ~~Fix Temi's ability to return~~ <- Still has issues on the return (getting through the door).
6. The go to location without the interrupt system seems to be having issues. (Head does not tilt an Idle angle for detecting users.)
7. ~~Q&A <- ChatGPT (Elevator Music for when it is processing)~~ <- Need to collect data to answer these questions.

From last week, there should not be any other goals that I need to get done this week. I think for today though my focus will be on trying to get communication between the Temi's working. In this case I am talking about the V2 and V3. I will have to turn off the greet mode for the temi V2.

--4--

The first thing I am going to try and do is set up my old for BLE. I am not sure if I will be able to connect to the Temi's with BLE and might need to switch to the classic. However, once I have connected the two, I want to send a message to the V2 from the V3 telling it to move to a location. This should allow me to do most of what I want.

I looked at trying to scan for the Temi's but ran into an issue where they cannot be detected. However, my phone can detect them. This tells me that my system needs to be changed from BLE to classic to connect. Switched my system and I can now detect the signal from the V2. This is good as it them allows me to do the next step of trying to connect to it.

Currently making some changes to the passed code I have for classic. Current version can only scan. The name of detected devices can be clicked to try and connect, but currently I am not able to successed in connecting with the temi v2. Currently get and error. I changed a few things. The first to move the scan button from the top of the screen to the middle. This will prevent the top section of the temi getting in the way of the scan button. The second thing was to make is to if the name of the

device is null then it will not show up. The reason for this is there is no point in looking for device with no name when the Temi's all have names. It just adds unnecessary clutter to the screen.

Most attempt I have made to create a connection and transfer have not been successful. My exploration has found that it may not be possible to connect to devices using the temi v2, but only to be connected to. I am not sure what other limitations it may have but I am having trouble being able to send data from the v2 to the v3.

Thursday 2:00pm – lecture will bring 6 students. They are Chinese, I will try and add a system to translate it into Chinese. Explain the temi, use V3 to show the tour. I will switch and try to get the translation system for Chinese working in my application.

Found a method that will allow me to get the language and the text from what a user said. Will need to test this out. It thinks I have a system to be able to detect language spoken by the user. I can confirm it detect English, but I have not checked it detects Chinese. I want to next look at how I can get temi to speak another language with a better accent. **There are three diverse types, I need to know which one is best to use.** There should be a system in place for converting all the text in my application into Mandarin. The only other thing I need to do is get responses from users and have the be translated into Mandarin and get ChatGPT to respond in Mandarin. Also note that I change the ASR language in the model in the wake up, not it should convert speech into Mandarin.

19/11/2024 Tour

The first objective is to get the tour set up with the translation into made Mandarin. I have converted all the lines of text into string resources, but I am having issues as I need to be able to use the context to get them. What the problem is trying to figure out how I can pass that context onto the viewmodel. Once done, this should convert all the text into Mandarin. The next step would to be looking at how to convert speech to the temi into Mandarin, will need to do testing. But my system should automatically detect the language. There may be a way to set the ASR language side stepping this whole issue. I hard converted three things into Mandarin. The first two are the words used for rejecting and confirming something and the third is in the string extract. Will need to change these back to ensure that the system works as intended. The last one is a list of goodbyes.

Here is a list of things that need to get done for the tour starting in highest to lowest order:

- First, I need to ensure that all dialogue was been converted into Mandarin. Also need to ensure that the program and run on the temi (having issues with getting the content to work
- Second, I need to ensure that the ASK is converted into Mandarin. If this is not done, certain section of the tour will not be possible to get done.

I have done a trail run of the tour and everything is working well, but there are a couple of things that could be improved, added, or patched. One issue I had during the tour was there a point when temi asks for your name. I tried to reject this be saying no but is kept creating a conversation preventing the comment from every being registered as intended. There is a way to patch this, but it would cause issues with the face animation and would require me to create a new system for animating the face.
I could also integrate ChatGPT into the model. The last thing that I can do is patch up the interrupt system. The screen tilt is causing issues so this could be addressed. The priority order is the interrupt, conversation then ChatGPT.

For the interrupt system, the method I am going to use to fix is to first create a system that will constantly tilt the screen to 20 degrees. If this does not work, the next idea is when the temi goes to a spot and their interrupt system is one, it will occasionally pause and look down to check if people are in front of it. Testing with trying to span the tilt screen down found that it would prevent the temi from working as intended. The temi was not able to move at all. The next step is to try a system of getting temi to stop and look down, after a set period. I could add a new part of the interrupt system that would make is so if nothing is detected in five seconds, Temi's movement will be stopped and the screen tiles and after another five seconds the interrupt system kick in. This system is only necessary for the go as the speech can have the screen tilt to whatever it needs to be.

I made a couple changes to the system. I change the interrupt system to check after 10 seconds then after five more seconds to stop. I noted that when temi gets to a position it tends to turn. This turning leads to temi being out of sight of the people it is showing the tour too. Hence, increasing the time from five seconds to 10 seconds just provided more time to position the temi. I found the issue with the conversation being interrupted by the conversation. Stateflows is what is used to update the speech. A quirk with it is the state does not update if the new variable to be update is the same as the old. Hence, in states where the same phrase is repeated multiple times it leads to the system not updating. Hence, no speech state update means no ending of the conversation. To fix this, I added a time stamp to the data class that stored the speech. This allows for each update to be unique. Thus, I am sure I have fixed the speech. At this point all the systems added to it should be working as intended. Just need to run more trail runs to ensure that everything is working and iron out quality of life features.

Need to create a system to explain that people need to be Infront of temi during the tour <- THIS IS A TODO

I finally figure out how to connect and send information between the two Temi's using the Bluetooth Classic. The issue was I was trying to use a pre-existing UUID that the temi had. The UUIDs have characteristics that specify how the port can be used. You can create your own UUID, which I did, and it is working. This is good; it should be possible to get the two Temi's to communicate with each other.

20/11/2024 Tour

1. Update the user handbook on how to use the tour system.
2. Create sequence for showing the drag system of the temi.
3. Add system for turning the temi and tilting the screen
4. Add system for getting two Temi's to communicate with each other.
5. ~~Fix Temi's ability to return~~ <- Still has issues on the return (getting through the door).
6. ~~The go to location without the interrupt system seems to be having issues. (Head does not tilt an Idle angle for detecting users.)~~
7. ~~Q&A <- ChatGPT (Elevator Music for when it is processing)~~ <- Need to collect data to answer these questions.
8. Add more GIFs. Try and make then so that they can be understood without language barriers.

--4--

From yesterday, I managed to get a system in place that allowed the Temi's to communicate using Bluetooth classic. The next step would to be able to integrate this system into the tour application. The question that I need to ask myself is how to I want to go about using it. Where would be the

best part to add, should it be added multiple times. These are the questions I want to figure out before integration of the code. My current idea is to have the communication happen at the end of the tour (Before the point under the poster where the temi says goodbye to everyone). There may options to have it at other places. I think for now it might be better to just have it at that one spot.

Here is what I am thinking for the integration between the two Temi's. Note that V3 is the temi V3 version while V2 is the V2 version of temi. Temi v2 will block the way of the temi v3. This will be done be using a define location on the map. When this happens, the temi v3 will stop about a meter in front of the v2. When this happens, the v3 should turn around to face the v2. When the v3 is in position, the v2 will then say, “What are you doing, I was meant to be the one to show them around. It was my turn.”

The temi v3 will then reply, “You were sleeping so peacefully. I did not want to wake you.”

The temi v2 will then move left to right while saying, “No, no, no. I told you when it is my turn to take the tour you must wake me up.”

Temi v3 will reply, “Ok, I will remember for next temi. But please do not do this now, I am doing a tour, and they are behind me.

Temi v2 will reply, “Fine, but I am telling the creator about this!” After saying this dialogue, the temi v2 will then move back to the charge bay.

To get this to work, I need to create a system that will allow me to connect the two devices. I noted that things work a lot nicer when the Bluetooth stuff is handled in the view. I might see if I can move this into a class that the viewmodel can that access to call upon those functions. It would make things a lot neater and easier to implement on my end.

I have a system that is set up and now am running tests to ensure that the system work. However, looks like a ran into a bug when trying to upload the code onto the temi. There was an issue with how the hitlview worked, managed to patch it out and get it working. When I mean working, I mean the application start the downloading onto the temi. It takes a bit to upload code onto the temi v2. There was an issue with getting it to run on the v2, but for the v3 it seems to be working as intended. Will try to upload the code again onto the temi v2.

Found out what the issue was. The version on the temi was different from the one uploading to it. The v2 has a hissy fit when this happens and requires you to uninstall the application on the temi. I have done this and will try to set the client on the temi v2. I had issues with not being able to detect the temi v2. The issue was caused by the fact that the permissions for using fine location were not given.

