



Research Project (IT 4010)

4th year

Research Logbook

TangiGuru

A Tangible Learning Solution

2022-287

IT19206806

Hettiarachchi T.C.D.S

In partial fulfillment of the requirements for the
Bachelor of Science Special Honors Degree in Information Technology

13.11.2022

Table of Contents

1	Supervisor, Co-Supervisor, External Supervisor Meetings, Emails, and Messages.....	4
1.1	Meetings with Supervisor and co-supervisor.....	4
1.2	Meetings with External Supervisor.....	6
1.3	Meetings with team	7
1.4	Emails to the Supervisor	11
1.5	Messages	16
1.5.1	Messages with the supervisor	16
1.5.2	Messages with the External Supervisor	17
1.5.3	Messages in the official TangiGuru-2022-287 Group	18
2	Individual Project Logs	19
2.1	MS Planner.....	19
2.2	Git Lab.....	21
3	Monthly Progress	22
3.1	2021 November 1st to 30th	22
3.2	2022 January 1 st to 31 st	23
3.3	February 1 st to 28 th	25
3.4	2022 March 1 st - 31 st	26
3.5	2022 April 1 st to 30 th	30
3.6	2022 May 1 st to 31 st	32
3.7	2022 June 1 st to 31 st	35
3.8	2022 July 1 st to 30 th	37
3.9	2022 August 1 st 31 st	38
3.10	2022 September 1 st to 31 st	40

3.11	2022 October 1 st to 31 st	44
3.12	2022 November 1 st 15 th	47

1 Supervisor, Co-Supervisor, External Supervisor Meetings, Emails, and Messages

1.1 Meetings with Supervisor and co-supervisor

This screenshot shows the Microsoft Teams interface for the 'General' channel of the team '2022-287_TangiGuru'. The left sidebar includes icons for Activity, Chat, Teams, Assignments, Calendar, Calls, Files, and Apps. The main pane displays a summary of a recent meeting: 'Meeting ended: 4m 59s' with '4 replies from IT19051130'. Below this, a message from 'Hettiarachchi T. C. D. S. it19206806' on May 12, 2022, states 'Meeting in "General" started' with '10 replies from you, IT19051130, and Narmada'. A thumbnail image of a person's face is shown next to the message. At the bottom, there is a blue button labeled 'New conversation'.

This screenshot shows the Microsoft Teams interface for the 'General' channel of the team '2022-287_TangiGuru'. The left sidebar is identical to the previous screenshot. The main pane shows a message from 'Hettiarachchi T. C. D. S. it19206806' on May 18, 2022, stating 'Scheduled a meeting' with a blue button below it. This is followed by a message from the same user on May 18, 2022, about 'Research Project Future work to be done' at 10:00 AM, with a download link for an 'Attendance report'. Below these, a message from 'Hettiarachchi T. C. D. S. it19206806' on June 3, 2022, says 'Meeting started' with '9 replies from IT19051130 and IT19215716'. Another message from the same user on June 3, 2022, says 'Meeting in "General" started' with '11 replies from you, IT19051130, and IT19215716'. At the bottom, there is a blue button labeled 'New conversation'.

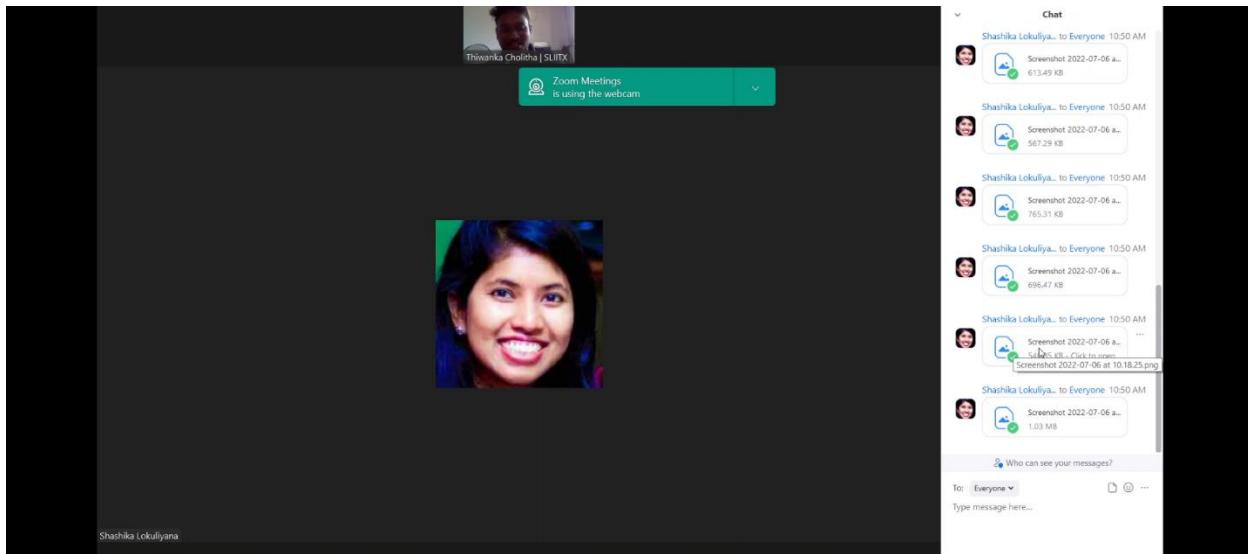


Figure 1.1.1: NBQSA Meeting

- After the covid restrictions were over physically meetings were taken.

1.2 Meetings with External Supervisor

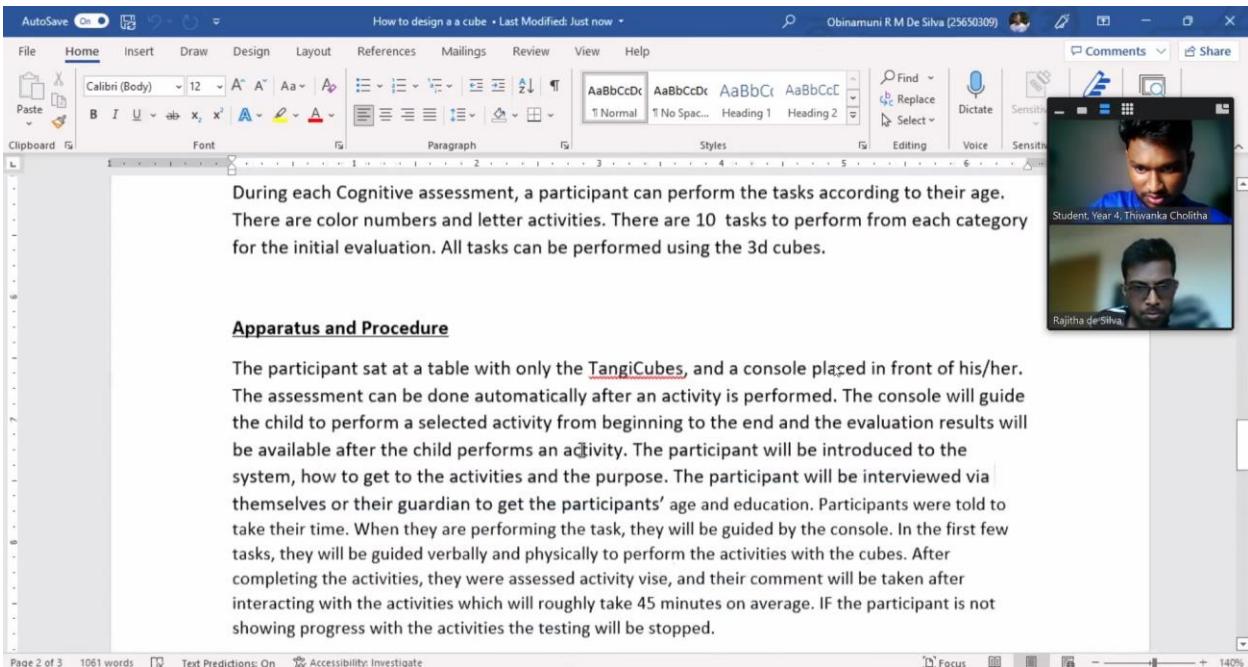


Figure 1.2.1: Components Modification

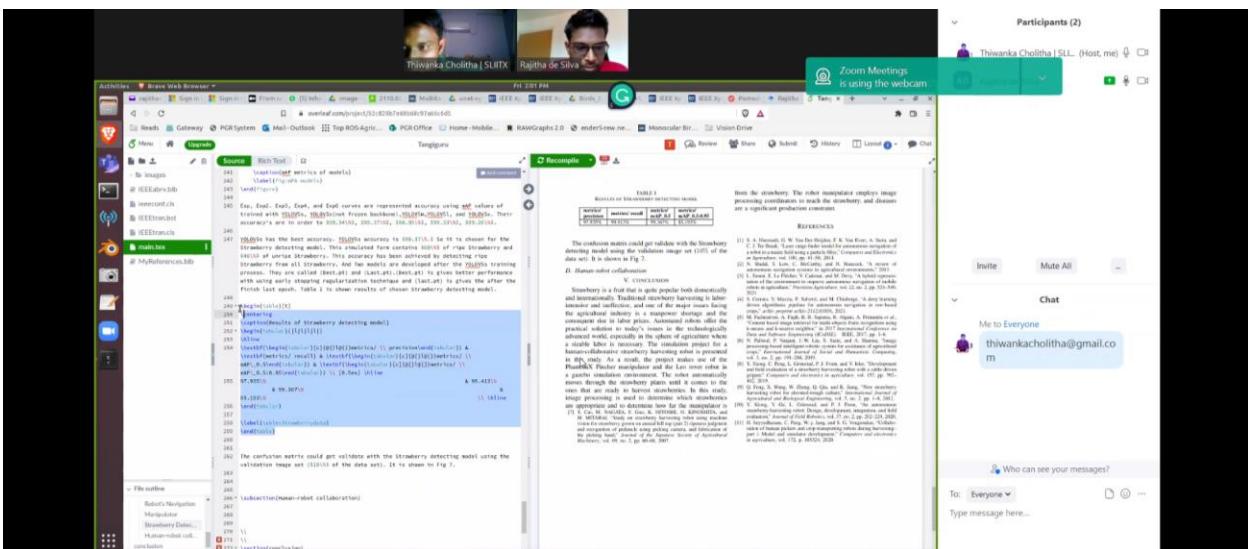


Figure 1.2.2: Research Paper Writing

1.3 Meetings with the team

This screenshot shows the Microsoft Teams interface for the 'General' channel of the '2022-287_TangiGuru' team. The left sidebar includes icons for Activity, Chat, Teams, Assignments, Calendar, Calls, Files, and Apps. The main area displays a post from Semasinghe L.S. (it19051130) at 3/20 10:14 AM regarding a research paper submission. The post has 6 replies from the user and Shashika Lokuliyana. Below the post, a message indicates the 'GitLab KT started' at 3/20 10:14 AM and ended at 3/20 10:14 AM. A blue button at the bottom right says 'New conversation'.

This screenshot shows the Microsoft Teams interface for the 'General' channel of the '2022-287_TangiGuru' team. The left sidebar includes icons for Activity, Chat, Teams, Assignments, Calendar, Calls, Files, and Apps. The main area displays a post from Semasinghe L.S. (it19051130) at 3/20 10:14 AM regarding a research paper submission. The post has 2 replies from the user and Shashika Lokuliyana. Below the post, a message indicates the 'Meeting in "General" ended: 1m 34s' at 4/17 10:14 AM. Subsequent posts show 'ESP32 Bootloader Fix ended: 6m 59s' at 4/26 10:14 AM and 'ESP Bootloader Fix 2 ended: 2h 35m' at 4/27 10:14 AM. A blue button at the bottom right says 'New conversation'.

General

Narmada Garage

Saturday, May 14, 2022

Ratnasuriya M. M. D. It19215716 5/14 6:45 PM
<http://localhost:3001/home>

Ratnasuriya M. M. D. It19215716 5/14 10:31 PM
<http://localhost:3001/home>

Sunday, May 15, 2022

Meeting started

ESP NOW FIX ended: 8m 38s

New conversation

General

Hettiarachchi T. C. D. S. It19206806 5/18 8:40 AM
Scheduled a meeting

Wednesday, May 18, 2022

Research Project Future work to be done
Wednesday, May 18, 2022 @ 10:00 AM

Research Project Future work to be done ended: 2h 3m

Attendance report
Click here to download attendance report

Sunday, May 22, 2022

Meeting started

9 replies from IT19051130 and IT19215716

Meeting in "General" started

11 replies from you, IT19051130, and IT19215716

Friday, June 3, 2022

Hettiarachchi T. C. D. S. It19206806 6/3 6:05 AM

New conversation

The screenshot shows the Microsoft Teams interface for the 'General' channel of the team '2022-287_TangiGuru'. The left sidebar includes icons for Activity, Chat, Teams, Assignments, Calendar, Calls, Files, and Apps. The main area displays several posts:

- A post from Hettiarachchi T. C. D. S. (it19051130) dated 6/3 6:05 AM titled 'Scheduled a meeting'.
- A post from Hettiarachchi T. C. D. S. (it19051130) dated Friday, June 3, 2022 @ 2:30 PM titled 'Discussion About the Research Paper ended: 44m 2s' with an 'Attendance report' download link.
- A post from Hettiarachchi T. C. D. S. (it19051130) dated Wednesday, August 31, 2022 titled 'Finalizing Research Paper started'.
- A post from Hettiarachchi T. C. D. S. (it19051130) dated Thursday, September 1, 2022 titled 'Research Paper Submission for ICAC & NITC started'.
- A post from Hettiarachchi T. C. D. S. (it19051130) dated Thursday, September 1, 2022 titled 'Research Paper Submission for WSA started'.

A blue 'New conversation' button is located at the bottom center.

The screenshot shows the Microsoft Teams interface for the 'General' channel of the team '2022-287_TangiGuru'. The left sidebar includes icons for Activity, Chat, Teams, Assignments, Calendar, Calls, Files, and Apps. The main area displays several posts:

- A post from Semasinghe L.S. (it19051130) dated 9/13 12:39 AM titled 'Research Paper Submission for WSA started'.
- A post from Semasinghe L.S. (it19051130) dated Friday, September 16, 2022 titled 'Hi All,' followed by a message: 'After discussing with you all, I have scheduled a meeting on Thursday (15th of September) at 2 PM to discuss the upcoming PP2 presentation preparations and Final Report Draft submissions. See you all there. Thanks a lot.'
- A post from Semasinghe L.S. (it19051130) dated Friday, September 16, 2022 titled 'Preparation Meeting for PP2' with a scheduled time of Friday, September 16, 2022 @ 10:00 PM.
- A post from Semasinghe L.S. (it19051130) dated Friday, September 16, 2022 titled 'Meeting ended: 1h 16m'.
- A post from Hettiarachchi T. C. D. S. (it19051130) dated Wednesday, October 5, 2022 titled 'Preparation Meeting for ICCCNT Presentation started'.
- A post from Hettiarachchi T. C. D. S. (it19051130) dated Wednesday, October 5, 2022 titled 'ICCCNT Presentation Practice started'.

A blue 'New conversation' button is located at the bottom center.

The screenshot shows the Microsoft Teams interface for the 'General' channel of the team '2022-287_TangiGuru'. The left sidebar includes links for Activity, Chat, Teams, Assignments, Calendar, Calls, Files, Apps, and Help.

