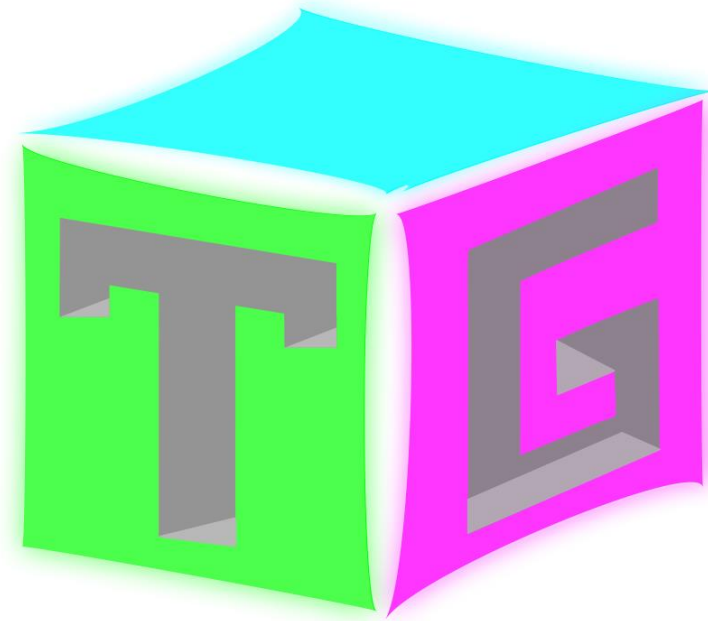


TangiGuru

Cloud-based Tangible Learning Solution for Early Childhood Development



Team



Supervisor:
Ms. Shashika Lokuliyana



Co-Supervisor:
Ms. Narmada Gamage



External Supervisor:
Mr. Rajitha de Silva



Thiwanka Cholitha
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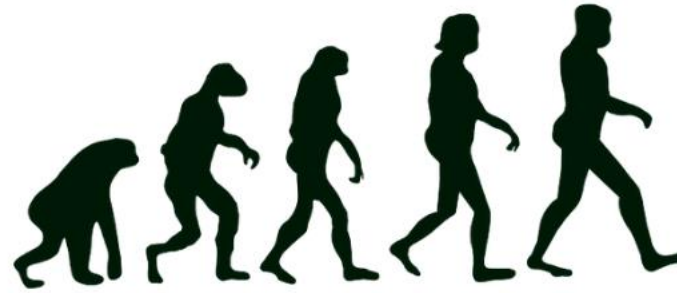


Lakisuru Semasinghe
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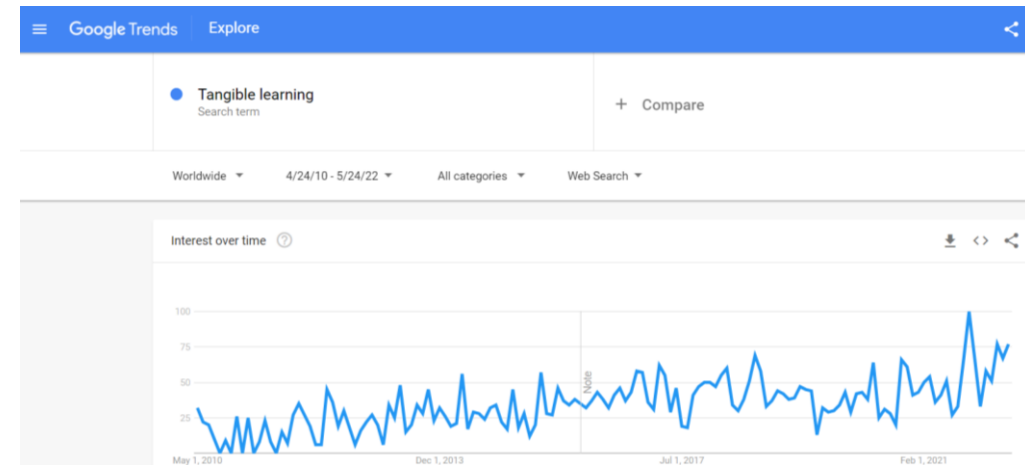
Manisha Ratnasuriya
IT19215716

Evolution



Introduction

- What is Tangible Learning?
- Why are we focusing on Tangible learning?



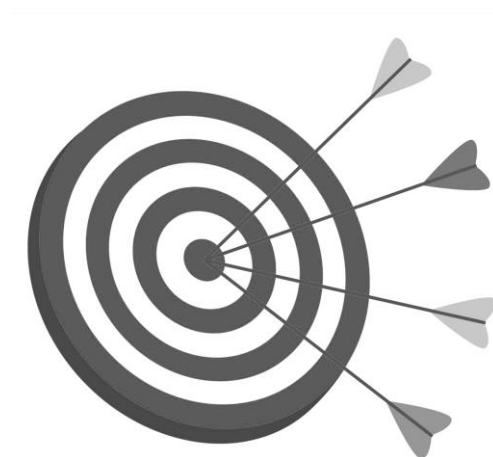
Research Problem?

- Limited Activities
- Will not be used after a time.
- No guidance
- Not Interactive



Main Objective

- To create a learning kit for the children to perform various activities with a single set of tangibles for developing the early childhood of children.