Now that the temi v3 can detect the v2, the step is to open the part for the temi v2 to connect to the temi v3. Check for the connection and everything is working at intended. Now that the communication system between them is set up I just must implement methods to get the temi to do things. Now, once they have sent the messages to each other they close their connection. Should do test to see how far away I can have the Temis before they must detect each other.

Current system will close socket once messages are sent, but the server will remain open to allow connection from the client.

What I want to do is have the client and the server to connect. When successfully connected I want them to continually send messages between the two of them. The goal of this is later I will add a gate that will prevent a message from being sent back before an event takes place (this event could

be something the robot needs to do). <- Changed the system to infinitely loop between sending and receiving. Just need to make a system that will hold messages until a flag is triggered. This should allow me to make scripted events.

The client must wait until an event occurs to send the message then must wait until it receives a message to move to next state. For this, there is a flag that is set to null. When an event is finished, this flag must be changed to false. This will allow the client to send a message to the server. Once done, the client will the wait until it gets a response from the server. When it gets a response from the server it will change the flag to true. This flag will be used to tell the system that the next event can take place.

There are talking, but I need a system more robust that can handle disconnect situations and allow for repeat. Ideally, I would want to connect at the start and disconnect at the end, but I am not sure how far the connection will work for.

There are exceedingly long pauses that keeps happening.

21/11/2024 Tour

1. Update the user handbook on how to use the tour system.
2. Create sequence for showing the drag system of the temi.
3. Add system for turning the temi and tilting the screen
4. Add system for getting two Temi's to communicate with each other.
5. ~~Fix Temi's ability to return~~ <- Still has issues on the return (getting through the door).
6. ~~The go to location without the interrupt system seems to be having issues. (Head does not tilt an Idle angle for detecting users.)~~
7. ~~Q&A <- ChatGPT (Elevator Music for when it is processing)~~ <- Need to collect data to answer these questions.
8. Add more GIFs. Try and make then so that they can be understood without language barriers.

For today, I would like to try and integrate the Temi's talking into the tour. My plan is to add it right at the end. I have noted that connecting to Bluetooth classic takes some time. I was planning to start connection at the last point of the tour. This should allow for ample time for a connection to be established by the time.

TODO: Would like to also add a system that will allow me to bypass all talk sequence if the connection between the two Temis is never established. This will allow the system to be more robust.

TODO: Would also like to implement a system to allow for temi to communicate using ChatGPT. The idea is to have a talk counter and when that talk counter exceeds a set threshold, the context provided to the model will be changed to try and finish the conversation.

TODO:

- **Clean Code (Code is starting to get a but disorganised, would be nice to clean it up.)**
- **Add communication system between Temis using ChatGPT**
- **Add gifs**
- **Implement dragging system.**

Testing has found that the Temis are working as intended. Will try to add a script in for the temi's. The map of the v2 is different from that of the v3. I will need to change the v2's charging bay location on the map.

I want the temi v2 to move upon a connection. This has been done, also have a system that will make temi return once conversation is done. What I want to do is create a system for the v2 that will make is return to home if a disconnect occurs at any point. The second is to make the temi be able to handle cases of when disconnect occurs. This is most important to get working as the temi v2 takes a long time to upload code. Doing this will be a massive increase to productivity.

22/11/2024 Tour

Today is more so going to be dedicated in trying to work out the issues with the Bluetooth classic system. The two major issues that are currently being faces is inconsistencies with commination times and being able to reconnect if a disconnect event occurs. The first issues that is being tackled is the commination issues. I talked to Dr. Foo yesterday on what could be the issues. From it we managed to ideate to look at the log of the buffer during collection to try and get a better idea what is going on and potentially switch out the blocking function of read with something more dynamic. Another idea I had is to keep a constant data stream flowing from the two Temis. I noted that when I first was sending data that constantly sending info did not seem to come with any significant delay for the project at hand. Might be an idea to test out if other systems do not work out.

Things to investigate is the buffer, stake overhead and the sniffer. I will look at the sniffer first. My plan is to adjust the method used for sending messages. Instead of sending them back and forth when a condition is met, I will keep the communication line live my sending messages constantly. I will then change the state of that message when a state occurs and have it work that way. It will require some alterations on how the system works.

With the new system implemented, I have yet to come across any delay when sending messages. More testing and trials will be needed to ensure that this is the case. But overall, things look like they are working. I also have a system that will make the temi v2 wait for a connection when it loses its connection with the temi v3. TODO: All I need for next is a system that will allow the restarting of the sequence and a system to skip the communication segment if the two Temis do not connect.

Week 13 – 25/11/2024 TOUR

Pretty much going on what I did last week with trying to get the communication working as intended. The three main things are getting a system to handle cases where the V3 does not connect with the V2, creating a time out system for the V2 so that is knows to go back to bay if left waiting for too long. The last is to try and get ChatGPT to communicate through the system.

From last week Friday, it was noted that the Temis at the end of the day had a significantly difficult time trying to connect with each other. Not sure why this was happening, but it is something to note. I am not sure if it is something I have done wrong in the code by mistake or there was another factor influencing the behaviour. I will need to check this out. I also bought the Kit-Kats for the dispenser. Not sure if they are the right size. Will find out at some point.

Testing found that the connection work when the Temis are close. However, I have done runs previously were the Temis have been able to connect from the spot I desired. I will try to do further testing to find out the issue. I thought it could be an issue with the buffer or using delays but does not seem to the case. I tried to create a system that would allow the Temi to try and repeat connection attempts in cases where it has failed to connect. This did not seem to work as when the

Temi V3 got close to the V2 there was still issues with trying to connect. I might try adding a delay after the temi starts moving to see if I can get the temi to try and connect a little but closer.

I have done more testing and found that there is something in my code that is preventing my search system for the client from working properly. The reason why I say this is if I manually move the temi to R412, comment out the go to command and run the code the temi can connect as intended. I noticed it had issues connecting close as well. I just need to find what the cause of the issue is. I will but the go to R412 in and see if it connects, if it does not that may suggest that something that occurs in the go to causes and issue with the connection of the Temis. I did this and the temi was not able to connect. My next test will be trying to add delays in section to see if this will help at all.

I had a go to, and a delay and connection was not working. I commented out the got and left the delay and the connection failed. I commented both out and the connection was working again. Further testing has found that the code works for the temi v2 for searching but the v3 has issues. I will try to switch the code so that the client is the v2 and the server is the v3. I am hoping this will circumvent the issue with the v3. I am not sure why it is an issue with the v3 and not the v2.

The idea is to make the v3 the server and the v2 the client. The v2 will constantly try and connect to the v3. This should be the case for all failed attempts and dropouts during communication. On the other hand, the v3 will only allow connection when it needs, otherwise it will reject attempts to connect. When the temi is connected. The first flag sent from the v3 will be used to get temi in place when it is needed. The second flag will begin the conversation between the temi v2 and the v3.

I still need to do more testing and editing to get the communication working as intended. The process has been incredibly annoying. The temi v2 keeps crashing and is not running code that the v3 is running. The v2 is low on battery which may be causing the issues. Back this is causing issues for my development. For the rest of the day, I will work on the software that I was working with someone on Friday, they wanted a system for buttons to move to a random spot on the screen when pressed and have a stop button the moves around the screen at random.

TODO: create a method to close the connection once done on the client end only (The server end already has a method for reconnecting).

26/11/2024 TOUR

Doing the same thing as yesterday, trying to get the communication working. The temi V2 seems to have significant decrease in performance when the battery reaches the 50% mark. It has constant crashed and the code for running the Bluetooth does not work even when it runs fine on the v3. Hopefully I can get it done today. There is not much more to implement. I just need a method to allow the v2 to passively wait to connect when disconnected to allow the system to reset. The second thing I need to do is make it so if the v3 cannot get a connection with the v2 it will ignore the whole talking sequence. I might add in a method to prevent the temi v2 from connecting if the battery is bellow 50%.

I will start the day checking if the issue I was experiencing yesterday was an issue with the temi or an issue with my code. Otherwise, I will proceed with trying to get the v2 to have a passive connection system and see how that works. After looking at the Temis I found that the issue was caused by a function not working well on the V2 that I tried to use. The idea was to try and connect to devices only using the mac address of the device. This would cause the temi to not work as intended. I removed it with the old method of searching for the device via its name then connecting to it. The address is saved the first time, other connection attempts after a disconnect does not need to search. I tested this system, and it worked well. I also managed to get the ChatGPT conversation

working. It is almost done; I just need to test it and iron out some bugs that are in it. I did not that it is not possible to use the ChatGPT in the v2. The entire conversation is generated in the v2 which then feeds it to the v2 so it can say. It does work though which is great.