The main area displays the following conversations:

- Wednesday, October 5, 2022**
 - Preparation Meeting for ICCCNT Presentation started**
4 replies from you and IT19051130
[Reply](#)
 - ICCCNT Presentation Practice started**
4 replies from you and IT19051130
[Reply](#)
 - Azure Blob Storage KT started**
7 replies from you and IT19051130
[Reply](#)
- Sunday, October 9, 2022**
 - Central Hub Testing ended: 1h 27m**
[Reply](#)
- Thursday, October 13, 2022**
 - Research Paper Finalization started**
6 replies from you and IT19051130
[Reply](#)
- Friday, November 4, 2022**
 - New conversation**

1.4 Emails to the Supervisor

Inbox - Sliit

Results

Hettiarachchi T. C. D. S. it19206806 > Coming to on campus [EXTERNAL EMAIL] This email has bee...

Semasinghe L.S. it19051130 > TangiGuru: Regarding the Problem Rai [EXTERNAL EMAIL] This email has bee...

Shashika Lokuliyana > TangiGuru: Requesting a timeslot fo [EXTERNAL EMAIL] This email has bee...

Shashika Lokuliyana [EXTERNAL EMAIL] This email has been re... in Inbox

Semasinghe L.S. it19051130 [EXTERNAL EMAIL] This email has been re... in Inbox

[Draft] Hettiarachchi T. C. D. S. it19206806 > Regarding Proposal Presentation S [EXTERNAL EMAIL] Sent from Mail for Windows From: Kz

Semasinghe L.S. it19051130 > TangiGuru Weekly Meeting [EXTERNAL EMAIL] This email has bee...

Semasinghe L.S. it19051130 > TangiGuru: Rescheduled Project Prop [EXTERNAL EMAIL] This email has bee...

Don't see what you're looking for? Try using different keywords.

Shashika Lokuliyana <shashika.l@sliit.lk>

2/1/2022 9:17 PM

To: Semasinghe L.S. it19051130 Cc: Hettiarachchi T. C. D. S. it19206806; Ratnasuriya M. M. D. it19215716

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Ops sorry putha i hv had presentations the entire day from 8.00 onwards

Shashika L. Lokuliyana
M.Sc. (IT) SLIIT, B.Sc.(Sp.) Hon's in IT (Spec. in CSN) (SLIIT), MIEEE, MCSSL
Senior Lecturer
SLIIT, Malabe Campus, Sri Lanka.
shashika.l@sliit.lk | shashika.l91@gmail.com
+94 77 2240 237

From: Semasinghe L.S. it19051130 <it19051130@my.sliit.lk>
Sent: Monday, January 31, 2022 11:19:57 AM
To: Shashika Lokuliyana <shashika.l@sliit.lk>
Cc: Hettiarachchi T. C. D. S. it19206806 <it19206806@my.sliit.lk>; Ratnasuriya M. M. D. it19215716 <it19215716@my.sliit.lk>
Subject: TangiGuru: Requesting a timeslot for a Mock Presentation

Dear Madam,

We have almost completed the Proposal Presentation slides and we'll be completing them by tonight and start practicing the presentation. I have shared the OneDrive link for our presentation slides a while ago.

We would like to have a mock presentation with you before attending the presentation on Feb 2nd at 12 noon. So we can identify our weak points and loose ends, and we can try to fix them early. Therefore, we would like to ask you for a time slot (like 30 mins) on tomorrow (Feb 1st) night to do the mock presentation if its possible with your busy schedule.

Thank you.

Best Regards,
Lakisuru Semasinghe
Reg. No: IT19051130
Phone: +94 71 5 889 333

Inbox - Sliit

Results

[EXTERNAL EMAIL] THIS EMAIL HAS BEEN RE... in Inbox

[Draft] Hettiarachchi T. C. D. S. it19206806 > Selecting a course on couresa [EXTERNAL EMAIL] Dear madam, I have tried to contact I

Hettiarachchi T. C. D. S. it19206806 > Submission was Done for Ingenuity Av [EXTERNAL EMAIL] Dear Madam, Thank you for your supp...

Hettiarachchi T. C. D. S. it19206806 > Coming to on campus [EXTERNAL EMAIL] This email has bee...

Semasinghe L.S. it19051130 > TangiGuru: Regarding the Problem Rai [EXTERNAL EMAIL] This email has bee...

Shashika Lokuliyana > TangiGuru: Requesting a timeslot fo [EXTERNAL EMAIL] This email has bee...

[Draft] Hettiarachchi T. C. D. S. it19206806 > Regarding Proposal Presentation S [EXTERNAL EMAIL] Sent from Mail for Windows From: Kz

Semasinghe L.S. it19051130 > TangiGuru Weekly Meeting [EXTERNAL EMAIL] This email has bee...

Semasinghe L.S. it19051130 > TangiGuru: Rescheduled Project Prop [EXTERNAL EMAIL] This email has bee...

TangiGuru: Regarding the Problem Raised by Mr. Ishara at Proposal Presentation

Semasinghe L.S. it19051130 <it19051130@my.sliit.lk>

2/6/2022 10:20 PM

To: Shashika Lokuliyana Cc: Hettiarachchi T. C. D. S. it19206806; Ratnasuriya M. M. D. it19215716

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Dear Madam,

Here is the recording of our Proposal Presentation. <https://mysliit.sharepoint.com/sites/2022Reg-ELP2/Shared%20Documents/Forms/AllItems.aspx?i...>

You can find Mr. Ishara raising the question from minute 27.50 – 33.00 in the above video. As we understood, he trying to state that majority of Cholitha's and mine research components are related to electronics which may not carry any research value related to this research project.

Can you please try to contact Mr. Ishara again on Monday and get his opinion on this problem?

Best Regards,
Lakisuru Semasinghe
Reg. No: IT19051130
Phone: +94 71 5 889 333

Disclaimer: This email and any attachment transmitted herewith are confidential and is intended solely for the use of the individual or entity to which they are addressed and may contain information that is privileged or otherwise protected from disclosure. If you are not the intended recipient, you are hereby notified that disclosing, copying, distributing, or taking any action in reliance on this email and the information it contains is strictly prohibited. If you have received this email in error, please notify the sender immediately by reply email and discard all of its contents by deleting this email and the attachment, if any, from your system.

Disclaimer: This email and any attachment transmitted herewith are confidential and is intended solely for the use of the individual or entity to which they are addressed and may contain information that is privileged or otherwise protected from disclosure. If you are not the intended recipient, you are hereby notified that disclosing, copying, distributing, or taking any action in reliance on this email and the information it contains is strictly prohibited. If you have received this email in error, please notify the sender immediately by reply email and discard all of its contents by deleting this email and the attachment, if any, from your system.

Inbox - Slitt

- + New mail
- Accounts
 - Slitt 191
 - it19206806@my.slitt.lk
- folders
 - Inbox 191
 - More

Get the free Outlook app on your phone

shashika lokuliyana

Results All folders

your daily briefing 4/25/2022
Hi Hettiarachchi T. C. D. S. it19206806

MV Microsoft Viva
Your daily briefing 4/25/2022
Hi Hettiarachchi T. C. D. S. it19206806

Hettiarachchi T. C. D. S. it19206806 Confirmation Letter to Sllasscom 4/24/2022
Dear madam, This is the email that I |

[Draft] Hettiarachchi T. C. D. S. it19206806 Confirmation letter for the SLASSCOM 4/24/2022
Dear student, We are processing you

Hettiarachchi T. C. D. S. it19206806 Getting HOD letter for the SLASSCOM 4/24/2022
Dear madam, I'm writing this email to

Hettiarachchi T. C. D. S. it19206806 Progress Meeting 4/20/2022
Progress meeting of the what we hav

Hettiarachchi T. C. D. S. it19206806 Tangi-Guru Meeting 4/19/2022

Hettiarachchi T. C. D. S. it19206806 Dear madam, We can have the meeti Sent Items

Shashika Lokuliyana [EXTERNAL EMAIL] This email has been re Inbox

Hettiarachchi T. C. D. S. it19206806

shashika.lokuliyana

RE: Tangi-Guru Meeting

Hettiarachchi T. C. D. S. it19206806 <it19206806@my.slitt.lk>
4/19/2022 8:17 PM

To: Shashika Lokuliyana

Dear madam,
We can have the meeting @11.00 a.m. in the morning on teams madam.
Best Regards!

Sent from Mail for Windows

From: Shashika Lokuliyana
Sent: Monday, April 18, 2022 1:42 PM
To: Hettiarachchi T. C. D. S. it19206806
Subject: Re: Tangi-Guru Meeting

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Shall we have a meeting this Thursday around 11.00 Am putha??

Thanks in Advance,

Shashika L. Lokuliyana
M.Sc. (IT) SLIIT, B.Sc.(Sp.) Hons in IT (Spec. in CSN) (SLIIT), MIEEE, MCSSL, MISOC
Senior Lecturer
CSNE Degree Program Coordinator
Committee Member - IEEE WIE Sri Lanka Section
International Liaisons Chair - 3rd TCAC 2021
SLIIT, Malabe Campus, Sri Lanka.
shashika@slitt.lk | shashika3791@gmail.com
+94 77 2240 237

Inbox - Slitt

- + New mail
- Accounts
 - Slitt 191
 - it19206806@my.slitt.lk
- folders
 - Inbox 191
 - More

Get the free Outlook app on your phone

shashika lokuliyana

Results All folders

your daily briefing 4/25/2022
Hi Hettiarachchi T. C. D. S. it19206806

MV Microsoft Viva
Your daily briefing 4/25/2022
Hi Hettiarachchi T. C. D. S. it19206806

Hettiarachchi T. C. D. S. it19206806 Confirmation Letter to Sllasscom 4/24/2022
Dear madam, This is the email that I |

[Draft] Hettiarachchi T. C. D. S. it19206806 Confirmation letter for the SLASSCOM 4/24/2022
Dear student, We are processing you

Hettiarachchi T. C. D. S. it19206806 Getting HOD letter for the SLASSCOM 4/24/2022
Dear madam, I'm writing this email to

Hettiarachchi T. C. D. S. it19206806 Progress Meeting 4/20/2022
Progress meeting of the what we hav

Hettiarachchi T. C. D. S. it19206806 Tangi-Guru Meeting 4/19/2022

Hettiarachchi T. C. D. S. it19206806 Dear madam, We can have the meeti Sent Items

Shashika Lokuliyana [EXTERNAL EMAIL] This email has been re Inbox

Hettiarachchi T. C. D. S. it19206806

shashika.lokuliyana

Re: Tangi-Guru Meeting

Shashika Lokuliyana <shashika.l@slitt.lk>
4/18/2022 1:42 PM

To: Hettiarachchi T. C. D. S. it19206806

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Shall we have a meeting this Thursday around 11.00 Am putha??

Thanks in Advance,

Shashika L. Lokuliyana
M.Sc. (IT) SLIIT, B.Sc.(Sp.) Hons in IT (Spec. in CSN) (SLIIT), MIEEE, MCSSL, MISOC
Senior Lecturer
CSNE Degree Program Coordinator
Committee Member - IEEE WIE Sri Lanka Section
International Liaisons Chair - 3rd JCAC 2021
SLIIT, Malabe Campus, Sri Lanka.
shashika@slitt.lk | shashika3791@gmail.com
+94 77 2240 237

"Smile is the mirror"

From: Hettiarachchi T. C. D. S. it19206806 <it19206806@my.slitt.lk>
Sent: Friday, April 8, 2022 7:53 AM
To: shashika.lokuliyana | shashika.l@slitt.lk
Subject: Tangi-Guru Meeting

Dear madam,
We are having doubts about a few concerns. We are like to have a small meeting to discuss all these concerns. 15 minutes will be more than enough. Can you send me a free time slot that you are having to put the event to send the calendar event? Thank you for your time!
Best Regards!

Sent from Mail for Windows

Inbox - Slitt

- + New mail
- Accounts
 - Slitt 190
it19206806@my.slitt.lk
- Folders
 - Inbox 190
 - More

Get the free Outlook app on your phone

shashika lokuliyana

Results All folders ▾

DISCUSSION ABOUT THE RESEARCH PAPER [EXTERNAL EMAIL] This email has bee...

Hettiarachchi T. C. D. S. it19206806, Sh... 5/18/2022 8:41 AM
Dear madam, We all went home after

Hettiarachchi T. C. D. S. it19206806 5/25/2022
Finalized Research Components of Ta
Dear Sir/Madam, I am writing this em...

2022-287_TangiGuru 5/18/2022
Research Project Future work to be done [EXTERNAL EMAIL] This email has bee...

Microsoft Viva 4/28/2022
Your daily briefing
Hi Hettiarachchi T. C. D. S. it19206806

Microsoft Viva 4/26/2022
Your daily briefing
Hi Hettiarachchi T. C. D. S. it19206806

Microsoft Viva 4/25/2022
Your daily briefing
Hi Hettiarachchi T. C. D. S. it19206806

Hettiarachchi T. C. D. S. it19206806 4/24/2022
Confirmation Letter to Slascom
Dear madam, This is the email that I I...

[Draft] Hettiarachchi T. C. D. S. it19206806 4/24/2022
Confirmation letter for the SLASCOM

Reply Reply all Invite more Archive Delete Set flag ...

Research Project Future work to be done

Hettiarachchi T. C. D. S. it19206806 <it19206806@my.slitt.lk> on behalf of 2022-287_TangiGuru <2022-...

To: Hettiarachchi T. C. D. S. it19206806; Semasinghe L.S. it19051130; Ratnasuriya M. M. D. it19215716; Shashika Lokuliyana; 2022...

When Wednesday, May 18, 2022 10:00 AM - 11:00 AM View calendar

Where

Accept Tentative Decline

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Microsoft Teams meeting

Join on your computer or mobile app
[Click here to join the meeting](#)

Learn More | Meeting options

Disclaimer : This email and any attachment transmitted herewith are confidential and is intended solely for the use of the individual or entity to which they are addressed and may contain information that is privileged or otherwise protected from disclosure. If you are not the intended recipient, you are hereby notified that disclosing, copying, distributing, or taking any action in reliance on this email and the information it contains is strictly prohibited. If you have received this email in error, please notify the sender immediately by reply email and discard all of its contents by deleting this email and the attachment, if any, from your system.

Disclaimer : This email and any attachment transmitted herewith are confidential and is intended solely for the use of the individual or entity to which they are addressed and may contain information that is privileged or otherwise protected from disclosure. If you are not the intended recipient, you are hereby notified that disclosing, copying, distributing, or taking any action in reliance on this email and the information it contains is strictly prohibited. If you have received this email in error, please notify the sender immediately by reply email and discard all of its contents by deleting this email and the attachment, if any, from your system.

Inbox - Slitt

- + New mail
- Accounts
 - Slitt 190
it19206806@my.slitt.lk
- Folders
 - Inbox 190
 - More

Get the free Outlook app on your phone

shashika lokuliyana

Results All folders ▾

MV Microsoft Viva 6/13/2022
Your daily briefing
Hi Hettiarachchi T. C. D. S. it19206806

Hettiarachchi T. C. D. S. it19206806 6/10/2022
NBQSA Confirmed
Dear Madam, I am writing this em...

MV Microsoft Viva 6/7/2022
Your daily briefing
Hi Hettiarachchi T. C. D. S. it19206806,

MV Microsoft Viva 6/6/2022
Your daily briefing
Hi Hettiarachchi T. C. D. S. it19206806,

2022-287_TangiGuru 6/3/2022
Discussion About the Research Paper [EXTERNAL EMAIL] This email has bee...