Sub Objectives



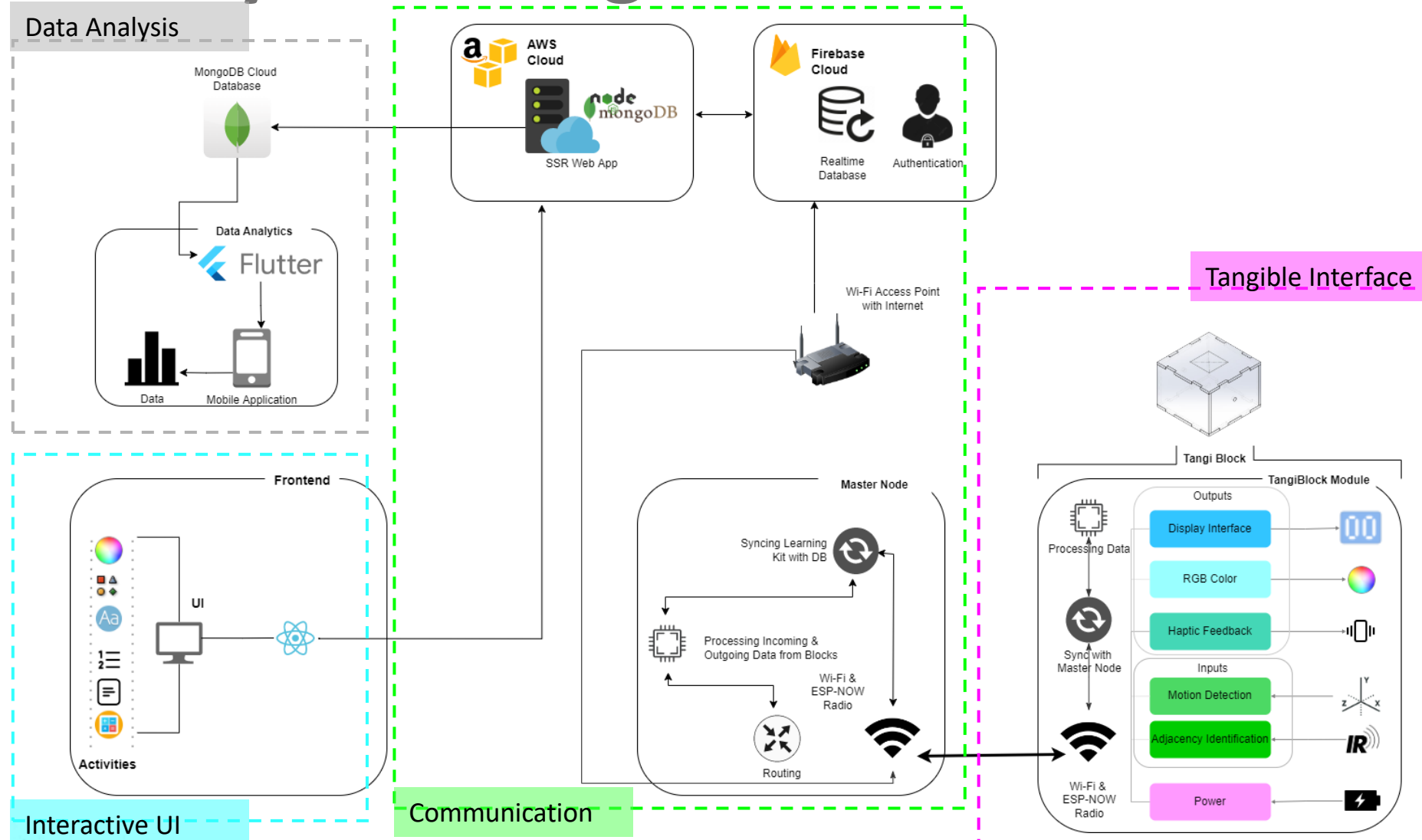
Tangible
Interaction

Communication

User-friendly
Interface

Data Analysis

Overall System Diagram



TangiGuru: Cloud-Based Tangible Learning Solution

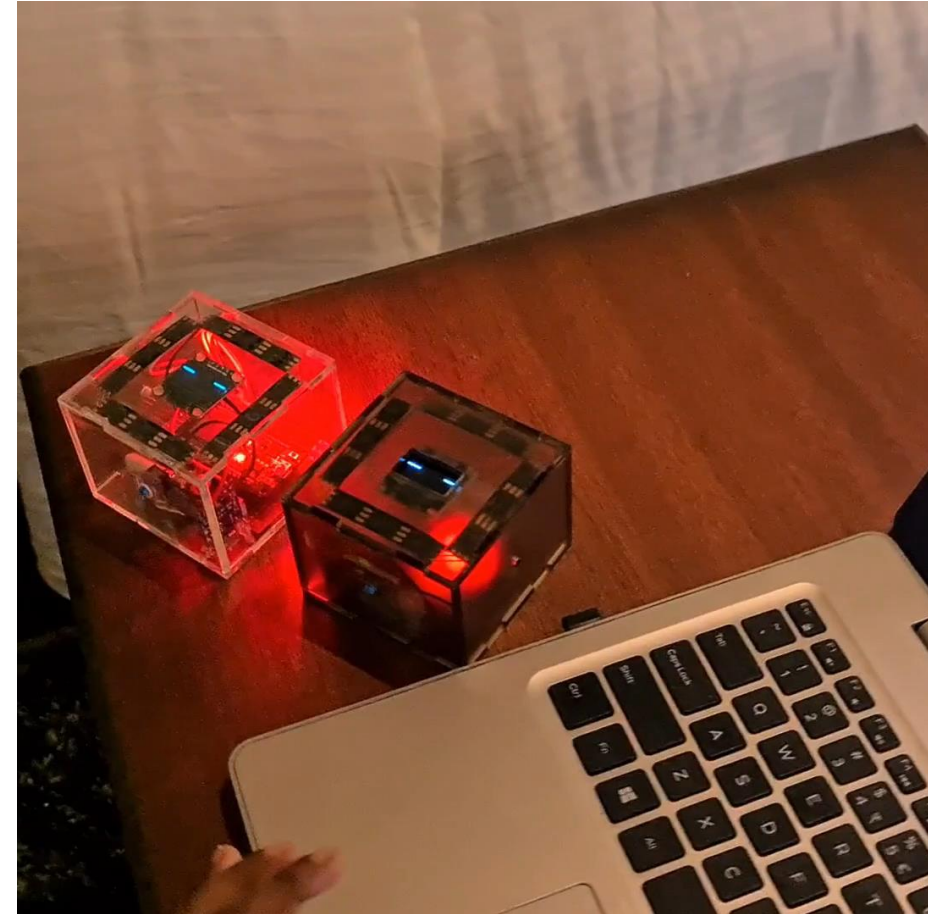
Tangible Interaction



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Background

- What is Tangible Interaction ?
- How Tangible interaction works ?
- How does Tangible Interaction relate to ?^[1]



Research Problem

- How to design a user-friendly tangible interface to interact with children?
- Does the tangible cubes will be interactive and develop the cognitive skills of the children?