~~**TODO: Ask Dr. Foo if he would like to add codes to the quiz app so that way a person can grab a card and only be limited with a certain number of runs. I can also make it, so the system has an archive of questions it can draw upon, so the questions are not always all the same. I should also ask what types of questions he would like.**~~

TODO: <- This is pretty much everything

- **Clean Code (Code is starting to get a but disorganised, would be nice to clean it up. Not necessary)**
- ~~**Add communication system between Temis using ChatGPT**~~ **<- almost done**
- **Add gifs <- Try making them in PowerPoint or try recording them**
- **Implement dragging system.**
- ~~**Fix it from getting stuck**~~

27/11/2024 TOUR

Yesterday I managed to fix the issues with the communication system between the Temis and also get ChatGPT running on it. I just need to do some patching for the ChatGPT as there might be some slight issues with how things work, it works but not as seems less as I would like. An example of this is the fact that when the Temis leave, the v2 leaves a lot sooner than the v3. The other thing that I would like to do is run some tests to ensure that cases are working. This includes the v2 not being set up to connect, asking no question and asking question. The is also an issue with the ask question being prompted on no I do not want to ask a question. This is caused due to that response being a user response. I have added something that should clear this up and make sure it works as intended.

One of the systems that I would like to make is a timeout system. Essentially, if the robot is left without any person in front of it within a set period of time, the temi will reset and go back to the start location. I could get this done by making it so that the system that handles the states is a launch function that is global. This would allow me to launch it in the tour area and be able to cancel it in the interrupts system. I have done some work on it, and it seems to be working now. I will do a trail run to ensure it is working.

The next thing I want to do is change the display of temi v2 so that the idle animation makes it appear to be sleeping. This should be easy to implement. After that, I want to try and add in the rest if the gifs into the tour.

Another thing I want try and get today is to create a system to report bugs. The idea is to have temi out actively waiting for users to try the tour. I case of bugs, I want to add a method so that users can make a report, and I can fix it.

- **TODO: <- This is pretty much everything**
- **Clean Code (Code is starting to get a but disorganised, would be nice to clean it up. Not necessary)**
- ~~**Add communication system between Temis using ChatGPT**~~ **<- almost done**
- **Add gifs <- Try making them in PowerPoint or try recording them**
- **Implement dragging system.**
- ~~**Fix it from getting stuck**~~
-

28/11/2024 - 20/12 2024 TOUR

My current plan is to set the Temis up so that they can perform trail runs. Before that, I need to do a run through of the temis to ensure that everything they are doing is correct. So, that is what I will do. Apart from that, I will begin doing documentation and will go to look at the Temis every so often to ensure that they are behaving as intended. After some minor patches, the system has been set in such a way that it is ready for trial run with test users.

While that is running in the background, I plan to start creating some of my formal reports now. As I am already a fair way through and have two main projects done for this task, it is possible for me to start writing about what I have done. To start off with, I will write about the creation of the Tour application since that is the done that, I am most familiar with as it is the current project I am working on. However, before I do that, I need to get the basic parts of my report done. This includes the title page, executive summary, acknowledgements and finally the Table of Contents.

On the Friday nothing of not occurred. The main thing that was done was setting up the Temis for testing. Documentation for the Final Report has also been started. I also now have a list of tasks that need to be done for the tour that is taking downstairs. I have a point of contact to which I can send my work.

Week 14 – 2/12/2024 TOUR and OH2024

Still doing more trial runs with the Temi tour. My goals for the day are simple, the first task is to get the code done for the Temi tour downstairs. After that, I will continue doing documentation for the final report. My idea for the report is to split it into different periods. One period will be about creating content, the next ensuring the content is good and the last generating any material that would be good to support (Such as images or tables).

TODO:

1. Tour

--1--

The table below outlines some of the stuff that needs to be done for the open house. This will be my first task of the day. I will start by creating the buttons.

**Table of program specs given for open house of 2024

Temi program specifications for OH2024 1. Greeting Module: - Function: Initiates a greeting when a visitor approaches within a defined distance (2 meters). - Temi walks around the area. A system for a randomized positioning around the general area would be great. (optional) - Output: Text-to-speech (Female voice) message such as "Hello! How are you today?"   2. Button Prompt System: - Three Buttons with distinct functionalities: (location or destination). - Provides verbal directions using

Button 1: Q&A (about Robot Functions)
- Function:
- Responds to common questions about the robot's capabilities.
- Predefined responses stored in knowledge base (e.g., "What can you do?" or "How do you work?").
- ^ If not possible, can use buttons instead of vocal response
- Some Clark stuff 💀

Button 2: Directions/Locations
- User is brought to a selection of locations within S block
- About 4 locations
- Design the buttons, Clark will fill in the blank locations himself

Button 3: Tours

- User is asked if they want a Tour around the S Block
- Temi brings them around a tour and talks about the 4 locations

I have spent some time working on the project. It took some time to set up the application in a way that would make managing the code easy. What I implemented was a system to allow the different screens in the application to be managed easily. I have completed the home screen and am not working on the general Q&A style questions. My first step is creating a hybrid between being able to ask temi and then being able to use predefined questions. I also added an exit button that allows going back to the home screen.

I let ChatGPT generate an approximate model of what I want this page to look like. The current changes I want to make alter the home button. At this point of time the home button is too small. I have made it, so it is a little bit bigger. Also want to add a big button that will allow asking temi a question.

With the basic UI done for the Q&A, the next part is to start implementation of the functionality. There are two main parts to this section. The first is pressing the Ask question button. What this will do is start up a prompt for temi to listen to the user. The result of the speech will be saved and used to generate a question. The idea is to use ChatGPT to dynamically generate a question. The second feature is using a list of pre-done questions that a user can press that will open a pre-made question. The idea is the answer to all those questions will be available to ChatGPT which will allow it to respond to those questions and more.

I will start doing the layout for the list of questions. What is meant to happen when a user press one of the question options temi will then begin to talk about the answer. I am not sure but can also make a system that will allow displaying text or images to make the answers more engaging. I will make it so that when answering a question, if the screen is pressed it will stop it early.

I added a method into the app that will speak out the dialoge when the button is pressed. My next step is to create a system that will open an image/text when this occurs as well and allow it to be closed when it is pressed again. All this has been implemented in. I do want to make the temi stop talking when it leaves a page. I will do this by sending in a speech to temi. Will need to change the ask question to remove the condition gate to allow for this to happen.

TODO: Want to add in a timeout system that will allow automatic returning to the home screen if the system is not interacted with in a set period of time.

3/12/2024

I am currently working on the specs that were given by Clark. I am hoping that I can get it done today. Most of the framework for the application was done yesterday, so things should be a lot easier. Since yesterday I have been working on trying to improve the functionality of the second screen location and direction. I have the buttons added, but they currently do nothing of note. My goal for these buttons is when they are pressed it will open a map of the area. The temi will provide the user with an approximate area that they are in and provide directions to the location that they are looking for. The temi will ask during this phase if they would like to be shown there. If yes, the temi will lead the user to the location.

I also thought of an issue that may happen with the first button. I never tested if it was possible to interrupt that question by pressing one of the pre-scripted questions. I need to test this and see if it is the case. I was correct, there were issues with trying to stop the ask question to do one of the answered questions. I have worked on it and the new system should be working. Most of the issue was the question and answer was designed with no consideration of needing to break out of it. So, it took some time to adapt as needed.

I am now going back to working on button 2, Direction and location. I have changed the size of the four location buttons as well as added in sound effects when they are pressed, they make sounds. I also increased the size of the text inside of the buttons to ensure that they are easy to read. I also changed the shape of the buttons from their circle to not more of a square. They have rounded corners now. The next step is creating a system to show the user location on a map based on Temis' current location. I have made a model of a map and created an indicator icon. I created a system that will allow the temi to go to coordinated on the map. The next step is to put that position onto the map and see how it goes.

I created a method of displaying the locations of positions on the map I created. The accuracy is not very high, but it does give the approximately positions which is what I want. Next, I want to add the user position on the map and have the position update in real time while the image is up. It is working as intended and did not take a lot of effort to implement. It is also pretty accurate, which is surprising given the rough approximation a had used for converting the actual position coordinates to the pixels of the map on the screen.

The next step I want to take is to create a system that will ask the user if temi would like to bring them to the location. If the user says yes, the temi will then go to that location. Otherwise temi will just show them the map. If showing the direction, Temi will say a line about how they have arrived at their location and then close the map. The other case, temi will tell the user to take their time and tell them to touch the screen when the have finished.