Hettiarachchi T. C. D. S. it19206806, Sh... 6/1/2022
↳ Discussion about the Research Paper

Hettiarachchi T. C. D. S. it19206806
Dear madam, We all went home after Sent Items

Shashika Lokuliyana 6/1/2022
[EXTERNAL EMAIL] This email has been re... Inbox

Hettiarachchi T. C. D. S. it19206806
Dear madam, I am writing this email Sent Items

Hettiarachchi T. C. D. S. it19206806
Dear madam, I am writing this email

Reply Reply all Forward Archive Delete Set flag ...

RE: Discussion about the Research Paper Submission of TangiGuru

Hettiarachchi T. C. D. S. it19206806 <it19206806@my.slitt.lk> 6/1/2022 4:04 PM
To: Shashika Lokuliyana

Dear madam,
We all went home after the presentations. We will be coming for the exams again. In the second week of July. Until that can we have an online meeting just for the time being to discuss the publication of the research paper?
Best Regards!

Sent from Mail for Windows

From: Shashika Lokuliyana
Sent: Wednesday, June 1, 2022 10:37 AM
To: Hettiarachchi T. C. D. S. it19206806
Subject: Re: Discussion about the Research Paper Submission of TangiGuru

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

i am at slitt today but next two days most probably will not be coming. Can you all visit ??

Thanks in Advance,

Shashika L. Lokuliyana
M.Sc. (IT) SLIIT, B.Sc.(Sp.) Hon's in IT (Spec. in CSN) (SLIIT), MIEEE, MCSSL, MISOC
Senior Lecturer
CSNE Degree Program Coordinator
Committee Member - IEEE WIE Sri Lanka Section
International Liaisons Chair - ICAC 2021
SLIIT, Malabe Campus, Sri Lanka
shashika.lokuliyana@gmail.com | shashika.lokuliyana79@gmail.com
+91 77 2240 237

Inbox - Slitt

- + New mail
- Accounts
 - Slitt it19206806@my.slitt.lk 190
- Folders
 - Inbox 190
 - More

shashika lokuliyana

Results All folders

Microsoft Viva Your daily briefing 6/13/2022
Hi Hettiarachchi T. C. D. S. it19206806

Hettiarachchi T. C. D. S. it19206806 NBQSA Confirmed 6/10/2022
Dear Madam, I am writing this email.

Microsoft Viva Your daily briefing 6/7/2022
Hi Hettiarachchi T. C. D. S. it19206806,

Microsoft Viva Your daily briefing 6/6/2022
Hi Hettiarachchi T. C. D. S. it19206806,

2022-287_TangiGuru Discussion About the Research Paper 6/3/2022
[EXTERNAL EMAIL] This email has been

Hettiarachchi T. C. D. S. it19206806, ↗< > Discussion about the Research Paper 6/1/2022
Dear madam, We all went home after

Hettiarachchi T. C. D. S. it19206806 ↗< Finalized Research Components of Ta 5/25/2022
Dear Sir/Madam, I am writing this em

2022-287_TangiGuru Research Project Future work to be d 5/18/2022
[EXTERNAL EMAIL] This email has been

Microsoft Viva

Discussion About the Research Paper

Discussion About the Research Paper

Join on your computer or mobile app
[Click here to join the meeting](#)

Learn More | Meeting options

Disclaimer : This email and any attachment transmitted herewith are confidential and is intended solely for the use of the individual or entity to which they are addressed and may contain information that is privileged or otherwise protected from disclosure. If you are not the intended recipient, you are hereby notified that disclosing, copying, distributing, or taking any action in reliance on this email and the information it contains is strictly prohibited. If you have received this email in error, please notify the sender immediately by reply email and discard all of its contents by deleting this email and the attachments, if any, from your system.

Disclaimer : This email and any attachment transmitted herewith are confidential and is intended solely for the use of the individual or entity to which they are addressed and may contain information that is privileged or otherwise protected from disclosure. If you are not the intended recipient, you are hereby notified that disclosing, copying, distributing, or taking any action in reliance on this email and the information it contains is strictly prohibited. If you have received this email in error, please notify the sender immediately by reply email and discard all of its contents by deleting this email and the attachments, if any, from your system.

Inbox - Slitt

- + New mail
- Accounts
 - Slitt it19206806@my.slitt.lk 189
- Folders
 - Inbox 189
 - More

shashika lokuliyana

Results All folders

Hettiarachchi T. C. D. S. it19206806, ↗< > Getting the approval for the NBQSA 8/9/2022
Dear Sir, Thank you for your approval!

Shashika Lokuliyana Hettiarachchi T. C. D. S. it19206806 ↗< > IOT Hydroponic System 8/3/2022
[EXTERNAL EMAIL] This email has been

Shashika Lokuliyana Semasinghe L.S. it19051130 ↗< > Streetlamp Project Research Paper 8/2/2022
[EXTERNAL EMAIL] This email has been re-inbox

Shashika Lokuliyana [EXTERNAL EMAIL] This email has been re-inbox

Semasinghe L.S. it19051130 ↗< > [EXTERNAL EMAIL] This email has been re-inbox

Hettiarachchi T. C. D. S. it19206806, ↗< > Group 49 IOT street Lamp 7/31/2022
[EXTERNAL EMAIL] This email has been

Shashika Lokuliyana Hettiarachchi T. C. D. S. it19206806 ↗< > NBQSA Registrations - Deadline Re 7/15/2022
[EXTERNAL EMAIL] This email has been

Re: Streetlamp Project Research Paper

Shashika Lokuliyana <shashika.l@slitt.lk> 8/2/2022 10:27 AM

To: Semasinghe L.S. it19051130 Cc: Hettiarachchi T. C. D. S. it19206806

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Dear Both,

We can submit the paper to this conference.

<https://icitr.uom.lk>

ICITR International Conference 2022

The 7th International Conference on Information Technology Research (ICITR 2022) will be held 7-9 December, 2022 at the University of Moratuwa, Moratuwa, Sri Lanka. The purpose of ICITR conference is to promote research in ICT and scientific exchange among researchers and scholars and engineers. ICITR 2022 will have a diverse technical tracks, student abstracts, invited speakers and workshops ...

icitr.uom.lk

but as I think we need to do this within the day.

there are modifications to be done I will go through the writing but all the programs should be written in a pseudocode manner. Not giving the actual program, and remove the ohms law components just mention that theory is being applied in how where and why, can we make those changes.

and please add me as a author as well. Normally you are suppose to add your supervisor and co-supervisor okay.

Thanks in Advance,

Inbox - SLIIT

+ New mail

Accounts

SLIIT 189
it19206806@my.sliit.lk

Folders

Inbox 189

More

Get the free Outlook app on your phone

✉️ 📱 🌐 🏷️ 🎯

shashika lokuliyana

Results All folders

2022-287_TangiGuru, Hettiarachchi T. 9/15/2022
Preparation Meeting for PP2 [EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Microsoft Viva Your daily briefing 9/12/2022
Hi Hettiarachchi T. C. D. S. it19206806

Microsoft Viva Your daily briefing 9/9/2022
Hi Hettiarachchi T. C. D. S. it19206806,

Hettiarachchi T. C. D. S. it19206806 9/6/2022
Meeting Schedle
Dear Madam, Can we have a meeting

CDAP SLIIT, Jagath Wickramarathne 8/31/2022
Awareness Session for SLIIT Nominees [EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Nadee Ranchagodage, Hettiarachchi 8/30/2022
Nominations for the IET awards [EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Microsoft Viva Your daily briefing 8/30/2022
Hi Hettiarachchi T. C. D. S. it19206806

Microsoft Viva Your daily briefing 8/29/2022
Hi Hettiarachchi T. C. D. S. it19206806

Shashika Lokuliyana Hettiarachchi T. 9/6/2022

Reply Reply all Forward Archive Delete Set flag ...

Meeting Schedle

 Hettiarachchi T. C. D. S. it19206806 <it19206806@my.sliit.lk>

To: Shashika Lokuliyana

Dear Madam,
Can we have a meeting today or tomorrow to discuss the issues that we have regarding the project. Your support is highly appreciated.
Best Regards!

Sent from Mail for Windows

Inbox - SLIIT

+ New mail

Accounts

SLIIT 187
it19206806@my.sliit.lk

Folders

Inbox 187

More

Get the free Outlook app on your phone

✉️ 📱 🌐 🏷️ 🎯

shashika lokuliyana

Results All folders

W WPMC'22 9/24/2022
[WPMC'22] Information about page [EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

2022-287_TangiGuru, Hettiarachchi T. 9/15/2022
Preparation Meeting for PP2 [EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

2022-287_TangiGuru 9/15/2022
[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Hettiarachchi T. C. D. S. it19206806 9/15/2022
Sent Items

2022-287_TangiGuru 9/15/2022
[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Microsoft Viva Your daily briefing 9/12/2022
Hi Hettiarachchi T. C. D. S. it19206806

Microsoft Viva Your daily briefing 9/9/2022
Hi Hettiarachchi T. C. D. S. it19206806,

Hettiarachchi T. C. D. S. it19206806 9/6/2022
Meeting Schedle
Dear Madam, Can we have a meeting

CDAP SLIIT, Jagath Wickramarathne 8/31/2022
Awareness Session for SLIIT Nominees [EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Semasinghe L.S. it19051130 9/15/2022 2:11 PM
on behalf of 2022-287_TangiGuru <2022-287_Tan...>

To: Semasinghe L.S. it19051130; Hettiarachchi T. C. D. S. it19206806; Shashika Lokuliyana; Ratnasuriya M. M. D. it19215716; 2022...

When Friday, September 16, 2022 10:00 PM - 10:30 PM (was Thursday, September 15, 2022 2:00 PM - 2:30 PM) View calendar

Where

✓ Accept ? Tentative ✗ Decline

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Hi All,

After discussing with you all, I rescheduled the meeting to Friday (16th of September) at 10AM to discuss the upcoming PP2 presentation preparations and Final Report Draft submissions. See you all there. Thanks a lot.

Lakisuru

Microsoft Teams meeting

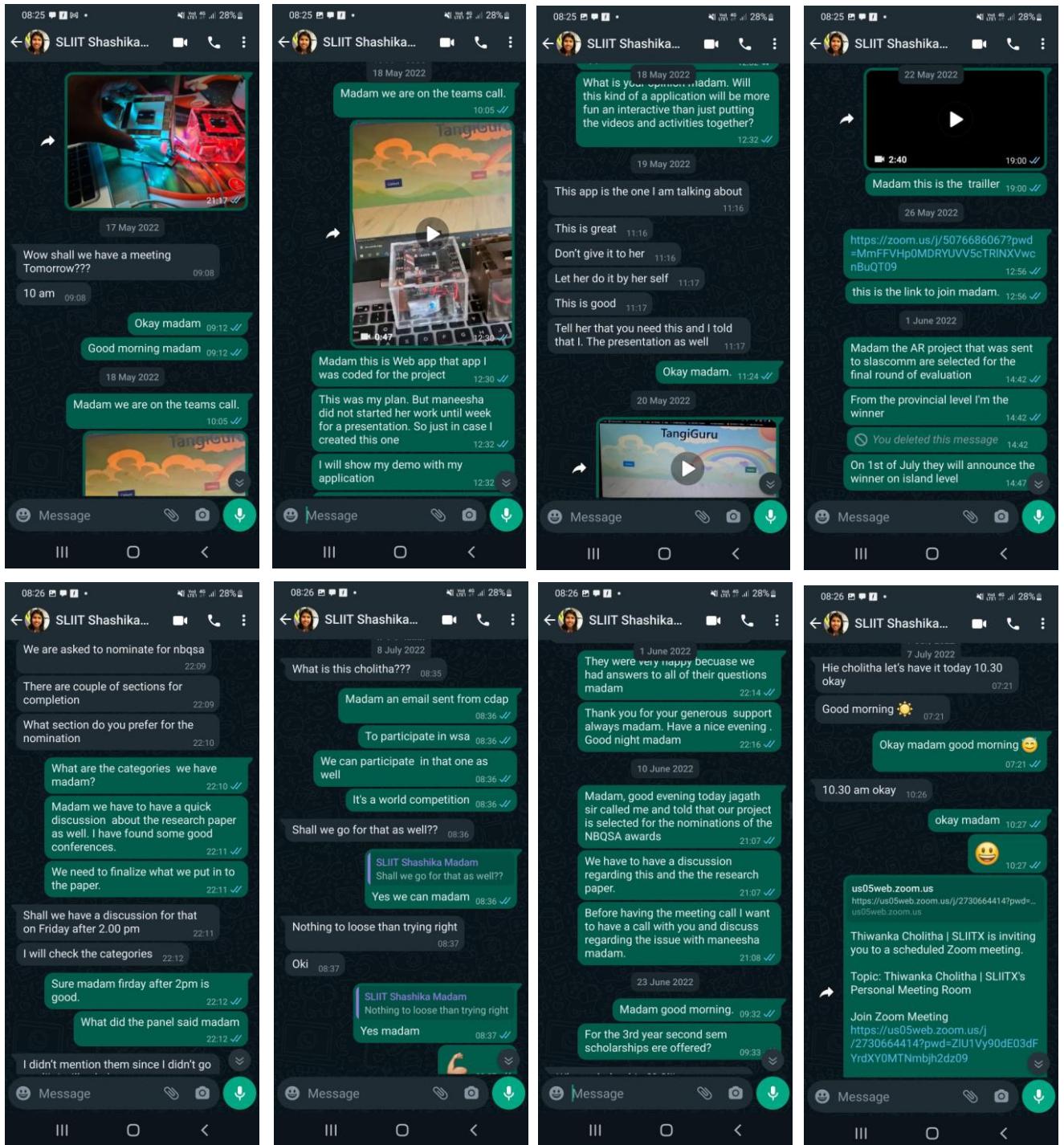
Join on your computer, mobile app or room device

Reply Reply all Invite more Archive Delete Set flag ...