Specific and Sub Objectives

- Main Objective

Develop objects that can actively interact with the Children and aid them to perform the learning activities.

- Sub-Objectives

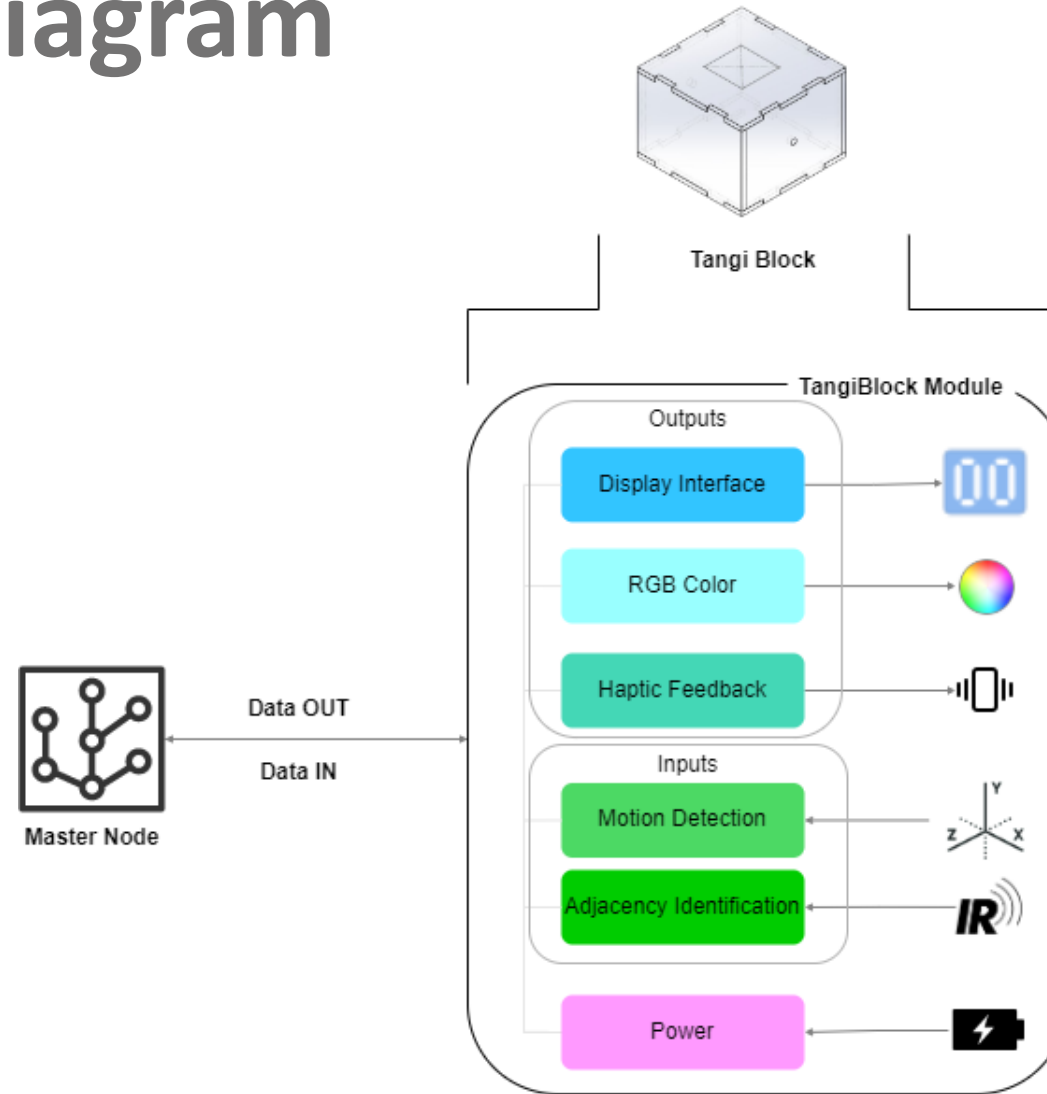
- Provide the interaction mechanisms to the cube (Color, Display, Feedback).
- Provide a mechanism to capture the interaction from the child.