Both those cases have been completed. But I have yet to check out any early cases. These are cases when the user tries to exit early. I think for this case I will make it so that when temi is talking, it will not be possible to exit the page. This will make things easier in the end and also makes sense to me. I can always change it down the line.

My next goal is to add a system to interrupt so that if a user leaves the temi it can stop showing directions. However, thinking about it as I write, the location will have lots of people which may trigger lots of false positives. I will ask if they want this feature, but I don't think the effort is worth

the reward. My other goal is to add a system that allow temi to give the user directions. The exact details of how I am going to do this are not fully fleshed out, but I will see what I can cook up.

04/12/2024

I am starting the day by continuing on the work that I did yesterday. I am still on button two. However, the current functionalities of that page are enough for it to be considered with some adjustments to the UI. What I want to add is a system that will show the user the path to take to get to their location. I want this path to be based on the user's current location and if the Temi shows the user the location, I want the points to adjust as need to show the user where the location is. I am not sure how this is going to work, but I will give it a shot.

I created a system that allows me to create a line out of dots by selecting two points. The way that the points are laid down in in a four loop. I can create a condition that alters what does are put down. This should allow me to create a pathway to the location. My goal is to create a system that allows the dots to disappear as the temi moves. My idea is to use the current location of the temi and to start generating dots starting from the closest dot to the temi. When the temi gets too close to a dot, that dot will then disappear. I have a couple issues that I can see being an issue. The first is how effective the dot disappearing will be, given the temi does not follow the path outlines, then the system may not work well. The second is being able to identify the direction of movement. I need a method to the dots which direction the temi is going, otherwise it will not know what direction to generate the dots. Fortunately, I think most paths that I will have will be linear in nature. That means, if I want to get to a location, the path I take will be constant. Hence, I can add a variable to pre-define the direction as a simple method. As my dot system already requires the user to add a start and end point for the line, it can be used to dictate the expected direction the temi will take.

I also added a small patch to the asking for direction system. Before, if the user did not respond the temi will keep asking the user. I thought this was not the best, so I made it so if no response is given to the temi it will see it as a negative response and stop querying.

Wait a minute, I can make it so that the dots only continue from the closet one to temi. This would make things so much easier for me. Ok, the system is implemented, and it seemed to be working exactly as I wanted it. The next thing that I need to do is be able to link those different paths together. Currently, my method only works with one line. I need to patch.

Ok, I did some programing and have a system that allows me to attach lines. One thing i was thinking of adding was a method that if two points have the same distance from user, the point further along the path is kept. However, I desired against adding this since the path is meant to be the way that temi should be talking. There should be no cases where the temi should not be following the path.

For not, I want to go back to the method I used to convert the coordinates from the real to the created map. As of now, the system is not as easy as it could be to convert things. It would be good if this was better. I also have another task. Doctor Foo has asked if there is any method that can be used to get the map on the temi. I will have a look to see if this is possible. It may be possible to get the map data and be able to use that to create a map.

05/112/2024

Need to continue patching up an issue that I had with the coordinate conversation system. After that, I will try and see if I can get the map from Temi Center and use that. Ok, I created a system that allows the user to select two locations from the Temi Center map and two locations that relate to those points on the created map along with the degree change of axis. After that, the rest of the crunching is handled by a function I made. I must note that there is no system in place for handling

the squishing and stretching of the map created. I have no idea how the function would handle it. I think it should be fine maybe. I checked the approximate position according to real and it does not seem to be so bad. There is a slight in accuracy, but it is not a world ending thing.

That system should be all good and done. The next step is to create a system for the last button. I might leave this and handle the greet mode first. The last button is meant to start tours. The reason I want to start with the great me mode is to start to develop a system to override that mode. The temi needs to stop if it sees a person and then if a button is pressed it should stop. I think now would also be a good time to create a timeout system that will set temi back to the home and back to greet mode if left idle for too long.

From what could be probably derived from the top, I will need to start creating the system for the greet me mode. From the list of specs, the following is needed: Detect people within a 2-meter range, go to location points at random, when someone is detected say hello. The first step I will take is to create a move that will always do this, I will not worry about overriding this mode for now. I just want to get it working first.

06/12/2024

I am still working on the greet mode. I have everything implemented, but I am doing a few patches to help improve quality of life features. The current feature I am adding is a timeout system. This system will allow temi to go back greet mode automatically if not interacted with them for a set period of time. For this I need to make a few flags. I cannot just make it so that when the screen is touched the timeout resets. I need to add cases for when temi is talking, temi is thinking or going to a location. I have not fully implemented all flags yet. It is in though. The second thing I would like to add is a delay for when I user is not detected any more when a detection event is triggered. At this point of time, when a detection event is triggered as soon as the user goes away this flag closes. The issue with this is it causes temi to constantly stop and go if there are many people moving about. By adding a delay after the user is lost it allows temi to let the user get back into line of sight it gives time for people to move away from the temi. Either way, I think it would be a good feature to add.

Another feature I would like to add for events when temi cannot see the user. I can use a system that will get temi to turn in the direction a person was once seen. This should help improve temis locating the user better. I also need to add a method to exit out of the show location once it has done showing a person to a location.

I think it might be worth adding a delay to the temi after it has detected the temi and is going back to greet me mode. This will help it overcome cases where people are standing around and not interacting with the temi necessarily.

Patched up an issue with the issue with the idle face. What was happening was the idle face would disappear before the face talking occurred. This created a brief moment when the home screen could be seen between the idle face and the talking. This issue is mainly an asthenic issue, either way it has been patched now. The method before used a flag that checks if the detection of user is valid. I created a new flag just for the idle face which occurs a little later than the validation of user detection.

I added two more delays to the system. The first a breakout when the temi detect a user. It will wait five seconds and if the user does not interreact with the buttons it will leave. The second will prevent the detection system from working five seconds after a precious detection trigger to allow temi time to move away from the person it detected.

Added the last few patches to the timeout system and it is good to go. I will begin to add a system for getting temi to turn in the direction the user was last seen. **<- Might not add this for now as it may not be as useful as I think it is. The current system works fine.**

Added a patch in. There were cases when going to a different screen the temi would still be in constrained follow mode. The idea was that when the user gets close to temi in the home screen it would turn off the constrained follow. However, if the trigger does not occur it can lead to the constrained follow being left on. Made a system that ensures that constrained follow is turned off if home screen is left.

The next step of my project is to go back to the functionality of the second button. At this point of time, once it shows you to a tour spot that is it. I would like to add a bit more to it. The first thing I would want is once it gets to a location it will then say to the user that it has made it to the location. It would then ask if the user needed any more help to be free to browse through its options for more assistance. It should self-close the image of the map once this is done.

Week 15 – 09/12/2024

Going based on what was completed last week on Friday, I found that there was a method to get access to map data. More importantly, this map contains information that can be used to render a map. The method was a one-dimensional array. With in the array is integer values that correlate to certain features of the map-. For example, the value of –1 is used to represent empty space. With this information I was able to create a bit map then render that map into an image. Currently, the issue that I am facing is finding ways that I can use to get the Temi coordinates onto the map. Once I get this done, it will be very nice. The other thing I want to be able to do is have the map interactable. This means being able to zoom in and out of the image and move around the position. I will see how easy this is to do.

I am having issues with trying to convert the coordinates from the temi center map to the map I have rendered in my application. What I am sure of is that the two points that I use to define my points on the created map are correct. What I am not sure of is the point of the temi center.

My current idea is to move temi to the battery bay and record it coordinates and move the point on my map to correlate to that location.

10/12/2024

Yesterday, I read an issue log that was put onto the Temi GitHub that explained a little more information about the map and what it means. The first thing is that the values provided are meant to be in reference to the home base. Hence, at home base the coordinates should be (0,0). The second thing is that the units are in meters and the axis follows the right-hand rule. Essentially, point your index finger in the direction the temi would be facing when it is charging and the is the positive-x direction and the direction the thumb is pointing is the positive-y direction. I also found that the height and width values gained from map data is the number of pixels that map has. From looking at the map on temi centre, you can find that the grid represents a square with a height and width of 35cm. In each grid, one side can be comprised of 7 pixels. This means that each pixel represents 5cm or 0.05m. If you have investigated it, this value provides the resolution value that is gained from looking up the map information.

From breaking down the values, I noted that everything that I have covered was done by method without this understanding. However, there were issues in the conversion. When looking at the issue I found that when the temi is at the home base the y-axis has an offset of approximately 7 meters which should not be the case. I have been having the issue of where my marker for the temi is off by

what appeared to be a fixed value. I will see if I can get this patched in and see what the impact of considering this has on the overall system. I also need to go about trying to automate some of the data collected such as the position of locations. This should help streamline some processes.