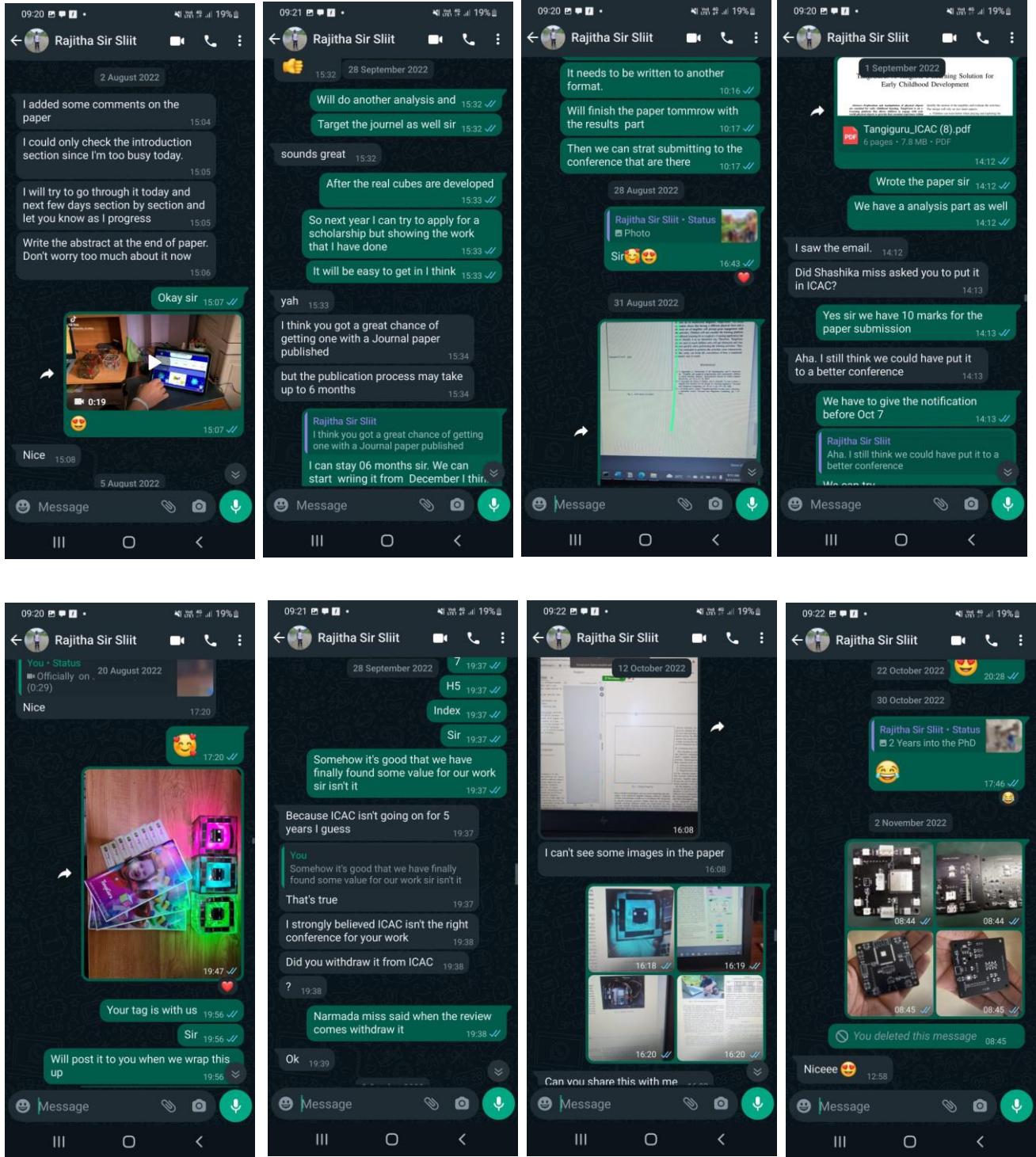
Preparation Meeting for PP2

1.5 Messages

1.5.1 Messages with the supervisor



1.5.2 Messages with the External Supervisor



1.5.3 Messages in the official TangiGuru-2022-287 Group

This screenshot shows a WhatsApp web interface on a dark-themed browser window. The main chat window is titled '2022-287: TangiGuru' and includes the subtitle 'Lakisuru, SLIIT, You, +94 77 384 3492'. The message history is as follows:

- SLIIT Shashika Madam: try this too 09:19
- https://13iccnt.com 09:19
- (You): Deadline was yesterday madam 😊 09:20
- SLIIT Shashika Madam: ohhh 09:22
- no no yet you can submit 09:23
- go to submission and login and see 09:23
- do it right now with the paper you have created 09:23
- (You): Okay madam 09:26

The message input field at the bottom contains the placeholder 'Type a message'.

This screenshot shows a WhatsApp web interface on a dark-themed browser window. The main chat window is titled '2022-287: TangiGuru' and includes the subtitle 'Lakisuru, SLIIT, You, +94 77 384 3492'. The message history is as follows:

- SLIIT Shashika Madam: 11 kB 09:31
- Submitting it 09:33
- SLIIT Shashika Madam: Dear all hope to see all three of your components of the project this week. I am available almost all week. Plz call before coming like I will leave at 3.00 today 09:02
- Lakisuru SLIIT: 112 kB 09:33
- SLIIT Shashika Madam: Dear all hope to see all three of your components of the project this week. I am available almost all week. Plz call before coming like I will leave at 3.00 today 09:51
- SURE miss. I will show you my component by end of this week because these few days are a bit occupied with mid-exams: 👍👍👍 09:51

The message input field at the bottom contains the placeholder 'Type a message'.

2 Individual Project Logs

2.1 MS Planner

The screenshot shows the Microsoft Planner interface for the team "2022-287_TangiGuru". The left sidebar includes links for Activity, Chat, Teams, Assignments, Calendar, Calls, Files, and Apps. The main area displays tasks grouped by category: Development, Documentation, Presentation, and Testing. Each category has a sub-section for completed tasks.

Category	Sub-Section	Task Description	Status
Development	Completed tasks	Code Optimization and Bug Fixing	Completed
		Full Integration with the RTDB	Completed
		Assemble the Hardware for the Chamber	Completed
		Design the Cube Chamber	Completed
		Interpolate Chamber with the RTDB	Completed
	In Progress	Assembling the cube	In Progress
		Cutting the materials for the prototype	In Progress
		Cube Design	In Progress
		Dev App for the cube	In Progress
		Topic Charter Submission	In Progress
Documentation	Green	Final Report Hardbound	Pending Review
		Project Proposal Draft	Completed
		Status Document 2	Completed
		Student Logbook	Completed
		Research Paper Submission	Pending Review
	Yellow	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Final Presentation and VIVA	Pending Review
		Final Report Hardbound	Pending Review
Presentation	Green	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Student Logbook	Completed
		Research Paper Submission	Pending Review
	Yellow	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Final Report Hardbound	Pending Review
		Final Presentation and VIVA	Pending Review
Testing	Green	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Student Logbook	Completed
		Research Paper Submission	Pending Review
	Yellow	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Final Report Hardbound	Pending Review
		Final Presentation and VIVA	Pending Review

This screenshot shows the Microsoft Planner interface for the same team, but with different task descriptions. The structure is identical to the first screenshot, with tasks grouped by category: Development, Documentation, Presentation, and Testing. Completed tasks are listed under their respective sub-sections.

Category	Sub-Section	Task Description	Status
Development	Completed tasks	Code Optimization and Bug Fixing	Completed
		Full Integration with the RTDB	Completed
		Assemble the Hardware for the Chamber	Completed
		Design the Cube Chamber	Completed
		Interpolate Chamber with the RTDB	Completed
	In Progress	Assembling the cube	In Progress
		Cutting the materials for the prototype	In Progress
		Cube Design	In Progress
		Dev App for the cube	In Progress
		Topic Charter Submission	In Progress
Documentation	Green	Final Report Hardbound	Pending Review
		Project Proposal Draft	Completed
		Status Document 2	Completed
		Student Logbook	Completed
		Research Paper Submission	Pending Review
	Yellow	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Final Presentation and VIVA	Pending Review
		Final Report Hardbound	Pending Review
Presentation	Green	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Student Logbook	Completed
		Research Paper Submission	Pending Review
	Yellow	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Final Report Hardbound	Pending Review
		Final Presentation and VIVA	Pending Review
Testing	Green	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Student Logbook	Completed
		Research Paper Submission	Pending Review
	Yellow	Progress Presentation-2	Completed
		Progress Presentation-1	Completed
		Proposal Presentation	Completed
		Final Report Hardbound	Pending Review
		Final Presentation and VIVA	Pending Review

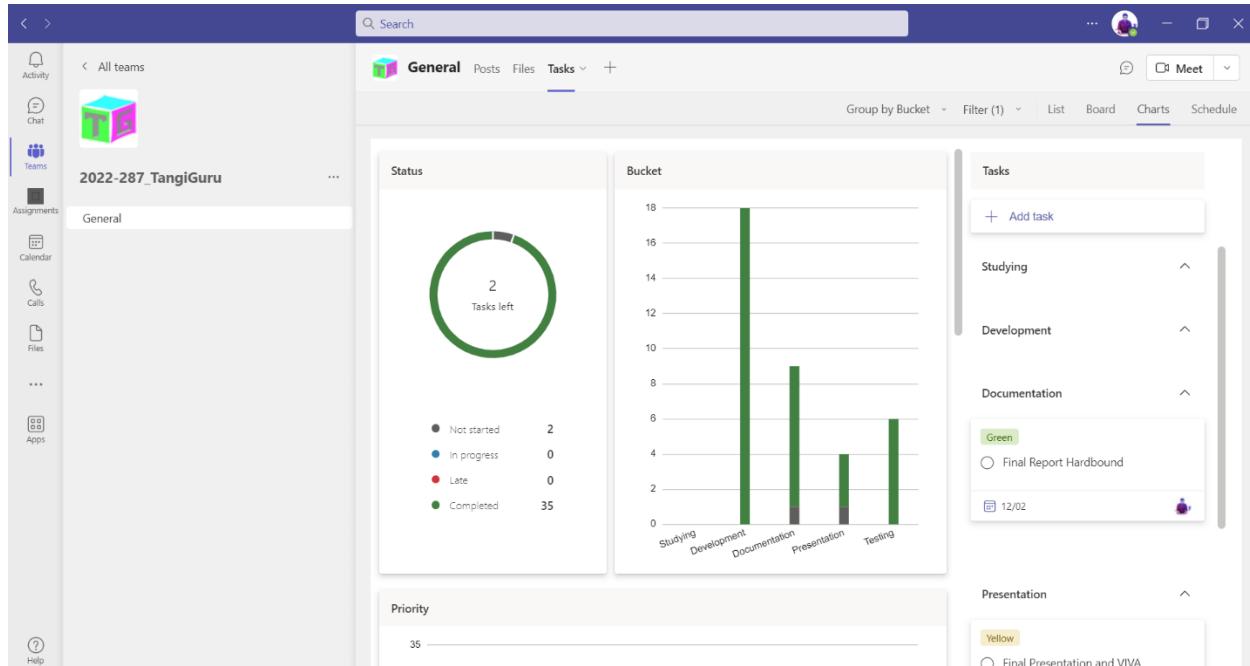


Figure 2.1.2: Chart View of Tasks

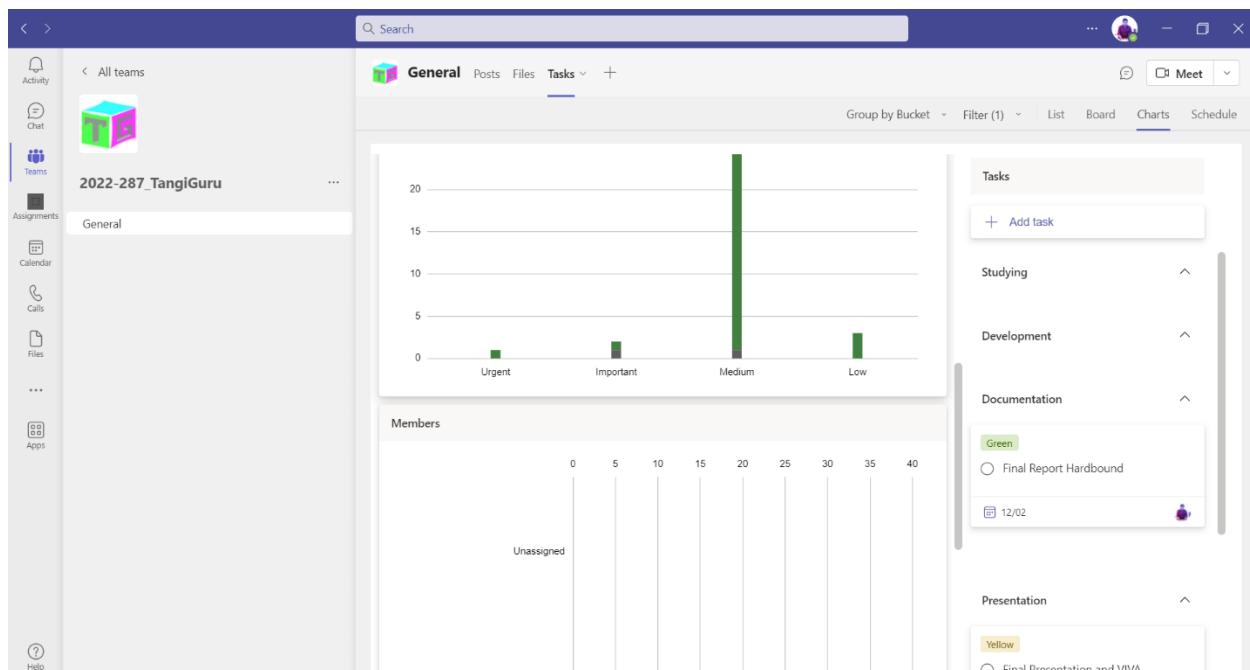
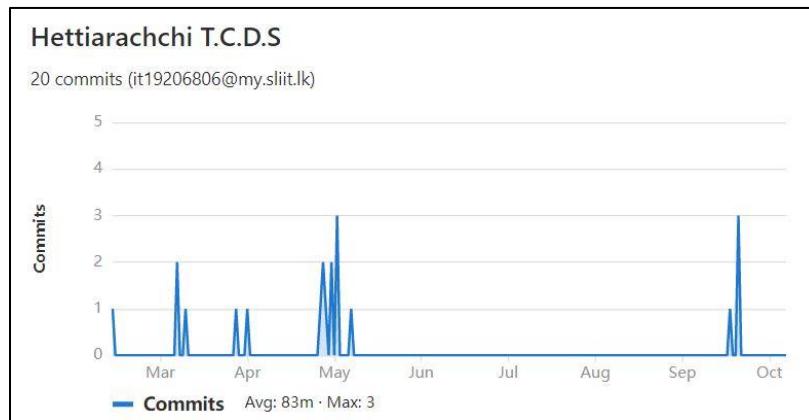
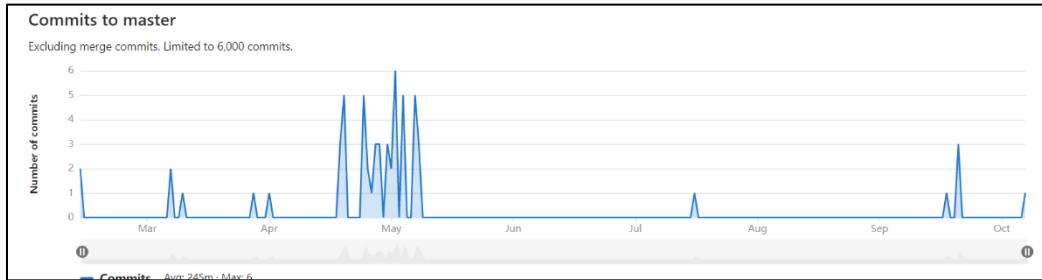


Figure 2.1.1: Completed Tasks on Teams Charts

2.2 Git Lab



GitLab Projects Groups More

2022-287

Project overview Repository Commits Branches Tags Contributors Graph Compare Issues Merge Requests CI / CD Operations Analytics

Collapse sidebar

Search or jump to... f3d4ad04 4814ae77 624b2d6e 67464858 3a0d1855 4a538d97 1061f27a 44799a29

10 May, 2022 1 commit

14 Apr, 2022 1 commit

10 Apr, 2022 1 commit

23 Mar, 2022 1 commit

20 Mar, 2022 2 commits

25 Feb, 2022 1 commit

Initial commit

Firebase configured and addColourToCube function done

Activity Developed. Cube and the app needs to be connected

audio instructions added

Firmware updated to ESP 32 from esp8266 and RTDB master communication tested with sucess

color activity created and cube design added

web application init

firmware files added to repo

3 Monthly Progress

3.1 2021 November 1st to 30th

- Finding different research topics and started with the 1st day of November because the topic submission due on 12th of December. The topics were mind mapped with the components that we can do. In the meantime, we tried to find a supervisor, co-supervisor, and external supervisor. This month was utilized to have discussions and select a good topic. All the topics were discussed one by one with the supervisors and the components. After selecting the topic, the scope of the research team finalized to continue with the selected topic. Conducted a SWOT analysis to find what are the lacking parts to improve as a team.