Methodology

- System Diagram
- Technologies
- Requirements
- WBS

System Diagram

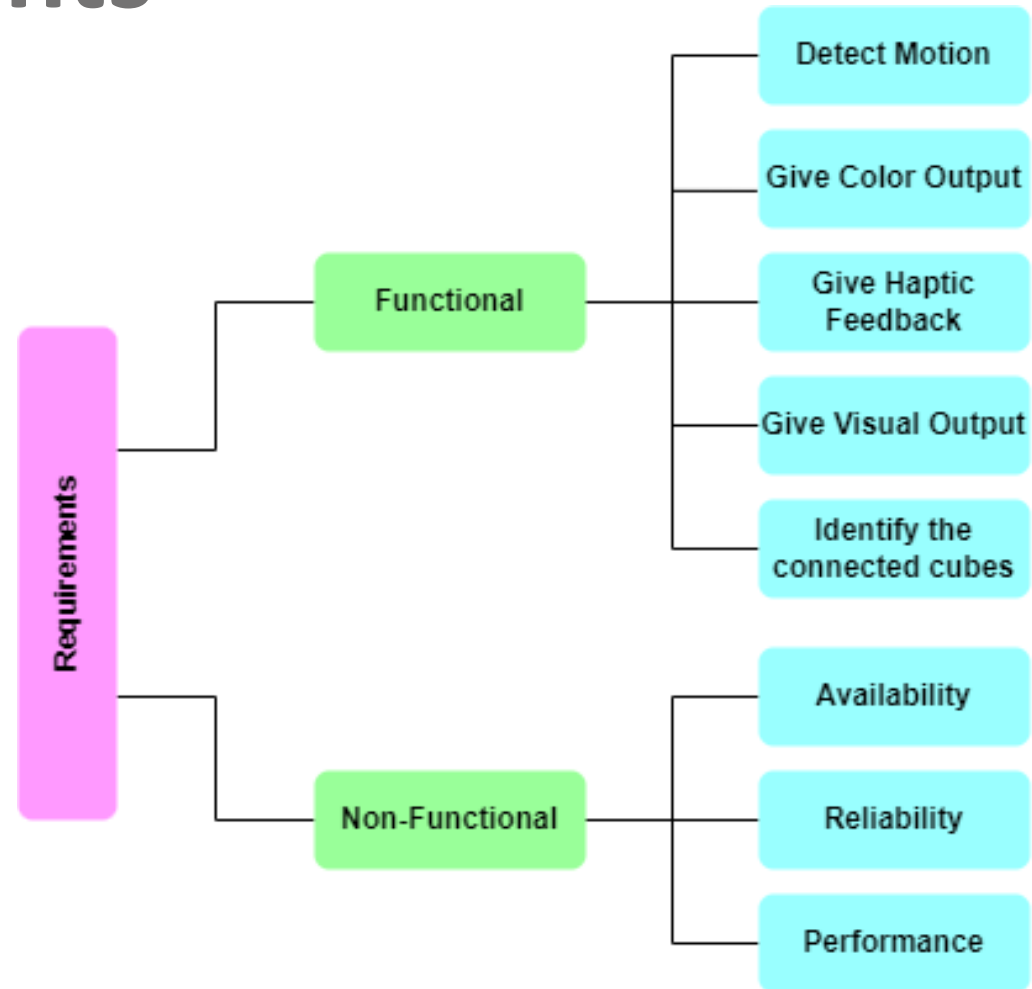


Technologies

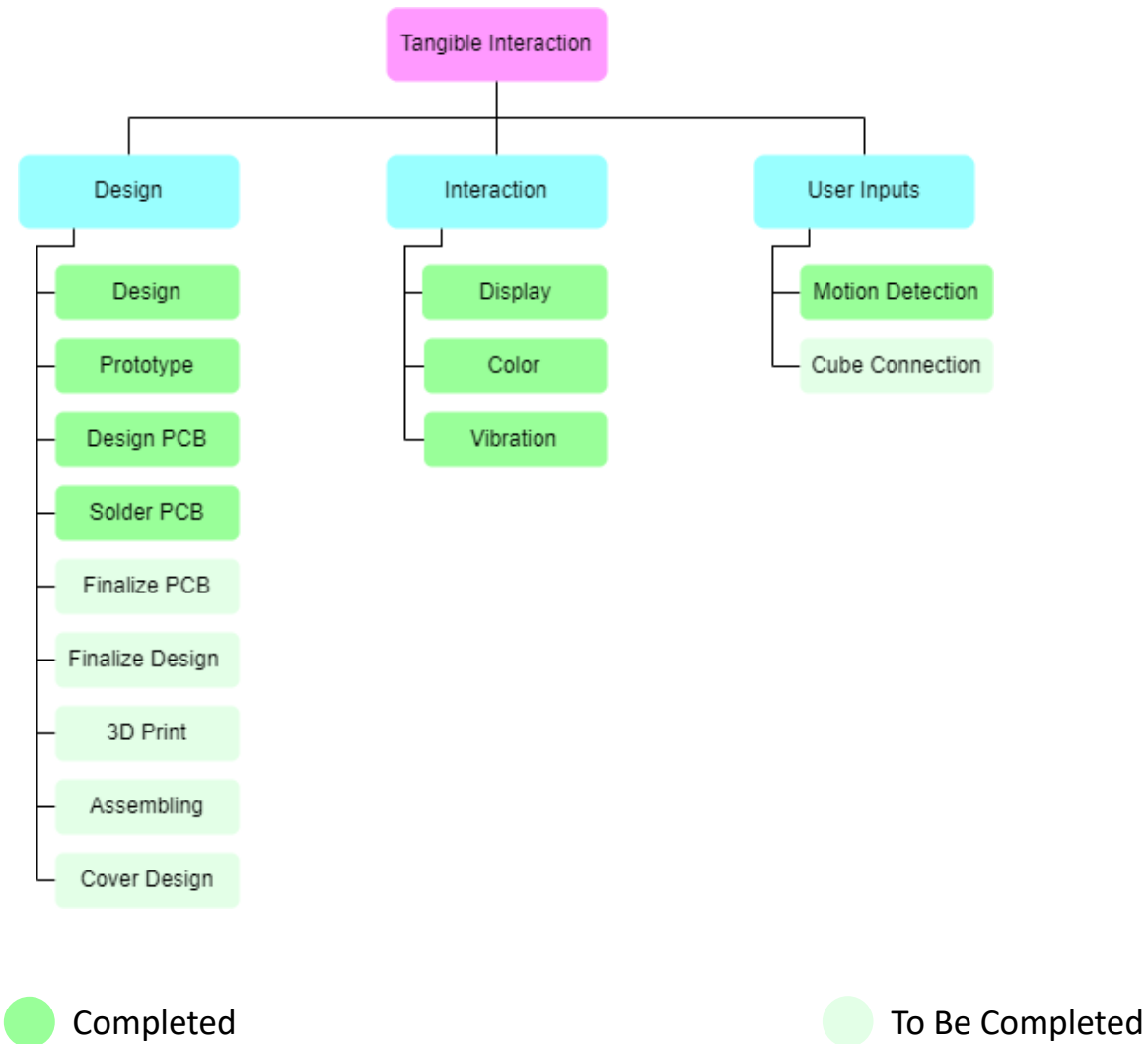
- C++
- OLED
- KiCad