By the end of the day, I have managed to get the map working as, from what I currently know, intended. There were a couple issues that need to be patched. The first was my understanding of how to convert the coordinates from the temi centre map into the map I rendered in my program. The main issues the corners I though where the system was meant to be in was incorrect. Hence, the whole frame of reference was wrong. The origin in at the top right corner for my map. When that was patched in, almost working as intended. I did have a major problem with lag. The cause of it after looking into it was a functionality of the convert coordinates system. There was a system that was used to shift an axis so that the x and y reference points from the real and rendered map align. The calculations that were happening there were apparently using a lot of computational resources. This function is my new system for mapping is mostly deprecated, hence I removed it to help increase performance. System performed dramatically better without this system.

The last thing that I need to do for this is to set the system back to what it was before and check that everything is working as intended. I also just remembered that I need to put back way points, but I think the system should be fin without them for now.

11/12/20224

Yesterday, I went to the library to start a new project to work on. For the want me to create a system that will great student at the entrance and then go on portals. From my integration and discussion with the curator of the library, here are the notes that I had taken:

** NOTES:

- Need a system to block the power button so that student do not power off the temi. However, this button still needs to be usable by the staff at the library. My idea is to add the NYP logo into the application that act as a hidden button. If this button is pressed x number of times within a y time frame, then the system will prompt the user to put in a password. Once done, this will re-enable the power button. As the intent would be to power down the temi be doing this, there will be no system to reverse this effect
- The temi will not have to go to level 2 but still needs to show people the way to the stairs or the elevator.
- They would like a method so student can leave feedback.

State GREET:

They would like the Temi to greet students at the front starting at 8:30am every day. This mode will be defined as the greet mode. Here is the current idea of the workflow.

12/11/2024 - 13/11/2024

Most to the day was done adding in patched and completing assets for the intro. What will be done next is looking at creating a map for the library and getting that system, getting a patch for the ChatGPT ask question and add in a third sound effect that can be used for button presses. I will start the day off with patch for ChatGPT.

The issue that is occurring with ChatGPT is the user can exit out of the ask question. What is meant to happen is the ask question sequence is meant to finish. However, in my case it is not. The audio

will play in the background and when the user goes back into the Q&A section, they will be greeted with the thinking phase. I am not sure what the issue is, but I will have a look and see what the causes may be. After looking into it, the cause seems to be due to a logic issue in the code. The Q&A system was taken from a previous system I made. The issue with the old system was it was not designed to be interrupted in the middle of the sequence. Hence, for the new application that required interrupts I had to adjust it. The system could be broken in any section (from my understanding and testing) but there is a flag that I created. This flag keeps track if a question has been asked. By default, it assumes a question has been asked. The problem with this is if the sequence is broken out the assumption of the question being asked causes the temi think sequence. The solution to this was to simply change the default from assuming a question had been asked to one where a question had not been asked. This patch has seemed to solve the issue I was facing.

With that patch rolled out the next goal of this day is to try and get a new audio for button presses into the system. From yesterday, I found an audio piece that I liked. All that I need to do is implement it into my code. I added in the new sound effect, but noticed the volume for these sound effects are not very high. I would like to increase the volume. I looked at my code add note that previously I had decreased the volume of sound effects to be 25% of their actual volume. I have changed this back to 100%. I noted and issue while running some tests on the temi. It appears that when I first interact with temi on the Q&A screen. I am not 100% sure of the triggers, I will investigate it now.

From testing, it only occurs the first time I enter another screen apart from home. This means it triggers in the Q&A and directions/locations. This makes me think the issue is happening in my logic for the greet me when it first gets switched off. The reason why is probably does not trigger after the first entering the page (That is before the greet mode is reset) is due to the greet mode not being turned on for 10 seconds after entering the home again. The system was to allow users to have time to switch between screens. From the looks of the head tilt, the angle is being set from 60 degree to 20. This is a good place to start looking. I found a tilt of 20 degree and commented it out. When the system was run again, I noted that the issue I noted before was not present. However, when a user leaves the temi it will no longer go to 20 degrees. From this, the logic to trigger this event is not correct and is cause a case where it tilts temi at the wrong time. The cause of the issue was from bad logic. The case for when not in home page and when someone is missing enters the same if statement. For both cases, the system made it so that the temi looks down 20 degrees. After that if the user is missing, it enters a state to restart the greet mode. If the person has interacted with the temi it goes into a while loop to idle until the user has done interacting. I the fix was making it so if the user is missing then do the 20 degrees.

The next step that I will work on is trying to create a map for the library. Currently, I have a method for generating a map using the data I got from Temi centre. The only issue is I don't know a method to extract that map so I can edit it. Hence, this is something that I would like to work on. My idea is to print the data out in the log and the copy that data into another code that I will create that will convert that data to create a bit map. Once done, I will be able to but it into editing software, such as paint, to edit the image. I plan to use python as I already have it set up on this device.

// I think greet mode is when temi is talking to people. I am not very sure what that flag is, and it is causing me issues. Looks like I set greet mode is true only on the home screen. When going to the home screen to the from a screen, there is a 10 second delay. This located in the main activity which is not a good place as it separates it from the other logic in the main activity but screw it.

// I may be able to get data an put it on a USB!!! I can use this to save the results from quizzes.

TODO:

- **Create map**
- ~~**Path in the time out system (Does not seem to be working) <- I have the delay up high for testing and forgot that I did that**~~
- ~~**Patch the interaction issue (temi looks down in first interaction with the Q&A).**~~
- **Create QR code for feedback for the library.**

Week 16 - 16/12/2024

I still need to do work on the application for the library. For now, I will put it on the side burner. I would like to get access to the map that the library has before I do any more work on it. For now, I will do documentation. I might move down to the first floor and start tailoring the application to that. At the very least I want to try and get 5,000 words done before moving onto something else in my application. Only got approximately 3,000 words done. However, I do have another task that needs to be done. I have been given questions from Doctor Foo that can be added to the Quiz application that I have made. We discussed adding a few new features into the application. These features are allowing random questions to be selected from a pool of questions. This is necessary due to the number of questions that was given. There are a total of twenty questions which is a bit much for a quiz. I think the ideal number of questions is 10. The second feature is to add a button that can be pressed to open an image that displays information that the user can read. However, this is pending until I get a confirmation from Doctor Foo on the answers I have created for the questions.

Work for the library application is still pending. I am currently waiting for the map from the library to be able to finish creating the feature I want.

17/12/2024

Once again, I will start the day off with doing documentation before I move on to creating the additional features for the quiz application. The focus of the documentation to refine the current work that has been done. Spent some time trying to get the other printer up and running so that two prints can happen at the same time. However, it does seem to be working the way I intended. It can print a straight line without issues but seems to struggle with doing small circular motions. I think I will test this out in a bit.

Also started adding in the features that Doctor Foo wanted with the quiz application. I have made it so that the number of random questions is selected from a pool rather than doing them all. I want to create a system that determines which questions are core and which ones are not. I also want to be able to set how many questions are taken from the pool. Both will need to be added into the txt format used to add questions. There is also an issue with the multi-language system as well as an issue with the audio cutting out randomly. For the audio, I think the issue may stem from the anti-misuses system which cuts the volume. I think it might be too sensitive. I will increase its sensitivity and see if the issue is still occurring.

18/12/2024 - 19/12/2024

The first thing that was done was to set up a print job on the 3D printer. It should be good in the next 4 to 5 hours. The second task that was done was to alter the quiz application. I added in systems that allow adding in a pooling size. This pooling size alters how many questions out of the total questions added in the text file are present in any given quiz. I also added a system that allows setting which questions must always be present in the quiz.

After discussion with doctor foo, a couple more applications were added to the quiz application. The first thing that was added was creating a second pool. This pool comprises of questions that are of high priority. This was implemented without many issues. There was also a change to the response of temi. Now the temi will tell the use to seek someone out after the end of a quiz for more questions. The last thing that needs to be done is to fix the language system that I implemented into the application. The current system is outdated a need to be fixed. I have been told that having English and the simplified Chinese would be the best. Other language models are not needed. To achieve this goal there are a couple things that need to be done. The first is to convert all text and speech into string resources to make adding translations into the system easier. The second is to implement a system for changing Temis language based on the setting. This also should not be too bad. The last is figuring out why the system is no longer working. This will probably be the most difficult thing out of everything.

There are currently three different languages: English, Japanese and German. I need to add Chinese into the current system. The good thing was previously I was creating documentation to help guide someone into adding another language into the system. Hence, I have a test one set up that I can convert into Chinese. I also went ahead a commented out the code that does the emotional detection system in the application. It was never implemented fully due to issues that I had faced. No reason to have it present still if it is not working. Oh, you know what the language system is working without crashing now. I think the method I used to run the emotional detection application was causing the application to crash. Note that the emotion detection system is a separate application to the main application. Hence, it is called when it needs to be used.