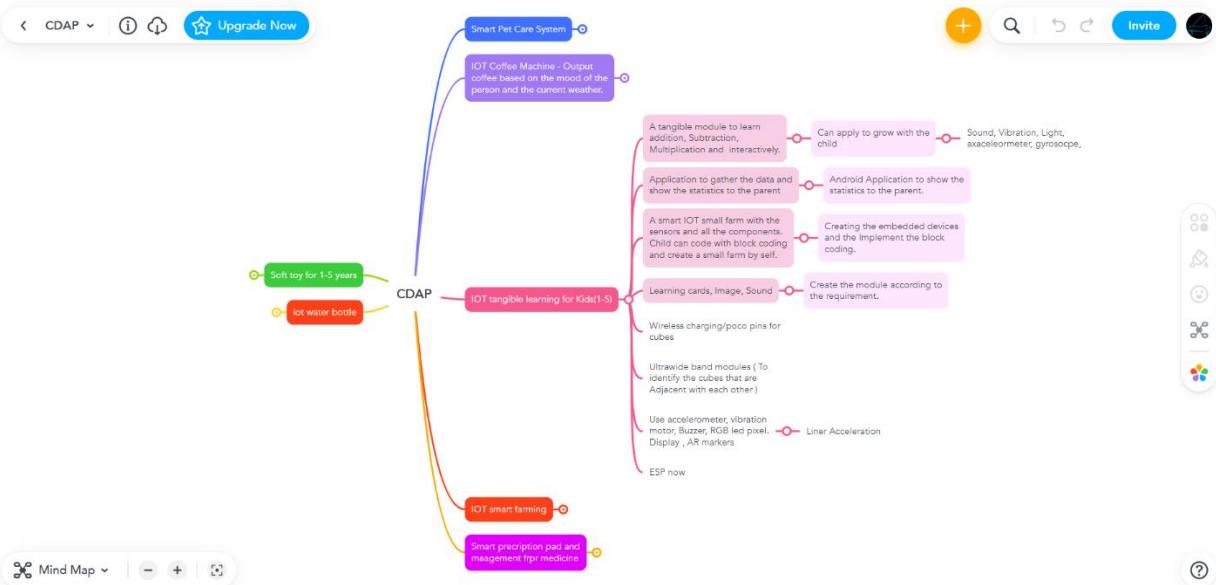


Figure 3.1.1: Mind Maps for Topic Selection

3.2 2022 January 1st to 31st

- The topic evaluation submission was due on the 12th of December. So, the preparation of the topic evaluation started on the 1st of December. Until the 12th of December, the topic evaluation form was well fine-tuned. The document was submitted on the 12th of December and waited for the topic evaluation results. The results were released on the 28th of December. After viewing the results project charter creation will be started on the 1st of January.

Project Topic Assessment-Final Year Project-2021 June CDAP-01

 Sri Lanka Institute of Information Technology
TMP-22-056

Project Topic Assessment – 2022 (Regular)

Topic
TangiGuru: Tangible Learning Solution for Early Childhood Development.

Abstract (200 Words Max):
Since early 2020, most of the world's education has been online due to the Covid-19 outbreak. It did not affect the elderly students, but students of younger ages, especially from 4 to 7, could not grab the teachings via the online platform. Also, they got addicted to electronic devices such as mobile phones and tablet PCs. Therefore, to improve the learning ability and creativity of the kids while solving the addiction to electronic devices, an interactive tangible learning kit with different activities is proposed to be developed for the children to learn things more interactively and improve their thinking ability and creativity. Children can learn with minimal supervision using the proposed learning kit while having interactive guidance similar to on-premise teachers. Therefore, this proposed Tangible Learning Kit solves most remote teaching activities related to early childhood development.

Keywords: Early Childhood Development, Tangible Learning, Embedded Systems

Page | 1

Figure 3.2.1:Topic Assessment Form

- After the topic was selected with minor corrections the project charter and the cover sheet were created to submit on the 12th of January. After the project charter and the coversheet submission, the proposal draft creation started because the due date is on the 24th of January.

The screenshot shows a Microsoft Word document titled "TMP-22-056-ProjectCharter.docx". The document contains the following sections:

- Project Registration Form:** Fields include PROJECT TITLE (TangGuru: Tangible Learning solution for Early Childhood Development), PROJECT NUMBER, and RESEARCH GROUP (Computing for Inclusive and Equitable Society (CIEC)).
- SUPERVISOR, CO-SUPERVISOR Details:** A table with columns for SUPERVISOR Name (Ms. Shanthika Lobudawaka) and CO-SUPERVISOR Name (Mr. Deepinda Sarage). It also includes fields for Signature and Date (12.01.2022).
- EXTERNAL SUPERVISOR Details:** A table with columns for Name (Mr. Rajitha de Silva), University of Colombo (University of Colombo), Contact Address (rajitha@iee.lk), Contact Numbers (+94 71 780 55 38), and a field for Attach the email as Appendix 3.
- ACCEPTANCE BY CDAP MEMBER:** A table with columns for Name, Signature, and Date.
- Project Group Member Details:** A table listing four members with their student names, numbers, contact numbers, and email addresses.

Page 1 of 18, 1294 words, Text Predictions: On, Accessibility: Investigate

Figure 3.2.2: Project Cover Sheet

- After the proposal draft document slides were created to do the proposal presentations because the presentations were on the 4th of February.

3.3 February 1st to 28th

- The proposed solution is weighted with hardware with more than 70% of the project. So, the components were altered with the request and the advice of the panel.
- After that the proposal document was updated and the final one was published for marking.
- After the proposal document was submitted development process started. So first the cube was prototyped in a cardboard box to test the main functionalities.



Figure 3.3.1: First Prototype Cube

- Basic Functionalities of changing colors, Displaying the letters, numbers, and words tested with the created prototype with the card box. This was created to check the basic functionalities. Create a solid base was initiated.

3.4 2022 March 1st - 31st

- Previously the prototyping was done on cardboard boxes. When it comes to adjacency, it is not very easy to test those with cardboard boxes. Therefore, a Mechanical design was drawn to prototype with the cube and finalized the components to design the PCB. The design was done using solid works which is a CAD design drawing tool.

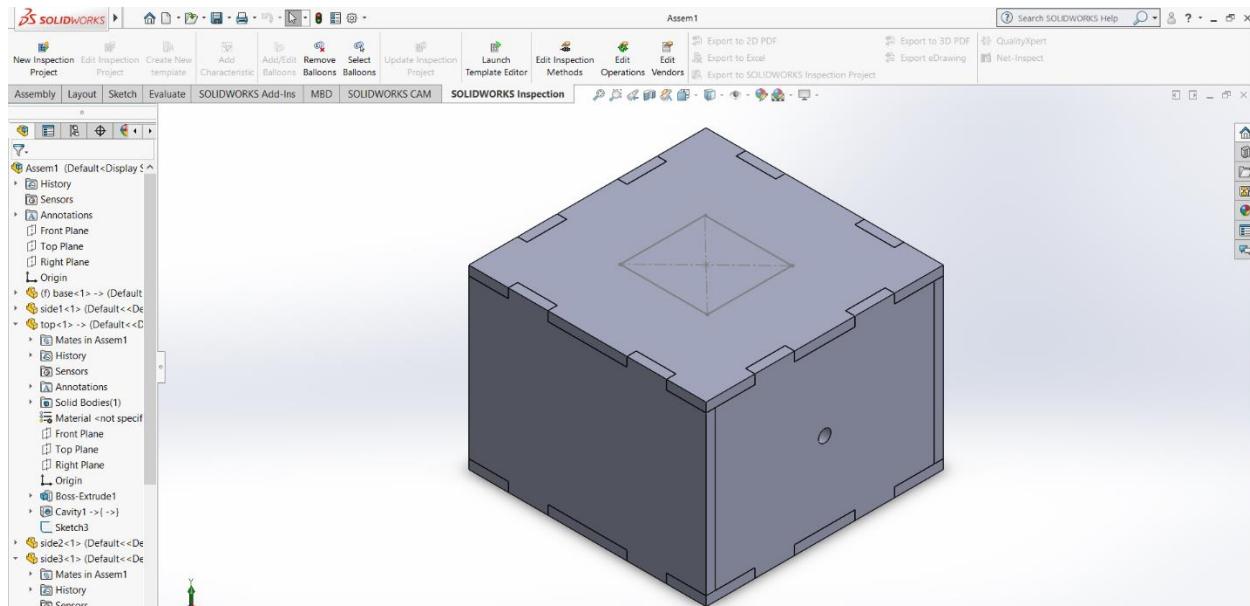


Figure 3.4.1: Designed Cube

- The design took 2 days to finalize. After the Design parts, all the parts were assembled and finalized the design. The initial design was 3x3x2 Inches. After the design, the design was cut using a laser cutting machine with acrylic material 3mm. All the pieces were cut to assemble the cube.



Figure 3.4.2: Laser Cutting Processes

- The Cube was assembled, and the prototyping was started for the progress presentation 50%. First to show the basic functions the cube was assembled.



Figure 3.4.4: Laser Cut Acrylic

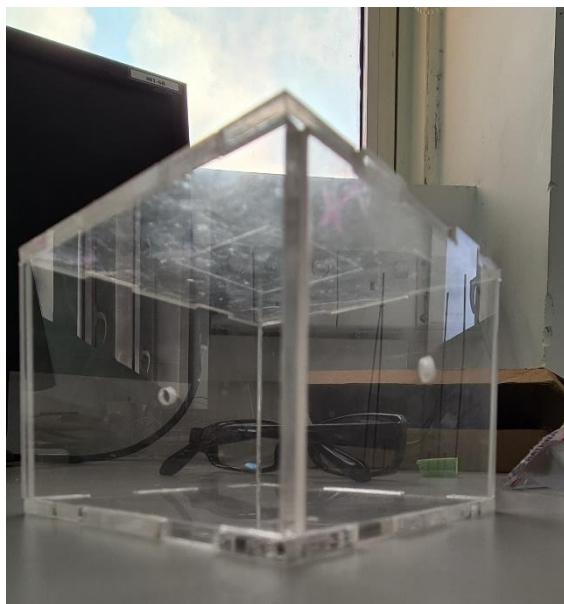


Figure 3.4.3: Assembled Cube

- To show the 50% progress a basic activity was created to show the functionality of the proposed system. Because member 3 has not completed up to 50%, I created a separate web application to show up to 50% and show the dynamic feature of the cube by changing the color feature of the cube.
- The simple UI was created using the Angular framework because I have previous experience with the Angular Framework.



Figure 3.4.5: Main Activity UI

- Color activity is created to demonstrate with two cubes.



Figure 3.4.6: Color Red Activity

- To connect the hardware a real-time database was required so with the time constraints for the progress presentation 1 as the best option I configured a Real-time database in firebase to show the functionality of the cubes and the user interface.

A screenshot of the Firebase Realtime Database console. The left sidebar shows project navigation with "Realtime Database" selected. The main area is titled "Realtime Database" and has tabs for "Data", "Rules", "Backups", and "Usage". The "Data" tab is active, showing a hierarchical tree structure of database rules and data. A warning message at the top states: "⚠ Your security rules are defined as public, so anyone can steal, modify, or delete data in your database" with "Learn more" and "Dismiss" buttons. The tree structure under "combineActivity" includes "cube01" and "cube02" nodes, each containing a "color" node with properties like "float: 0.4", "motion: 91", and "name: 'Thiwanka'" for cube01, and "B: 255", "G: 0", and "R: 0" for cube02. At the bottom, it says "Database location: United States (us-central1)".

Figure 3.4.7:Realtime Database

3.5 2022 April 1st to 30th

- After creating the web application and creating the hardware started. The hardware development started step by step. First, the display was implemented and tested because it was the key element of the cube. The display was glued to the cube and the required coding was done to change the display according to the instructed letter from the user interface.

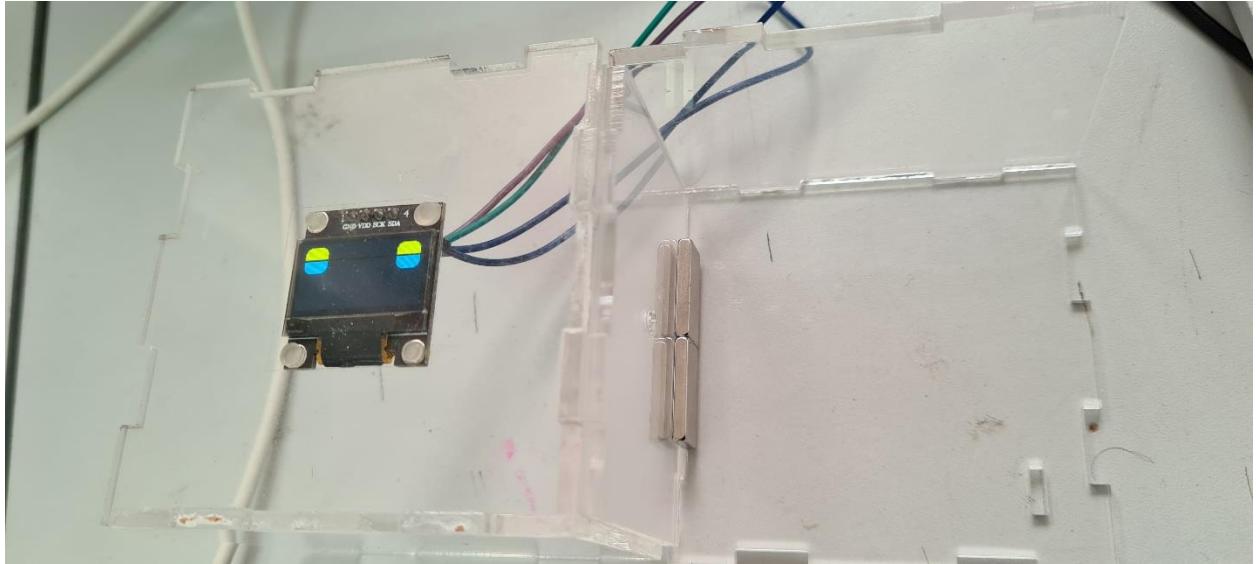


Figure 3.5.1: Display Configured

- To bring novelty and user-grabbing features humanoid eyes were implemented. This was coded separately for the cubes in order to make the cube more interesting and interactive.



Figure 3.5.2: LED Configuration

- After configuring the display, the next component is configured which is the RGB LEDs to change the color of the cubes according to the activities.