- Solid Works



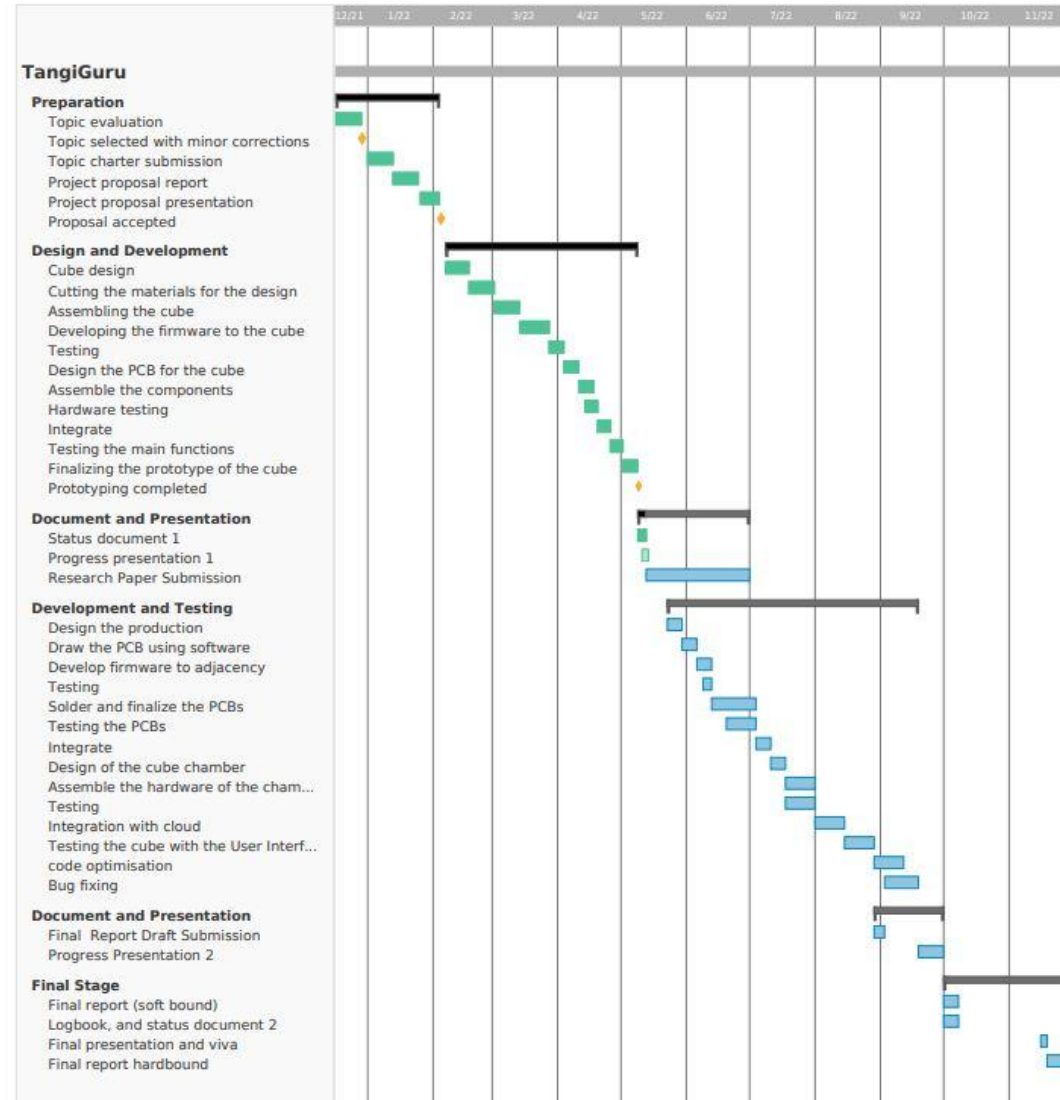
Requirements



WBS

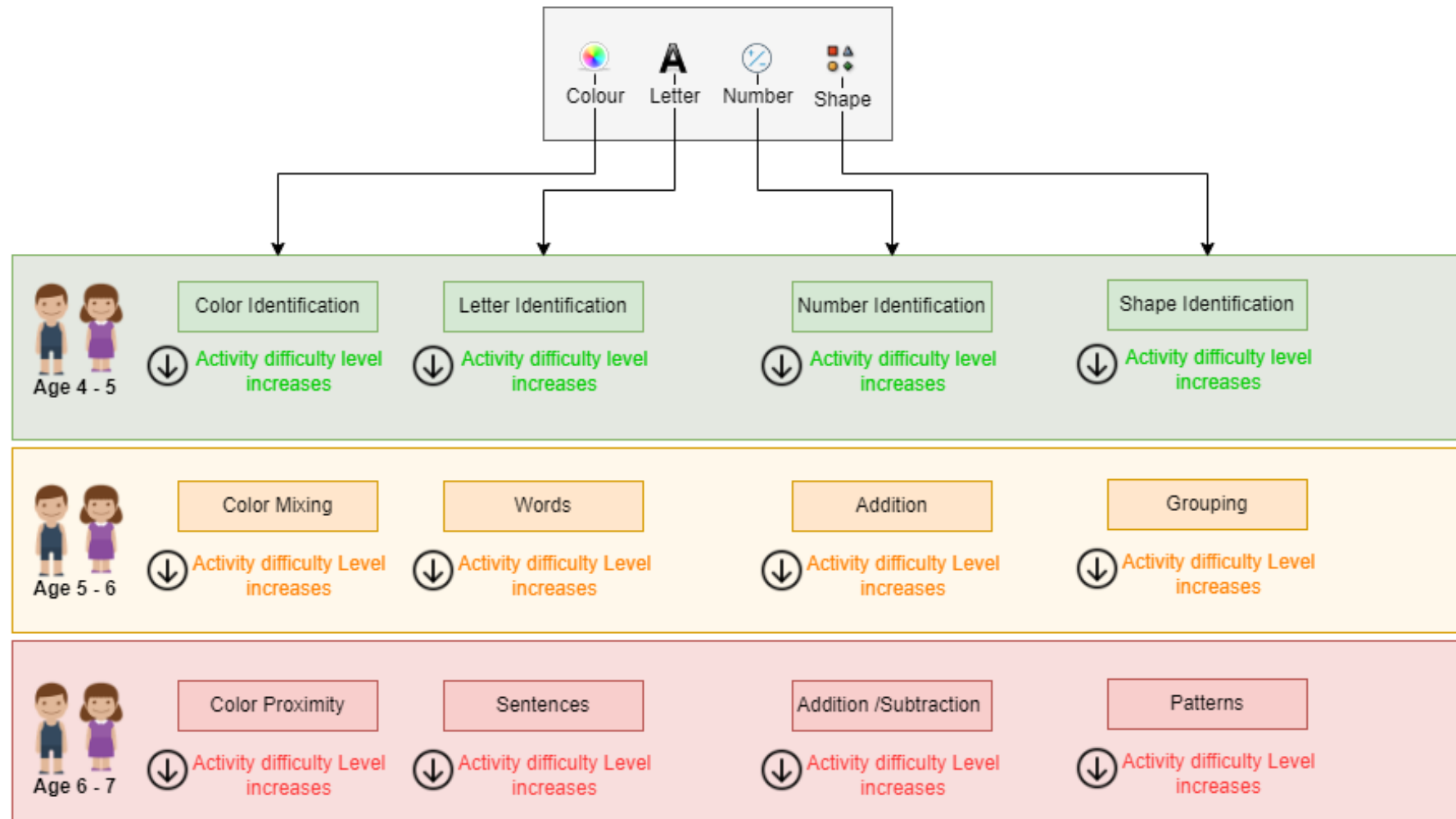


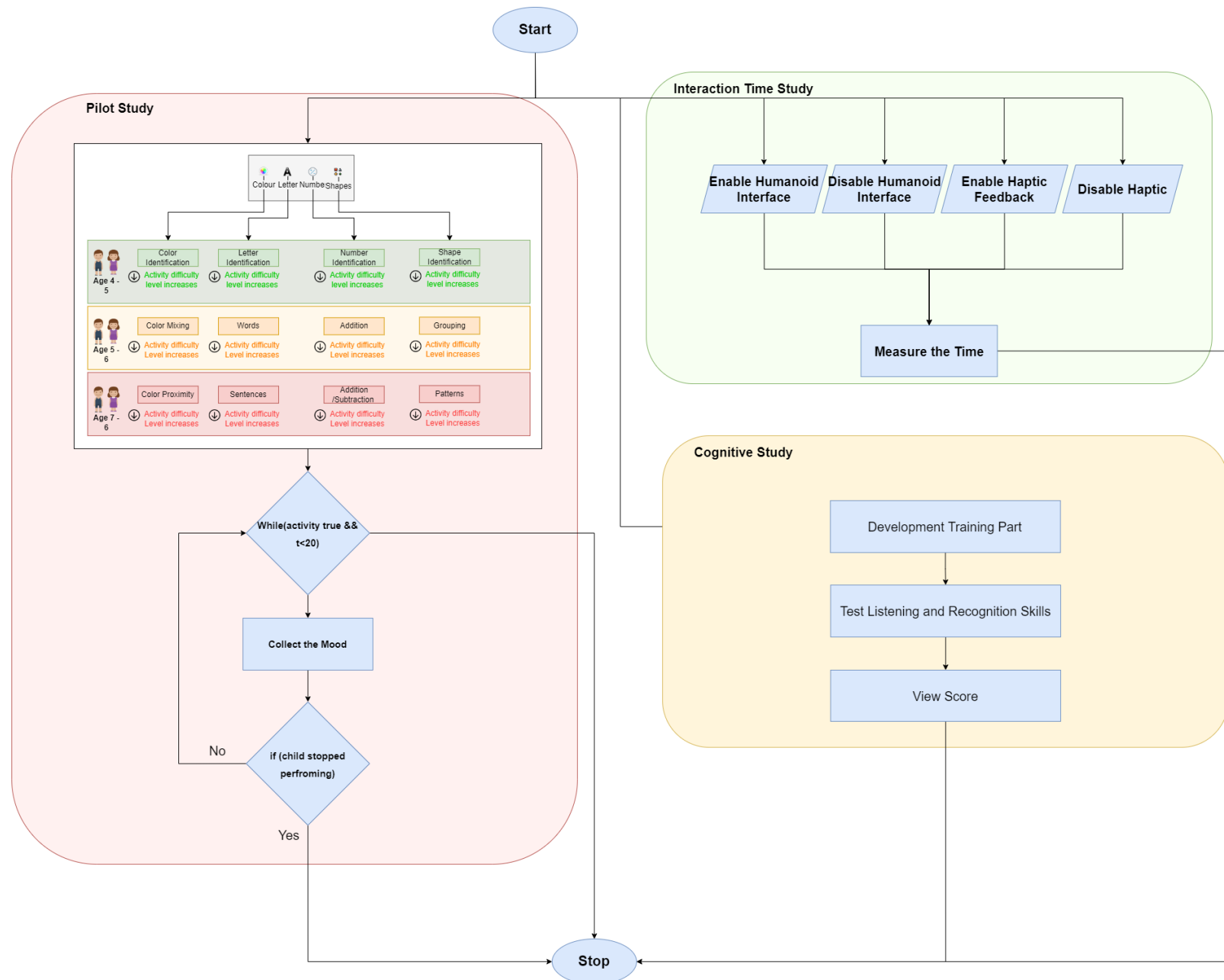
Gantt Chart



Hettiarachchi T.C.D.S. IT19206806

Evaluation





References

- [1] M. Liang, Y. Li, T. Weber, and H. Hussmann, “Tangible interaction for children s creative learning: A review,” *ACM Int. Conf. Proceeding Ser.*, 2021, doi: 10.1145/3450741.3465262.