With language translation method no longer being depreciated the next few steps should be easy.

From looking at the code there are two thing that control the language of the temi, this is the speech and the listen capabilities of the temi. As the quiz application only uses the speak function and not listen all I need to be alter the speak language. Since all speak system derive the speak function in the robot controller, this makes changing the language of Temi a lot easier.

The language change of the Temi has been implemented and seems to be working as intended which is good for me. The next step is to go through the code and convert all string into string resources. I went through the code and should have converted all text and dialogue into string resources. The next step is to translate the string resources into the different languages and then translate the quiz into different languages.

I was testing out the application and noted that there is an issue with the score board system now. After looking into it a bit a found that the issue is causes somewhere in the scoreboard function. This function is what handles the creation of the score board. The main issue is the screen freezes which prevents the ability to exit the screen. I looked through it figured out the system used for the score board is depreciated with the new system for choosing questions. Essentially, it used to really on the quiz number to ensure that is can distinguish between different quiz attempts. Since the question are pulled from a pool now the position is random, and this method can no longer work. I changed the method I bit to that now all question has a new data point. This data point is used to determine if that question is the start of a run. This can then be used as a reference to ensure that the different attempts can be determined from each other.

My text goal is to fix the formatting of the question so that the look better.

TODO: Figure out how to change the language of the keyboards.

~~**TODO: Add full translation**~~

~~**TODO: Add full language change of temi**~~

~~**TODO: Test to ensure that the servo is still working and update the code on the system so that way the servo works as intended.**~~

I am back with doing more patching for the temi robot. The list of tasks that need to be done are as below. Changed the label to say info instead of image. I need to change the font size for the buttons as well as pop ups. I have attempted to change the font size of the selection buttons.

I am attempting to create another aleart prompt when the user first enters the quiz. The promt will ask the user if they would like questions to be submitted automatically when going to next question or not. First step is to create a alter dialogue when the user presses the start button. I have added in the dialog and create a variable to keep track of state. The next part is I need to use that variable to create effects.

To do this, I think I need to just find the buttons and see what happens. Once I have a better idea I will plan more. What I am thinking is the function of the submit button will remain the same, the difference is if the next question button will submit. To do this I will use an if statement to check if the question is automatically answered. If so, the question will be submitted, and the user will need to press the next question button to move to next question. If manual, the application should work as it did before.

TODO:

- **Change font size**
- **Add pop up asking if users would like questions to be submitted on their behalf or if they would like to do it**
- **{DONE} Change show image to show info**

20/12/2024

Ok, still working on the quiz application from yesterday. Couple of issues that I know need to be fixed is switching languages seems to cause crashed in constantly, but it always occurs. I need to find the cause of this and patch it up. From testing yesterday, I got two different errors from the log that I need to look at. The first is an error that I added to the system. I noted that I have two of those functions, so it is difficult to locate where the issue is occurring. Hence, I add someone to help me identify where the issue may be occurring. I need to run the code and wait until the error occurs. While doing this another fatal error occurred which seems to be caused by the medio player. I will investigate more of what may be leading to this error. From the log it seems that there is a case when the audio player tries to play the audio, and it is not in the correct state. This leads to the system crashing which is not ideal. Looking at the code the issue most likely is occurring when the language is changed. When this event occurs, the audio is released, and the page is refreshed. But when the page is refreshed the audio is played and the player may not have been created again. This may be what has led to the error. A quick fix to this is to stop releasing the audio. The issue with this

is it cause memory leak, but there should be code elsewhere that will release it. It should not be too bad. Either way implementing that fix seems to have solved the issue.

The seconds issue that is being faced is the error that I placed in myself. With the log being updated to provide more details on the location I now know the error is occurring the multi choice question. This is good info. Found out the issue was caused by the type of semicolon used. I also made a mistake on how I set up the formatting but the issue for the Chinese is fixed. The next step is to get rid of the word survey from all the questions.

The next step that I will be doing is adding in a system to make the audio global. Currently the audio is cutting out at seemingly random (I do not know what the trigger is). To fix this I plan to make the audio player for the music global and getting rid of the release commands for them. Hopefully this will solve the issue that I have been facing. The code has been altered to make the audio global, hopefully this fixes this issue. The only way to know for sure is to wait. However, while rolling out this patch I did see something that could have caused the issue. In the code I had it so that the music would release upon disposal. This is the only case where release was used. Either way, the new system should fix a few issues that was present such as audio being dupped as such.

Next goal is to fix the translation issue. I will look at this after lunch. Ok, the issue with the translation is the string resource in the mainViewModel is not being updated. Hence, it stays as English while everything else changes. So, either I figure out a way to update the string resource the view model or I add a method to pass the strings to the view model. I will try the former first. I implemented a similar method into the view model that was used for changing the string resources in the view. Was surprisingly simple which is good.

I found a bug that I had when I implemented the audio. For the quiz area I set the audio to the wrong player, I have fixed it.

I tried looking at changing the keyboard based on the language but found that doing so is restricted. The are work arounds for this, but I do not think it is worth creating a method that would be too intrusive. Hence, I have decided to scrape it.

Audio still and issue, tried more patching by setting all audio to be global. Still need to wait and see if it is still and issue. The next step that I will do is add in the images that Doctor Foo wanted in the quiz.

TODO:

- ~~**Fix crashing when language translation occurs**~~
- **Add the ability to change the key board layout when switching languages <- NOT POSSIBLE FROM CURRENT UNDERSTANDING**
- **Patch the servo code to work with the continuous one**
- **Testing quiz application on the v2 and validate that the detection mode can work as intended**
- ~~**Change audio system so music is global**~~
- ~~**Remove survey from questions that don't need them (which is most)**~~
- ~~**Fix the issue with the translation (the translation that occurs in the viewmodel is not happening correctly.**~~
- ~~**Get image from doctor foo**~~
- ~~**Message Alton**~~

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This is the Monday the following week. I am not going to bother with creating a separate log as I will not be there the whole entire day and am only going in on this week. My goal for today is to get the Temi V3 set for running at OH2024. For this I need to fix an issue that is with the current map. When a map is selected there is no system that allows the user to exit the map. Meaning if they select the map, they are just stuck it in for ever. But the first thing I will do is set up the passive go to location system to work for temi at S1 block.

Changed the code to tell it to go to the locations on the map which is good. Just need to test and adjust the points as needed.

TODO:

- ~~**Set up temi to move around based on new area**~~
- ~~**Fix map system to be able to click out**~~
- ~~**Set up the map system of temi to include area**~~
- **Add in questions**
- **Alter temi to be able to use the doc for reference**
- **Battery System**

Week 17 – 06/01/2025

I have just gotten back from my break and need to review the task that I need to get done. I know in the next few days that the open house will begin again. Hence, I need to ensure that all code for it and applications is set up before that date. Looking at the previous log that I did I can get an idea of what still needs to be done. I believe that the system for the V3 bot (the greeter) can go around, and the map system is working as intended. There are two features fort it that need to be developed; the most important one is getting the Q&A system set up. The second is getting the tour system. However, before the tour system is even started, I need to get the robo master introduction done. Higher priority. Will do an extra hour a day to try and get ahead of the curve and ensure that everything is set up as intended.

The quiz application from what I know is already up to snuff. I just need to set up trail runs and to get the dispenser set up again. That will also be in my list of goals. After that, everything should be good to go. If I have time, I will see about adding addition features. I also need to remember I still need to develop the application for the library.

A couple goals down the line is getting the final report done, write a paper and see if I can intern from robo solutions to co-author it, clean up code and create the user manual. I know these need to be done but are later down the line. I will not bother with adding them to the list of what todo. System has been added for subtitles.

The next goal is to adjust the Smart ask system.

TODO: (Ordered in terms of priority.)

- ~~**Set up Q&A questions**~~
- ~~**Add sub system for text.**~~
- **Adjust the ChatGPT chat system**
- **Set up robo masters introduction**
- **Add system to bring temi back to charge bay automatically.**
- **Fix Temi detection issue with the V2**
- **Add images to Q&A**
- **Get the dispenser set up.**

- **Set up tour <-**

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This segway is meant to indicate the point where I have stopped reviewing what I need to do and getting the jobs done. I am currently trying to start the OH2024 system, but it keeps crashing. I have altered permission and granted access to permission it needs, but the crashing persists. Checking the log next. The log says that there is an issue with connecting file. I know that before I had a system that allowed me to add text files into a usb connected to temi, so I thought this may be the issue. However, I do know that I removed that code as it was not needed anymore. I also noted that on temi centre the map that is being used for the OH is not the same which way also be leading to issues. I change the map from temi centre to the OH from the previous and run the code. I still get the errors for file directory not being correct. Despite this the code now runs with the old map added back which is good. This tells me that the error of the file directory is most likely linked to the system I was talking about before but had no effect on how the system performed. At least the issue is fixed.