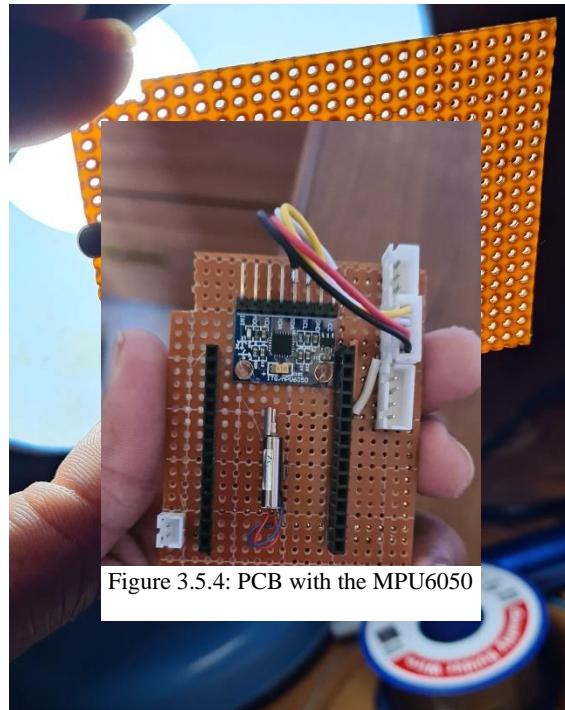
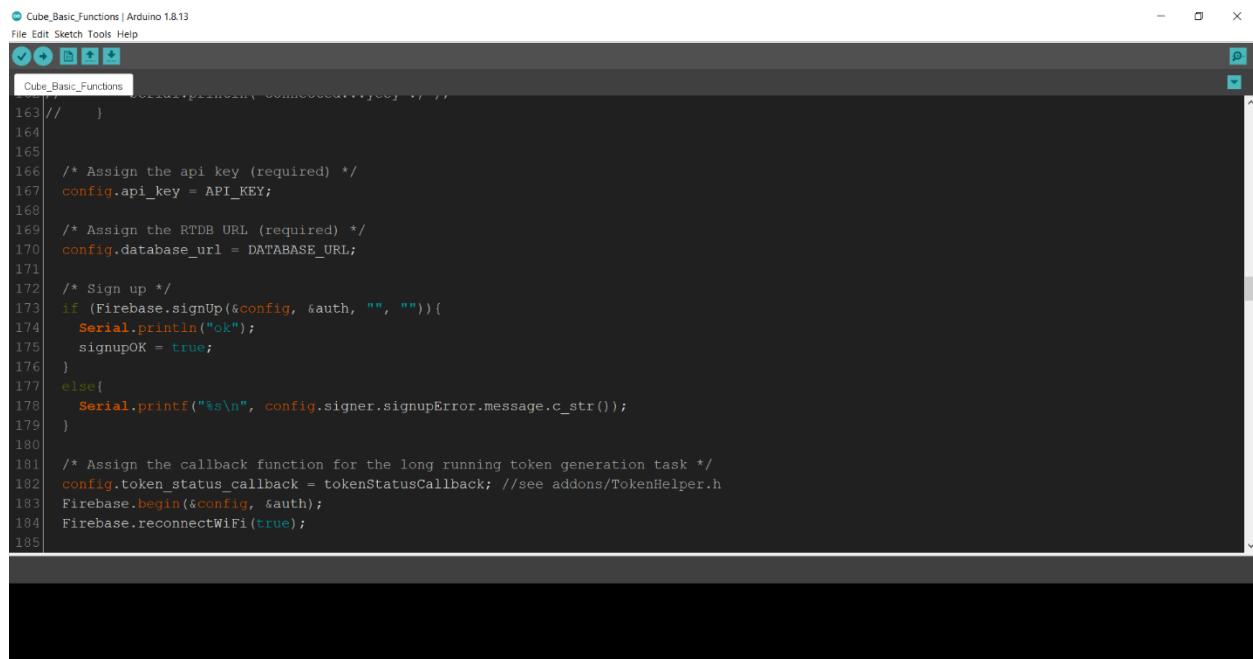


Figure 3.5.3: PCB Soldering Processes

- After that the gyroscope sensor was configured separately and tested to identify the movements of the children when shaking the cube. After testing the gyroscope code, it was embedded with the current PCB and soldered.
- After the Assembling of the MPU-6050 the hardware was tested with the correct configurations and tested with sample codes separately.
- The next was to connect the Esp-32 to the Realtime database to connect it with the cubes to work with the web application that was created.



The screenshot shows the Arduino IDE interface with the file "Cube_Basic_Functions" open. The code is written in C++ and configures a Firebase database. It includes assignments for API key and database URL, a sign-up function using Firebase's signUp method, and a token status callback setup. The code is numbered from 163 to 185.

```
163 //      )
164
165
166 /* Assign the api key (required) */
167 config.api_key = API_KEY;
168
169 /* Assign the RTDB URL (required) */
170 config.database_url = DATABASE_URL;
171
172 /* Sign up */
173 if (Firebase.signUp(&config, &auth, "", "")){
174     Serial.println("ok");
175     signupOK = true;
176 }
177 else{
178     Serial.printf("%s\n", config.signer.signupError.message.c_str());
179 }
180
181 /* Assign the callback function for the long running token generation task */
182 config.token_status_callback = tokenStatusCallback; //see addons	TokenNameHelper.h
183 Firebase.begin(&config, &auth);
184 Firebase.reconnectWiFi(true);
185
```

Figure 3.5.5: Firebase Configurations

- The cubes were connected with the real-time database to change the color of the cubes.
Two different colors were assigned to test the cubes

3.6 2022 May 1st to 31st



Figure 3.5.6:Color Assignment to the Cubes

- Getting prepared for proposal presentation 1 was started because of the progress of up to 50%. Because the member who is developing the UI is not completed up to 50%, I created a separate application to show the cube functionality with 2 cubes.

- After the development of the cube the application is coded with a color activity to perform with the cube and the application.
- Preparation of Progress Presentation 1 started because the initial dates for the presentations were the 13th to 15th of May. But with the current situation of the country, the presentation dates were changed.
- Status document 1 preparation started because the submission 13th May. Because of the presentations were postponed due to the prevailing situation in the country the presentations were scheduled for the 26th of march.
- Because there is additional time, I try to create a small demonstration video by giving the developed cubes to the child and testing how they will perform because the user experience is required. 3 children gathered to introduce the tool and give time to play with the cubes. In the 3rd week of May, the solution was introduced to the children with the prototype to children and the video footage was collected. The initial moments and the emotions were captured when using the two cubes.



Figure 3.6.1: Child Performing the Color Activity

- After analyzing the videos, the video created as a sample demo to show in the Progress Presentation 1.

- A business site was coded to show the business aspect of the project and the outcomes of the project.

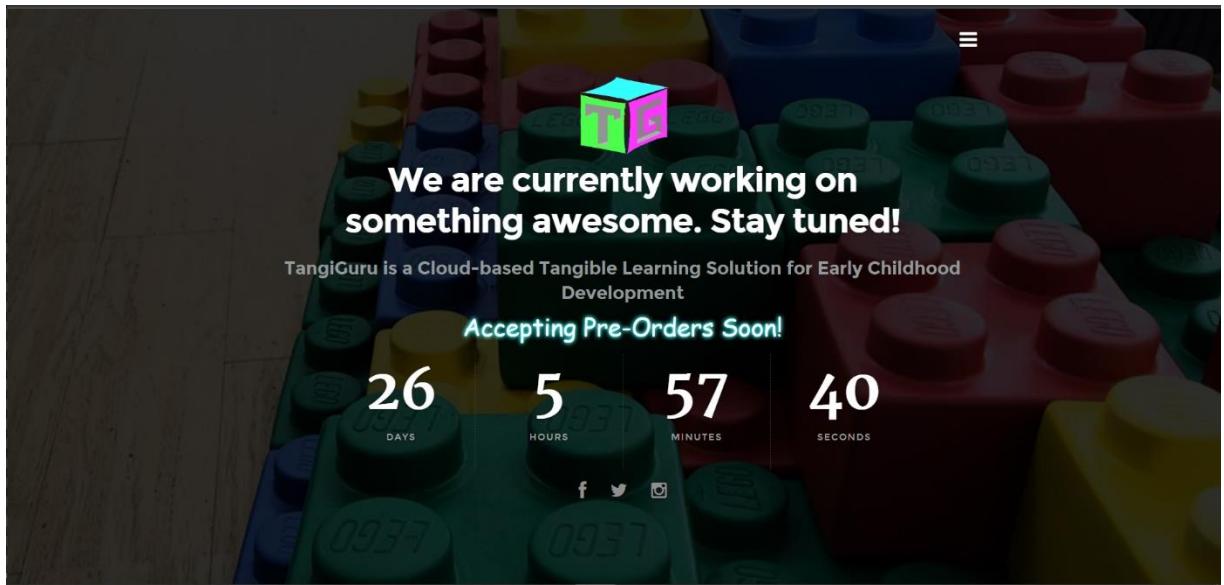


Figure 3.6.2: Introduction Website

- After that preparation for the presentation was done. How do we do the analysis also planned to show in the progress presentation 1.

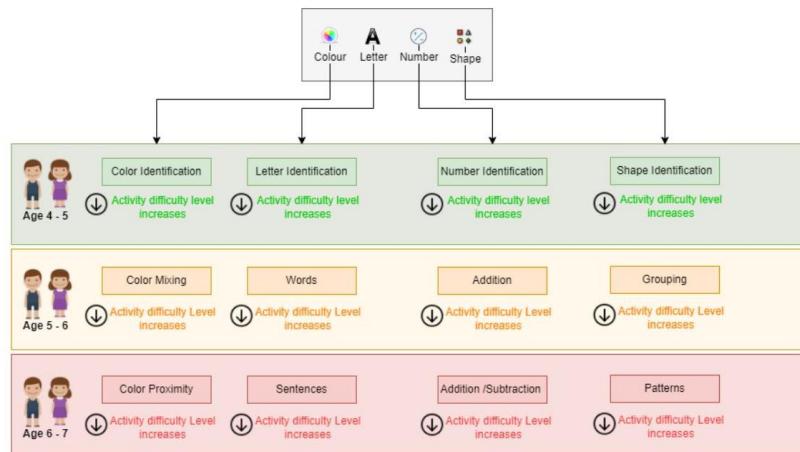


Figure 3.6.3: Evaluation Plan

3.7 2022 June 1st to 30st

- After the presentation the panel comments were reviewed. The next stage was to develop the algorithm to find the adjacent cubes which will enable the cubes to perform the word formation. To achieve this backend, need to be developed. Backend development started using Spring boot.
- First a method was required to identify the connected cubes. So first a connection identification mechanism using the magnetic sensors.
- Algorithm developed using the States of the magnetic sensors. Sketches were drawn to develop the algorithm. 2 weeks were spent developing the algorithm.

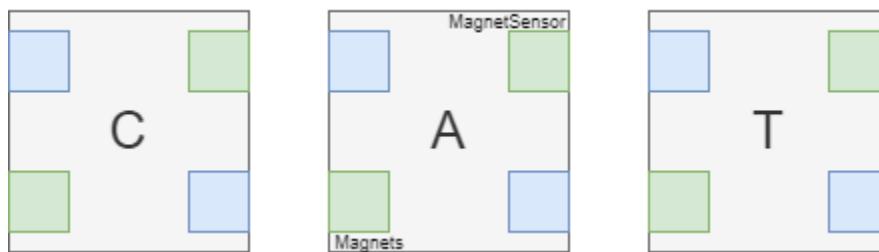


Figure 3.7.1: Connected Cubes Identification

- Algorithm developed to create the wordings because the evaluation needs to be done to write up the research paper.
- The evaluation is done through the third week and the analysis of the collected data was analyzed to write the research paper.



Figure 3.7.2:Evaluation Processes

- Research Paper draft submitted on 30th June.

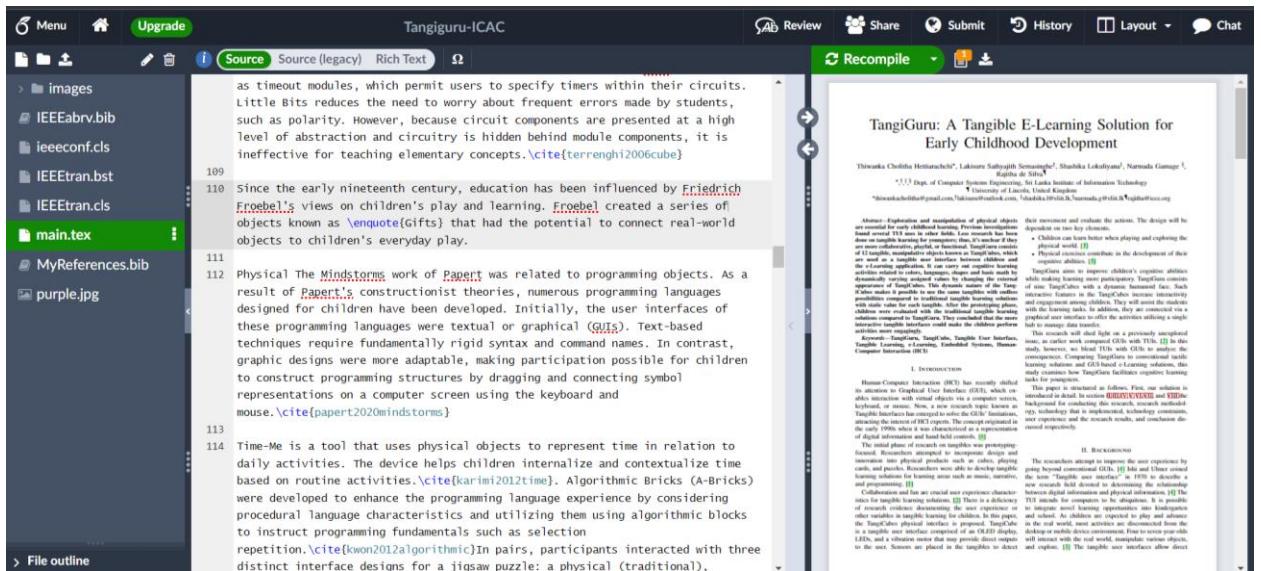
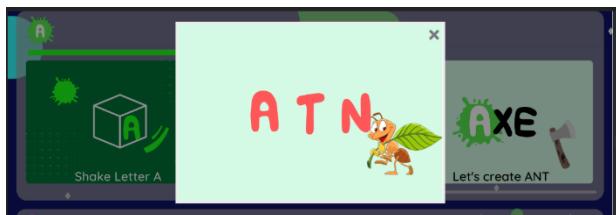
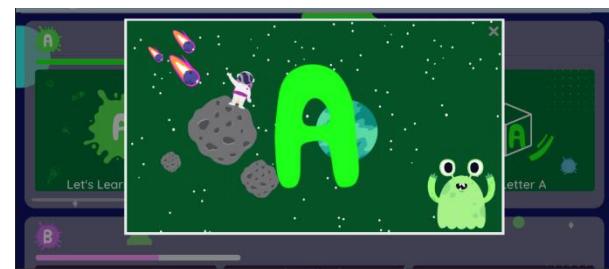


Figure 3.7.3: Written Research Paper

3.8 2022 July 1st to 31th

- We got nominated by SLIIT for the NBQSA. The evaluations were on the second week of August.
- Preparations were started for the NBQSA by developing the rest of the application and the user interfaces with the hardware.
- Different activities developed step by step to show the different activities. Developed one letter activity, and number activity.



- The user interface was developed to be a more child-friendly interface to perform the activities and give the visual output to the children. The user interface is optimized during the month.

3.9 2022 August 1st 31st

- Preparation for NBQSA started with the leaflet design to offer to the panel when we go for the presentation started because we are participating in the business category.