Communication



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Introduction

- Background
- Research Problem
- Specific and Sub Objectives

Research Problem

- How to **Apply Modern Wireless & Cloud Technologies to Provide an Interactive Tangible Learning Experience for Children?**



Specific and Sub Objectives

- Main Objective

To integrate modern Cloud and Wireless technologies to develop an Interactive Tangible Learning Solution.

- Sub-Objectives

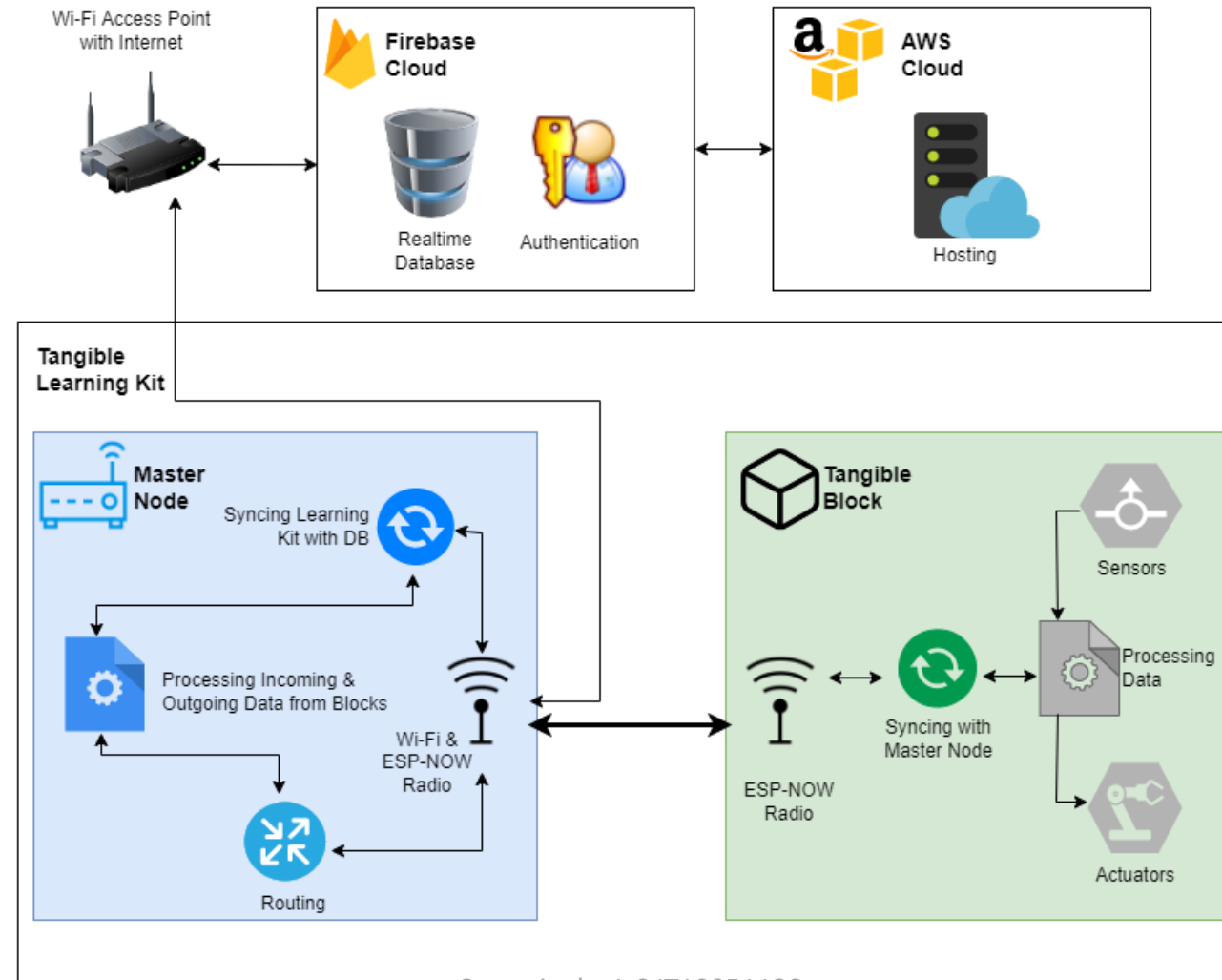
- Wirelessly interconnect tangibles with minimal use of resources.
- Provide a transparent, seamless connection between tangibles and software learning activities via cloud.