With the application up and running my next task is to validate that the map application is still running. I note that I have a system for adding paths to the temi that currently not implemented due to technical limitations of the path. Essentially the paths assume a one direction. This is not correct. While all locations can be accessed from the going on a linear path. While the system works for the locations at the start and end of the path, it does not work for location in the middle as temi can be either to the left or right of the location. Hence, the path needs to be able to detect those changes and implement them. I will investigate this more later. It is not the highest concern now.

I will now be adding the question from the quiz into the Q&A. The current workflow is to add in the questions and then the answer, add in images that relate to each question and then add a feature that will add subtitles to what is being said. For the subtitles, I want the text to be written in relation to what is being said. I can use the temi talk speed to set this up.

I have added in the questions and now just checking to see if it is all working. The next step is adding images and gifs (I forgot I can add gifs). Everything seems good, but some of the questions are too long. I will need to decrease the font size to ensure all questions fit as intended.

I am now working on adding in a subtitle system. The first step is creating a box at the bottom of the screen with text that relates to the question that has been pressed.

Noted that there is an issue with the show image. Currently it is not set up to show. I also think it might be worth making it so there is always a black box at the bottom and just but text there when needed. Added in the black box, but it takes over the whole page, need to patch that out before checking if my fix for the images works. I need to system to animate talking.

Need to change how the show Image is stopped now. Current system uses a timer. System also crashes on questions that do not use images. Also need system to reset the animation on new at end of sentence to prevent overflow event from occurring. I will fix timeout system first. Idea is to use the is speaking flag that I must control when the subtitles and images are displayed. Once I know that it is working, I will then add a delay for when the system is not talking to allow the sub and images to linger for a bit. The text system seems to be working well enough. Just need to adjust to handle overflow.

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Stuff for RB:

Droid Battle Arena: Command your Droid

#1

Step into a future where droids carry your load and fight alongside you.

Command your droid in an FPV battle to defend Sky City from Imperial forces!

#2

also put in the game play

The goal of this game is to knock down all the targets as quickly as possible.

Participants will start at the same starting point.

Participants will activate the timer to start the run

#3

Participants have to move around the map in order to shoot down the targets

Must follow number order

Successfully completing the race will earn them a small prize.

#4

If the participants' time beats a certain time (Timing is set by the Robotics team), they will receive a large prize.

If participants run out of the map, they will be asked to restart.

If map is damaged (pillar knocked down)

If not a lot of people, restart

If have people, continue as we repair

Repeating this 3 times will result in them being disqualified (Cannot continue to play).

07/10/2025 - 11/01/2025

These days have been spent preparing and running the Temis for the oh2024. This included creating a video and poster, finishing off a kit-kat dispenser and making adjustments to code as needed. As of writing this it is not Friday, and I am implementing some patches to the code. The list of what needs to be done is below:

TODO:

- ~~**Make it so the quiz only one question (if not possible have it so it is one, do two)**~~
- ~~**Increase the timeout of the quiz to 5 mins**~~

- **Add a patch to the blue tooth connection so that the temi sends a signal to the blue tooth module of set period to ensure there is no time out.**
- **Create posters for the robot master and one for the temi (Reuse the poster made for the library**
- ~~**Send video to Doctor Foo, the latest one**~~

Week 18 - 13/1/2025

This week I need to finish the application for the library as quickly as possible then move on to writing the report for my university. I am not sure how long it will take to finish the library application, but I will need to review what I have done thus far to determine what else I need to do for it. As of this week, I only have a total of 14 days to get all tasks done. I would also like to try and get a paper done for this as well as to create a user manual. The order in which each task was mentioned is the priority they will be given.

For starters I will look at the library application that I have made. I need to figure out what I have done and what I will need to do. From memory, the application is only meant to have two features, an ask question and a show location feature. As these are based off my OH2024 code, they should be fine in the respects of function. I did update the OH2024 to have the answer questions to have subtitles. I also need to figure out a method to get the code running on the v2 (for the detection mode). For the order of task, I will focus on getting the answer questions completed then move onto getting the go to location.

First off, I noted that the application is crashing. I am pretty sure I know the cause. The map used in the code is for the library. The location the temi is set in has been changed to the lab again as other software had to be developed. Hence, by changing the locations and map to respects to the lab the application should run as intended.

While making changes to the application, I noted there was a bug with the poster not showing. The exact cause of this is not fully understood. It seems to trigger when the detect someone, the press the poster then walks off without selecting any of the other applications. This should not be an issue since the logic for the return face and the poster is the same. I think I figured it out, there is a 3 second delay for the poster to return. It is possible to click the poster and for the face to return then detect someone. Hence, one way to fix this problem is to increase the timeout on home screen which I think is needed anyways as it times out to quick.

It appears to not be that simple as the poster does not show even after multiple attempts once the poster is missing. The poster is still there but appears that the window selection screen is above it. It also does not seem to be a time issue as the poster still does not show after a notable delay between the screen going back to idle and reactivation.

I found the issue to the image not showing up. It was caused by the opacity. The system can change the opacity of the image. The problem is that I never reset it once it is first pressed which makes it so it can fully transparent but still there. I have updated it so the opacity resets once the face appears.

There is also I problem with the temi nodding. I think this is caused by the temi having issues with its location and trying to adjust just to find out that it is at the right spot. I will need to see how I can patch this bug.

TODO:

- **Need to remember to adjust the yaw for use in the library**
- **[DONE] Check out the question section of the application**
- **[DONE] Update the Q&A system in the application, needs to be the same as the OhH2024 with mild adjustments to it**
- **[DONE] Need to remove ChatGPT from the application**
- **Need to adjust the time out period to be shorter when implementing the temi into the library. Now it is very long to make development smoother.**
- **Temi when idle will nod its head [BUG] <- I think this is an issue on the temi center end.**
- **[DONE] The poster does not show after the first display [BUG] <- Occurs when the temi times out due to not seeing someone seems like a logic issue**
- **[DONE] When loading, it randomly crashes, not sure why this is the case [BUG] <- Does not crash, but moves out of the app. The app is still running {Caused by system that close the app running at of battery, not done properly}**
- **[DONE] There are now subtitles, what happened to them?**

The next stage is to look at editing the go to location system. First, I need to get an idea of what the temi can currently do. Currently the map of the library has not been added into the application. What I need to do is add a bunch of locations so that I can test out the dynamic location system that I will be adding into the application. I think for the locations I will add them into a lazy row which are stacked on top of each other.

I have created a new method for adding in locations that just requires the user to add in the location IDs for it to work. There is no fail safes added, so if they are added incorrectly the system will just ignore them. I am also going to make a change so that the ID name also comes along with the location.

I will be heading out to lunch in a minute, I want to try and get the dynamic location buttons done next. Note that it would be nice to have the first letter of any ID capitalized. Did a quick test and things seem to be working relatively well.

I added in a lazy row, and it does well. There are a couple acetic changes I would like to make to it though. The first thing is I would like to make the buttons larger and replace the purple color they currently have too images of the locations in question. I would also like to have the name of the location to above the button and increase the font size.

I had a look at the locations and noticed that what I was doing was slightly different from what is wanted. I need to create three different sections based on categories. What I have done is created a home menu that will allow me to go to each of the other menus. What I need to do is create a method that will allow me to display each of the locations that I need to go to. What I know that I need to do is create a back button to go from the sub menus to the main menu as well as adjust the capitalization method I must do it to the start of every word.

To add the location, I plan to use the map that I have and add the spots for temporary testing. Before that, I am going to test what I currently have and ensure that it is all working before going any further. The only thing I need to do is to add in the temp locations and add them in

TODO (LIBRARY):

- **[DONE] Implement the map system from oh2024**
- **[DONE] Allow the allocation of new locations to be dynamic. Essentially make is easy for someone to add more locations**

- **Add the map for the library instead of the sample**
- **Remove the create path system (It does kind of work, but needs more refining before implementation)**
- **Use images as location points**

14/1/2025

I am currently in the process of trying to figure out what is wrong with my application that is stopping it from running. I think the issue might have been occurring due to a section of code in my application that exits the application if the battery is low. It was set that this check happens right after the application is run it may have led to cases where the battery was not properly read. Hence, the application would close without a crash log.