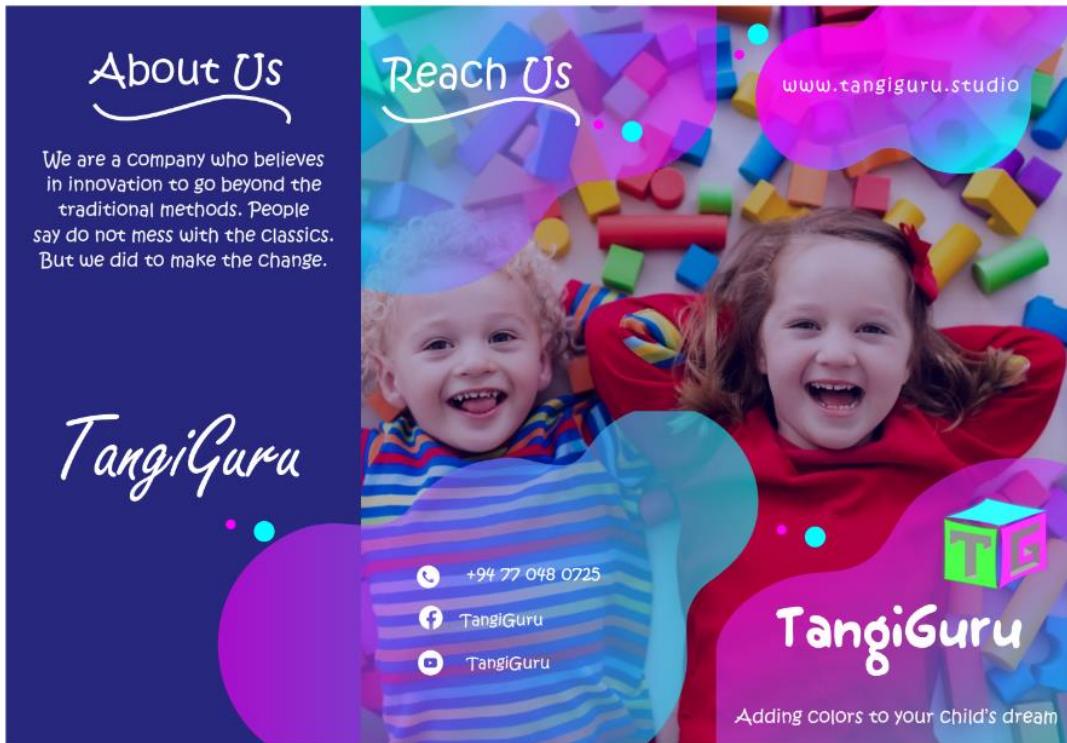


Figure 3.9.1: Hand leaflet Designed

- App optimization and presentation creation was started, and the practice sessions were started to perform the presentations on the 14th of August 2022.
- Demo video was created to show the presentations as the demo video.
- 14th of August We went to participate in the NBQSA round 1. After that, the preparation for the second was started because the results will be announced within another week. As new options Sinhala Letter Activities, Color Activities, and Number Activities.

- These are developed with new algorithms for their usage.
- New user Interfaces were developed to match the activities which will enable the children to perform different activities.

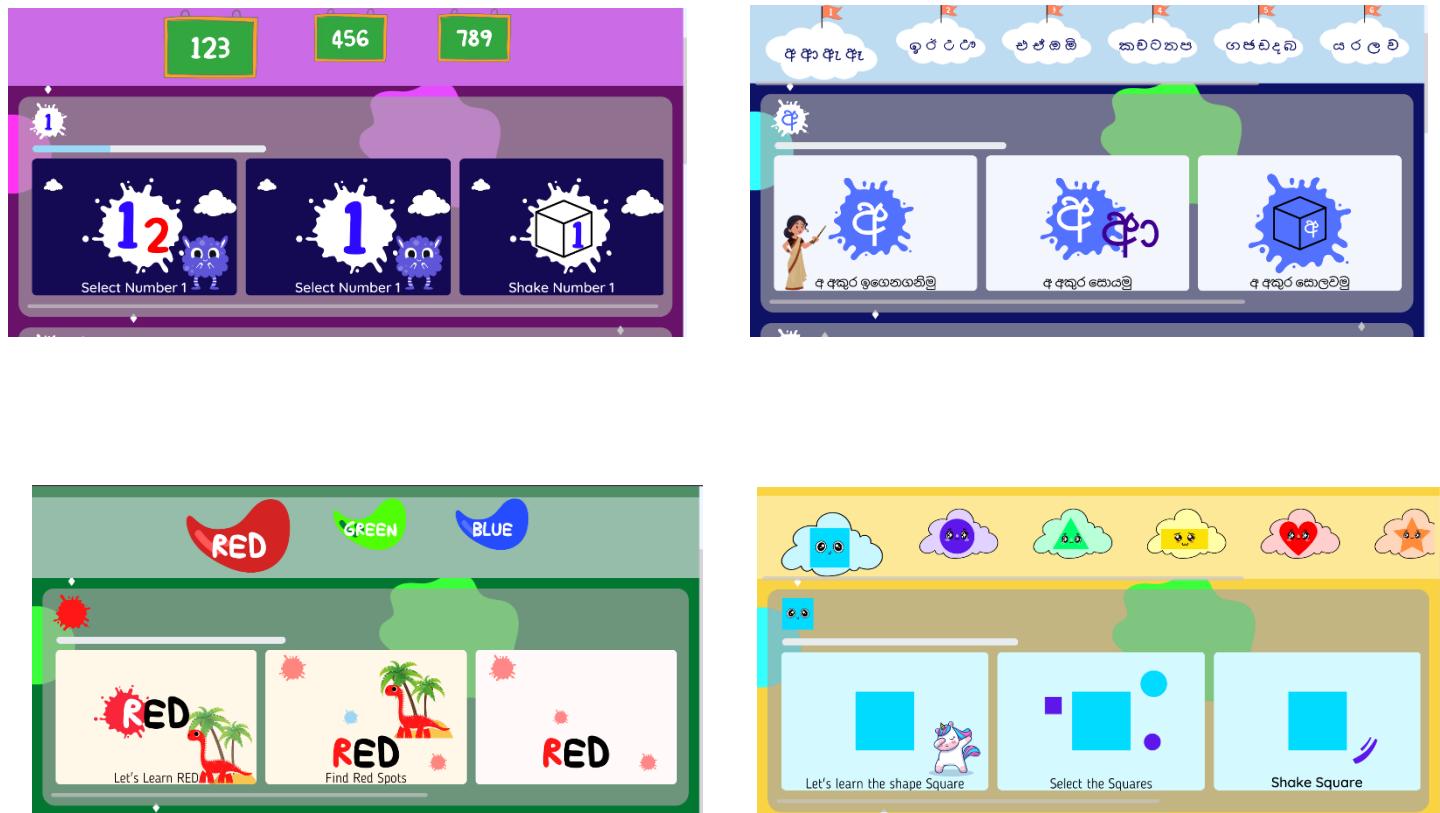


Figure 3.9.2: New Activities Added

- The activities were developed for the NBQSA 2nd round hoping that we were selected for the second round, but unfortunately, we didn't make it to round 2 evaluations. So, our NBQSA journey ended.
- After that the development of the other remaining progress started by separating the tasks that were left.

- Because the prototype is finalized the PCB design was started.

3.10 2022 September 1st to 31st

- With the easy EDA the design was started. So as the first step the schematics were drawn by choosing the footprints. So the PCB was designed with the programmer built into the board.

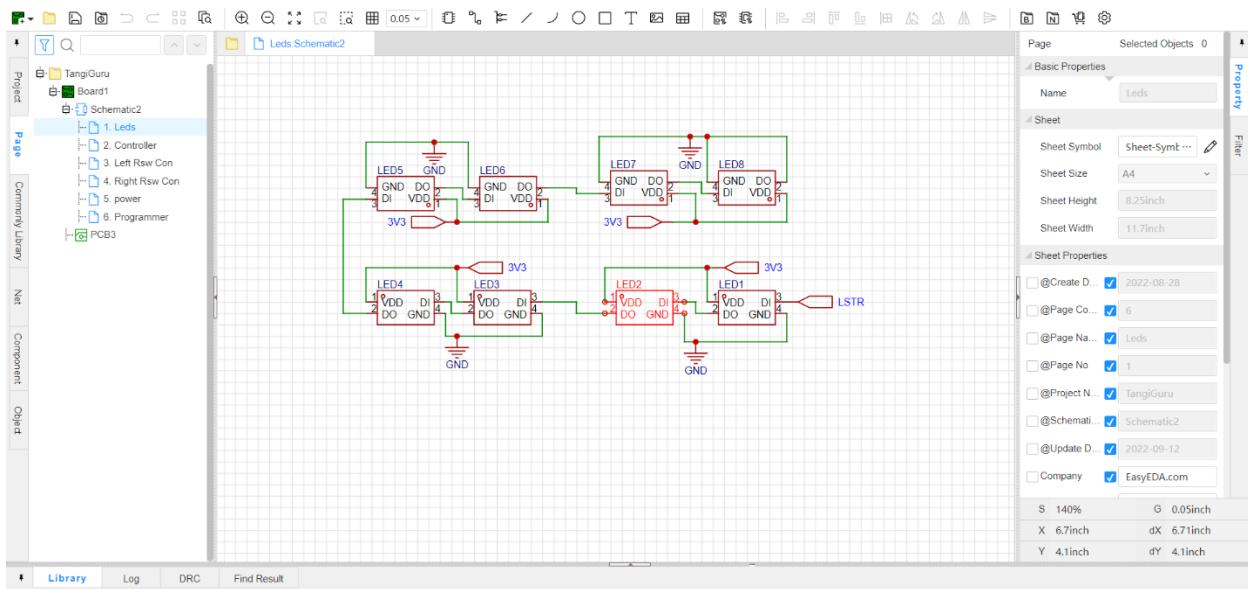


Figure 3.10.1: WS2812B strip

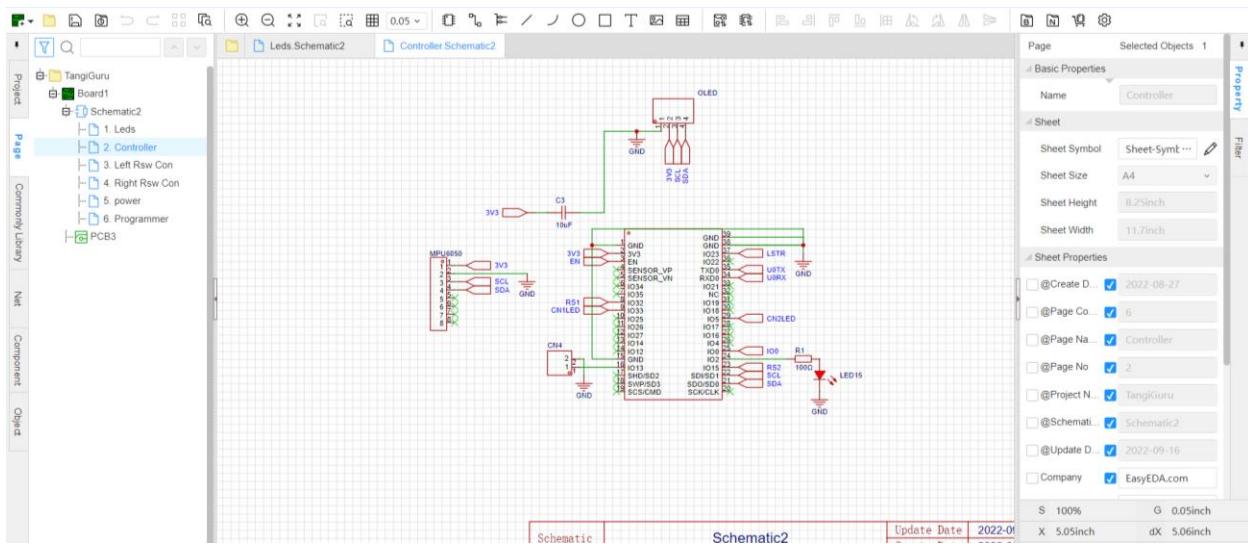


Figure 3.10.2: Controller

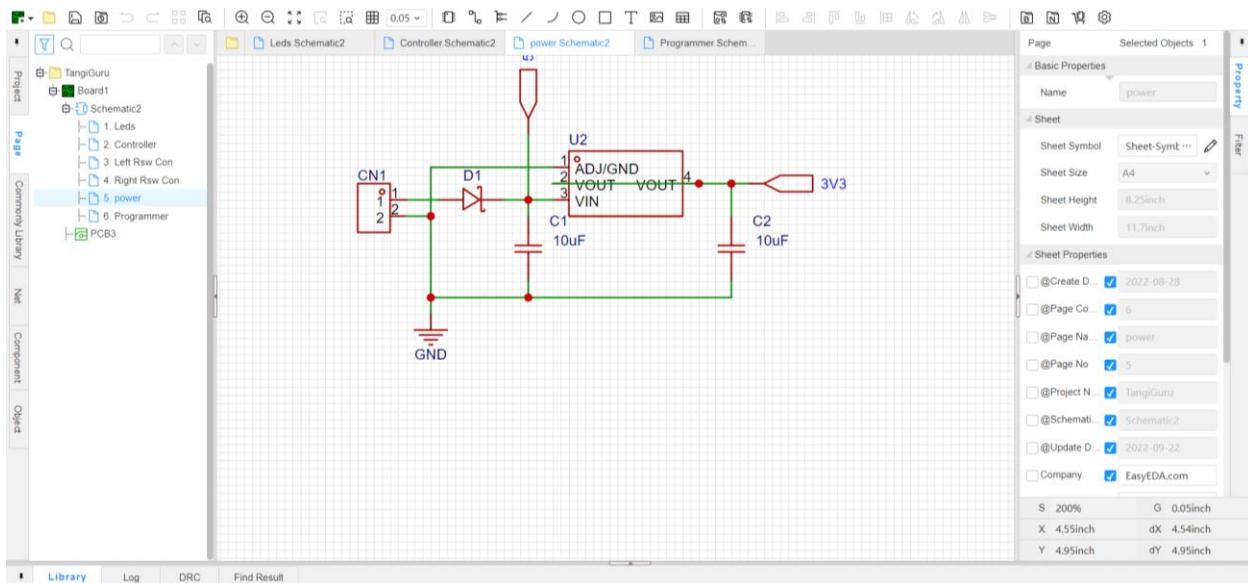


Figure 3.10.3: Power In

- After drawing the schematics, the PCB design process started. The first week was used to find the correct footprints and draw the schematics.

- After the schematics were drawn the design phase of the PCB was started. The PCB paths were created and checked. It took a week to design the paths created.

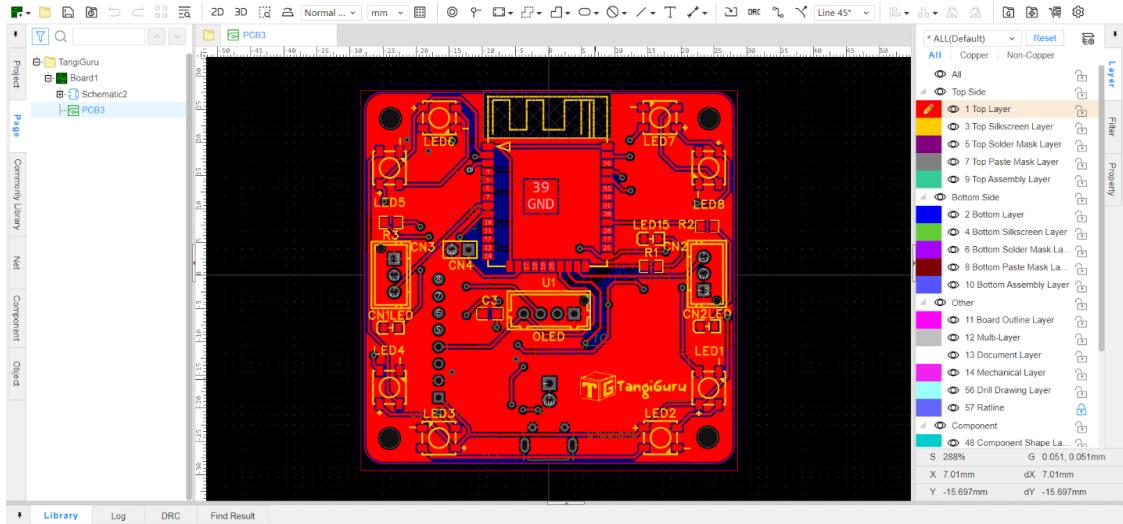


Figure 3.10.4: Top Layer Routing

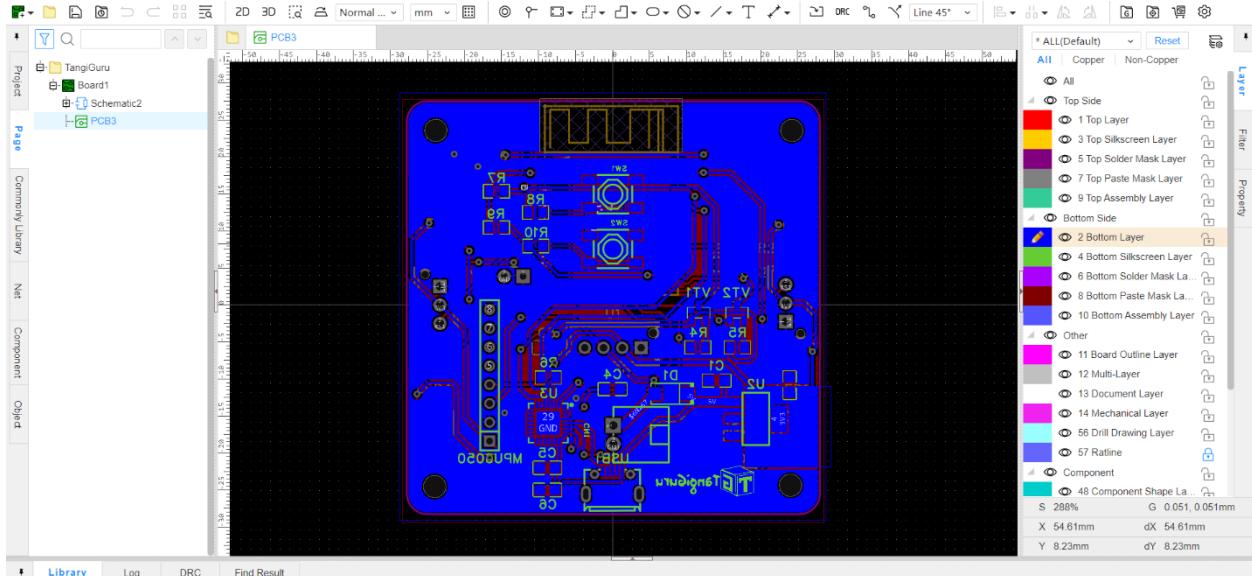


Figure 3.10.5: Bottom Layer Routing

- After finalizing the PCB, the components were ordered from LCSC, and the PCB was ordered from the JLC PCB. After the PCB print process started the other components were collected from Sri Lanka to assemble the Cubes.

- In, the same time I submitted the paper for research conferences to get the paper accepted from the conferences with the h5-index 10 or above.

3.11 2022 October 1st to 31st

- The final cube design was started. There were a few modifications to the cube design. Because the design was transferred from acrylic to 3d printed material. The design phase started with the base cube design.
- The components that were required to solder the PCB arrived at the customers. The clearance part was done.
- Because the PCB is delayed by two weeks more due to the Chinese holidays. So, the design continued with the time constraint I have to complete the project.

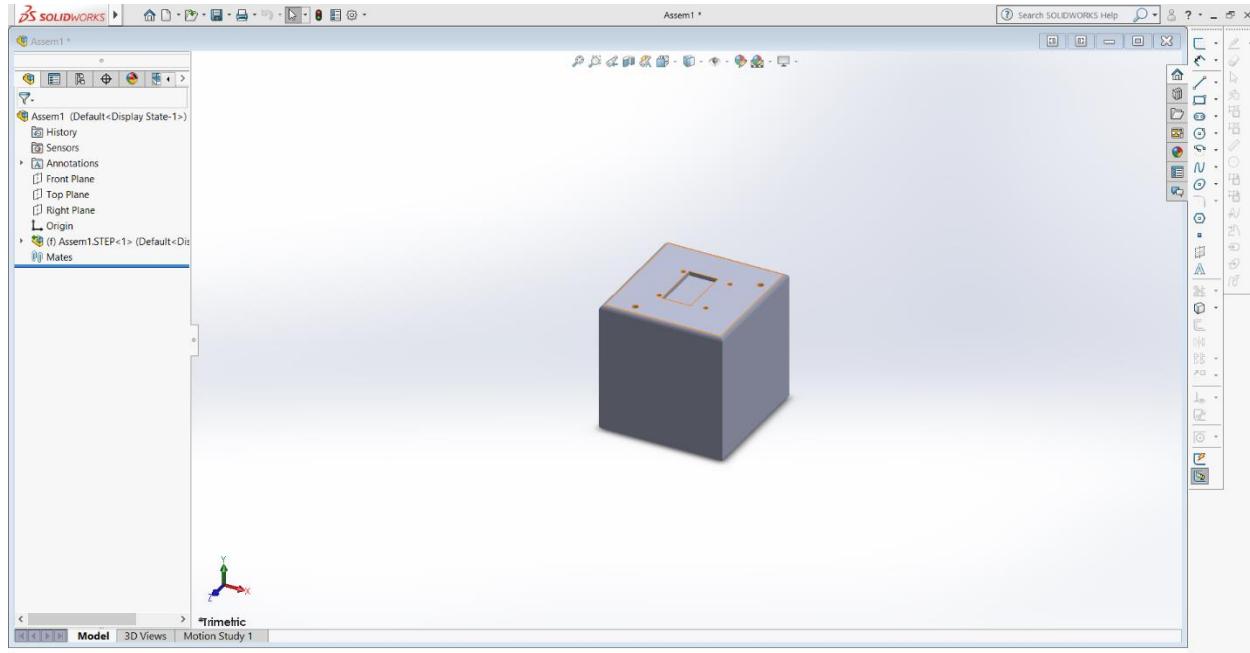
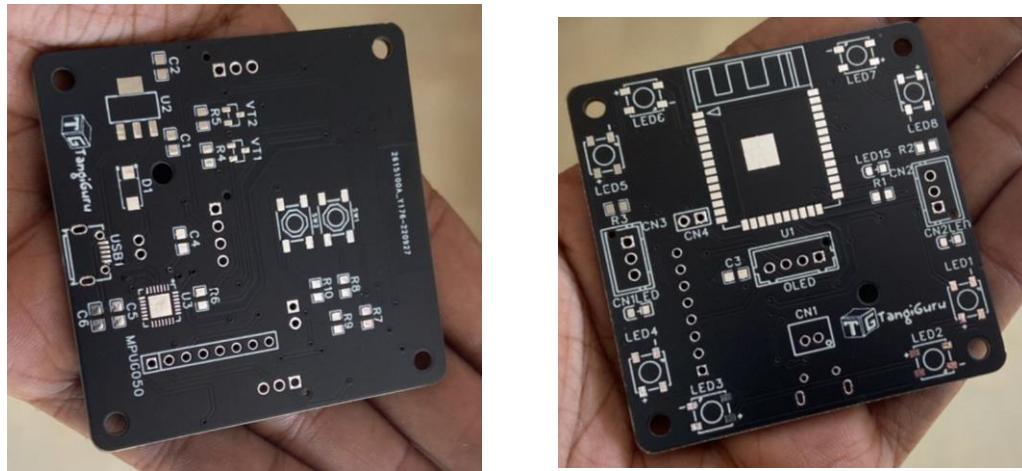


Figure 3.11.1: New Design of the Cube

- With the new design the cube looks too bulky because we had a small 128 x 64-pixel display. The top part must be redesigned.
- Also, the preparation for progress presentation 2 was started because the scheduled date was on October 13th. The feedback from the panel was good. So, they are expecting a production level for this project. So, I stated I try my best to do what I can.

- Video footage was collected to create the video of the
 - The PCBs arrived in the 4th week of October. After that, it was cleared the customs.



- PCB was given to solder the SMD components to the printed PCB. It took 5 days to solder the 5 PCBs that arrived

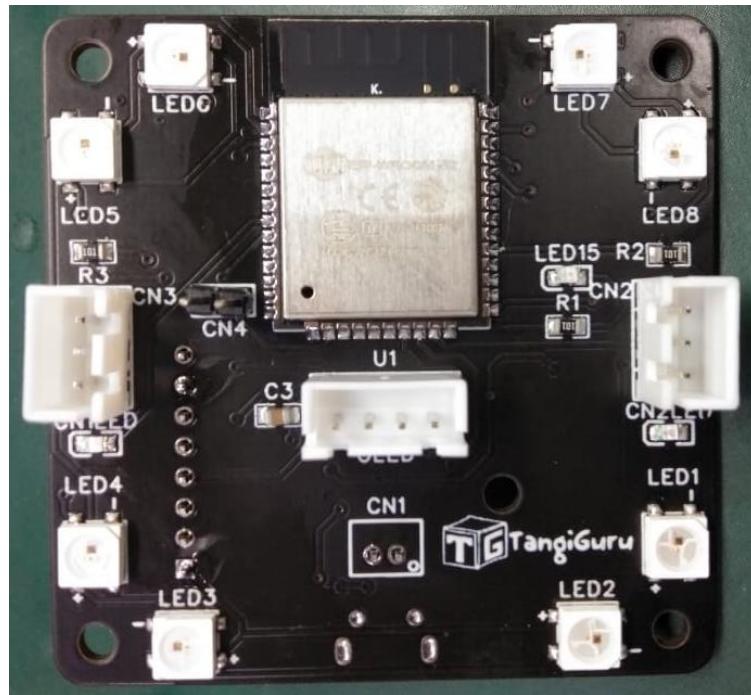


Figure 3.11.2: Soldered PCB

- After soldering the PCB all the components were tested separately. After running the diagnostics, it was found that there were no errors on the printed circuit board.
- The Cube interface was designed again with a new design approach. Because the old design will give the feeling the display is too small for the cube.

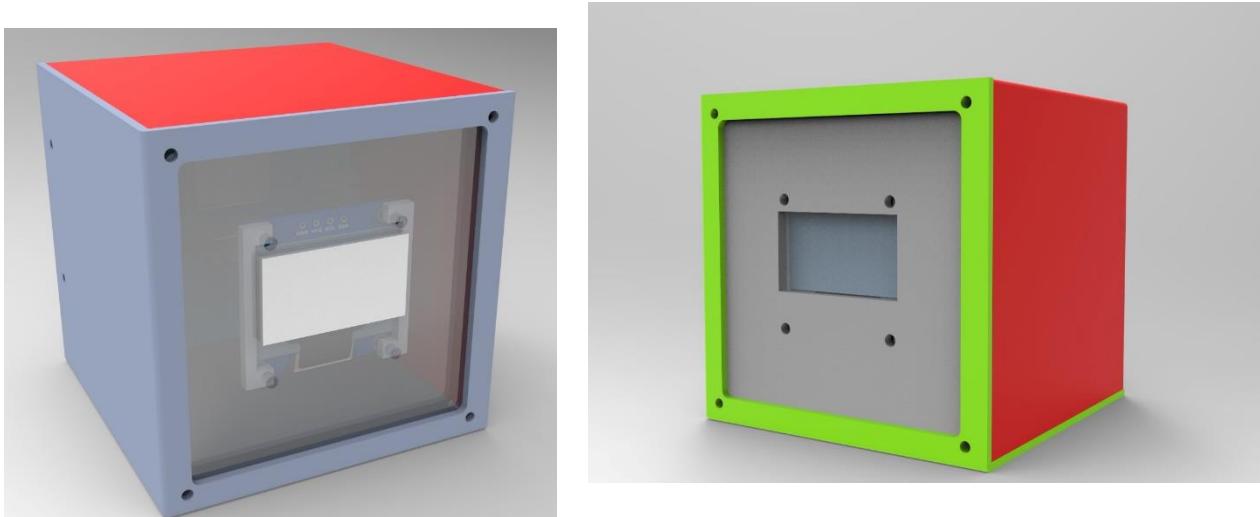


Figure 3.11.3: Designed Cube Finalized

3.12 2022 November 1st 15th

- Cube was printed with the 3D printer for the final presentation.

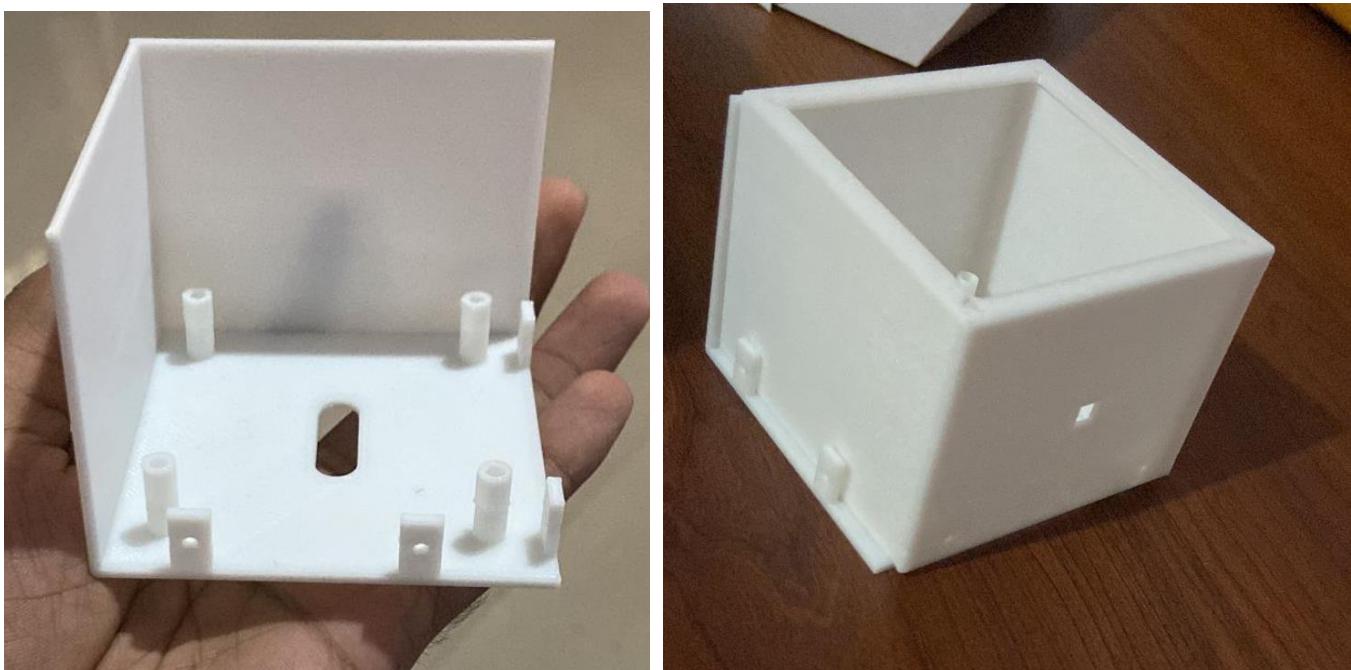


Figure 3.12.1: Printed 3D Cube with the selected material.

- The Research website is coded to submit to the CDAP

A screenshot of a website page. At the top, there is a navigation bar with the 'TangiGuru' logo on the left and links for Home, About, Milestones, Team, Achievements, Documents, and Contact. The main content area has a dark blue background. In the center, there is a large white play button icon. Below the play button, the word "ABOUT" is written in large, semi-transparent white letters, with "ABOUT THE PROJECT" in smaller blue capital letters underneath. In the bottom right corner of the main content area, there is a small circular icon containing a white upward-pointing arrow symbol.

Figure 3.12.2: Research Web Site

- Created status document 2 to submit to the CDAP cloud location.
- Started creating the slides to show in the final presentation. At the same time, evidence as the video was created to show in the final presentation.
- The cubes were assembled and tested to do the presentation