One thing I would like to fix is the nodding temi issue that I have. From my understanding, the issue is caused when temi is told to go to a coordinate and there is only a minor difference. Hence temi does not move but is technically not in the right spot. Hence, the nodding that is seen. After this, I need to add in the image for the library and the rest of the stuff is adjusting at the library.

Fixed the nodding bug. The issue was caused by the yaw angle that it needed to be in and its actual. If the angle between them is to small the temi cannot move to get to the position. However, the temi is in the wrong spot. So the temi constantly tries to correct itself but cannot. There was a threshold to try and correct this, but it was not large enough. I increased it and it seems to have fixed it.

15/01/2025

I ended up doing more work on the temi on the library. I ended up having to stop as there is a bug that is preventing the temi from being reset. Will need to wait until the temi out of battery before trying again to develop code.

So, for the rest of the day, I will be working on my final report. I need to review what it is that needs to be done. I have not looked at it for a while, so I am not very sure what is needed. I have a format that I was using that I can follow. I will create a separate section to cover what I am doing for the report to ensure that is all complied together. Honestly, I should have done that from the very start.

16/01/2025 - 17/01/2025

The rest of the days was spent either working on the application or working on the report, there was nothing much to report for these days.

Week 19 – 20/01/2025 - 24/01/2025

Just for note, the application for the library is yet to be completed. It is pretty much done. All that needs to be done is upload the final version and check the code to ensure that it is running as intended. Doctor Foo said about organising a meet up day on either the Tuesday or Wednesday of this week. For today, Monday, I will be working on the writing the report.

Scratch that, there was a slight change of planes. I ended up working on uploading the hopefully finial version of the application onto the Temi robot. It took a lot longer than I was hoping it would take. The cause was due to technical issues with memory size and data transfer rates. I ended up having to switch from using my mobile phone hot spot to using a router and compressing images that were used on buttons. It is uploaded and trail runs still needs to be performed

Pretty much the entirety of the week of just spent on the final report. By the end of it the following sections still need to be completed. The Quiz, robosolutions, creating the flow chart for temi tour,

creating the process table for the OH2024 and the rest of that section (almost complete) and the conclusion. Once done I can do a proofread and start reformatting the document as needed.

Week 20 - 27/01/2025

There are still a few things that needs to be done regarding documentation. This being of course the final report (this can be pushed to be done after the placement), the user handbook and a presentation highlighting the benefits of Temi. The method I will be doing for the first few days is starting the day off by doing the user documnetation then at the end of the day switching to doing the final report. The main reason for doing it like this is it gives me a bit more variation in the day. That is nice. I will update the log when this changed.

Also almost forgot, I need to make sure to send a message to Pauzi about when to return the keys for the apartment. Need to do that on Monday at some point. Last week baby!

Final Report notes

First I need to review what things I have created.

- Created a quiz application
- Tour application
- OH2024 Rootmaster intro
- Bluetooth system
- User handbook
- Chocolate dispenser
- OH2024 Guide
- Library Application
- Robot solution
- Emotional detection application

Note that the report cannot be greater than 50 pages, excluding a few sections. I have also previously worked on a structure that I can use to create the sections. The below table contains the structure. For the Tour SDK, I only managed to get to 1.3 and am sure that they are not fully completed. Hence, I will review what I have done and ensure that they are up to standard before adding more sections.

From reading the intro, everything seems to be good. I did some mild changes (there was a section that repeated what was already said).

Reading what I did for the features and functionality, I think what I have done there is quite weak. I would like to work in this section more until I am happy with it. I also want to explain in greater detail on how the Bluetooth system works

TODO:

- **I need to get access to temi script so I can take pictures as reference for the report**
- **Do the flow diagram to completion (I have already started a small part of it)**
- **I am not sure yet, but I think it would be a good idea to explain how the BLE system for cross temi commination works.**
- **Create something to help show how commincation happens between the two temis using bluetooth.**

Section 1: Software Development Kit (SDK)

1.1 Introduction

Briefly introduce the purpose of the SDK.

Explain its significance to the project goals (e.g., enabling customizable guided tours, enhancing user interaction with Temi).

Outline the main objectives of the SDK development.

1.2 Planning and Design

Describe the initial planning process, including any research conducted (e.g., SDK documentation, existing implementations).

Detail the design goals and considerations (e.g., flexibility, ease of use, scalability).

Include diagrams or flowcharts, if applicable, to illustrate the SDK's architecture.

1.3 Features and Functionality

List the key features of the SDK and explain their purpose.

Describe how these features align with the project's objectives (e.g., enhancing outreach activities).

Highlight any innovative aspects of the SDK.

1.4 Development Process

Provide a step-by-step overview of the SDK development process.

Tools and Technologies: Outline the software and hardware tools used and why

Challenges: Discuss any difficulties faced during development and how they were addressed.

Milestones: Highlight major development milestones and their timelines.

Mention collaboration with other team members if applicable.

1.5 Testing and Validation (combine rest, 1.9 done at end of report)

Explain the testing methodologies used to validate the SDK's functionality (e.g., unit testing, integration testing).

Provide test cases or scenarios to demonstrate how the SDK meets its design goals.

Share results or outcomes from the validation process.

1.6 Implementation

Detail how the SDK integrates with Temi's existing capabilities.

Provide examples of usage (e.g., snippets of code or user scenarios).

Discuss how the SDK enables the creation of customized tours.

1.7 Challenges and Solutions

Identify any major challenges encountered during development.

Discuss the solutions implemented to overcome these challenges.

1.8 Impact and Significance

Explain the broader implications of the SDK for NYP's outreach efforts.

Highlight how the SDK contributes to achieving the overall project goals.

1.9 Conclusion and Next Steps Summarize the SDK's achievements and its alignment with project objectives. Suggest recommendations for future development or enhancements to the SDK.

Side Notes

The temi pro is the newer model and is known as temi-chan and the temi V2 is the one I will be using (It has a ribbon on it). It is known as temi-san.

Do not try to connect to the temi using temi script while it is restarting. This will cause an issue and the temi will need to be restarted again.

Appendix

Table 3 TemiScript Code for mini tour demo <= Should Add video of it working

```
wait; 10
say2; voice=en-au-x-aub-network/ Hello there, I'm Temi. Could you be so kind as to show me the way to the tour?
wait; 1
say2; voice=en-au-x-aub-network/ From there I will be just fine.
set; speed / fast
follow
wait; 20
goto; r410 front door
wait; 3
turn; 45 / 0
tilt; 55 / 0
wait; 1
say2; voice=en-au-x-aub-network/ Thanks for that.
wait; 1
turn; 120 / 0
tilt; 0 / 0
wait; 1
image; map_NYP_bock_R.png
wait; 3
say2; voice=en-au-x-aub-network/ Hello everyone, I'm temi and welcome to NYP. You are currently on level 4 of block R.
wait; 1
say2; voice=en-au-x-aub-network / I will be happy to show you around.
wait; 1
say2; voice=en-au-x-aub-network / The current time is $HOUR$ $MINUTE$, this tour should only take a couple minutes to complete.
wait; 1
say2; voice=en-jp-x-aub-network / Durning this tour, please at all times stay a couple feet behine me. Thank you for your cooperation.
wait; 1
say2; voice=en-au-x-aub-network / Add more information on this current spot here.
wait; 1
image; null

goto; r412
turn; 140 / 0
```

tilt; 0 / 0
wait; 1
say2; voice=en-au-x-aub-network / one
wait; 5

goto; r405
wait; 1
turn; -70 / 0
tilt; 0 / 0
wait; 1
say2; voice=en-au-x-aub-network / I cannot go down this hallway due to poor internet connection. I will get lost, so we will be going to the right.
wait; 5

set; speed / slow
goAndSay; trophy cabinet 1 / This is our award cabinet from all our project at NYP based on robotics. Please add more text here to explain more about what the awards are and what they represent.
wait; 1
say2; voice=en-au-x-aub-network / Are there any questions?
listen
wait; 5
say2; voice=en-au-x-aub-network / All good, I will continue the tour.
wait; 1

set; speed / fast

goto; r416
wait; 1
turn; 140 / 0
tilt; 0 / 0
wait; 5
say2; voice=en-au-x-aub-network / four

goto; r417
wait; 1
turn; 140 / 0
tilt; 0 / 0
wait; 5
say2; voice=en-au-x-aub-network / five

goto; r410 back door
wait; 1
turn; 130 / 0
tilt; 0 / 0
wait; 5
say2; voice=en-au-x-aub-network / six

say2; voice=en-au-x-aub-network / Thank you for attending this tour, see you next time.
wait; 1
say2; voice=en-au-x-aub-network / Going back to home base.
goto; home base