Methodology

- System Diagram
- Technologies
- Requirements
- WBS

System Diagram



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Technologies

- ESP32 and ESP-NOW
- Firebase, AWS
- Wi-Fi
- React Native, Node Js
- C++



Requirements

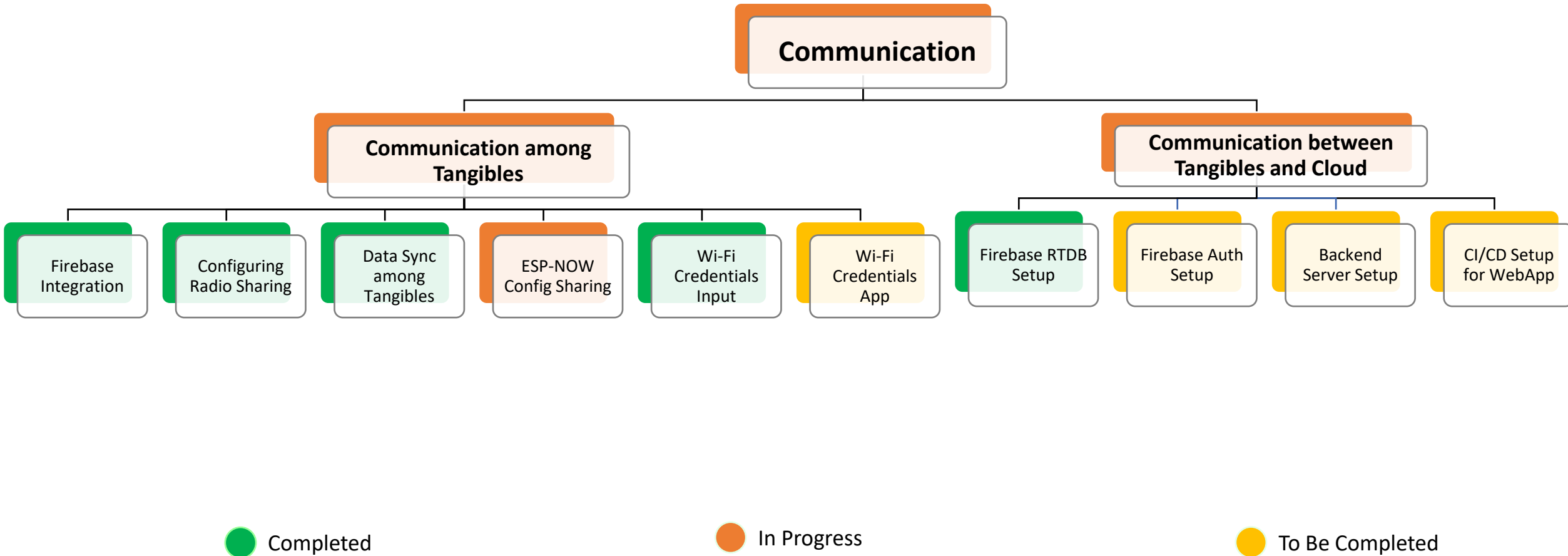
Functional

- ✓ Real-time data transfer
- ✓ Power efficiency
- ✓ Compatibility with existing technologies and devices.
- ✓ Small physical form factor

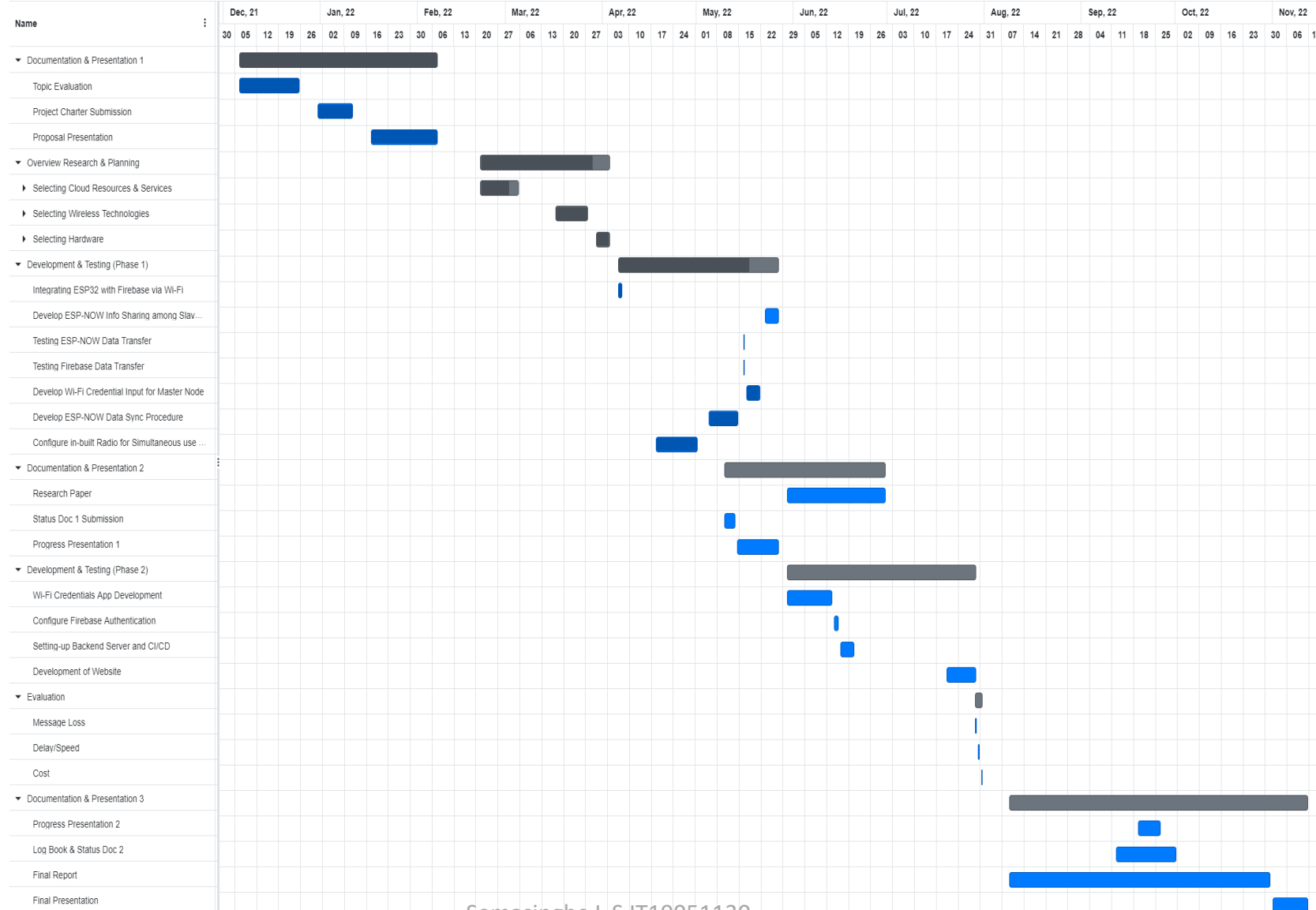
Non-Functional

- ✓ Cost efficient (capital & operational costs)
- ✓ Future-proof for 3-4 years

Work Breakdown Structure



Gantt Chart



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Evaluation

The following metrics will be measured and analyzed.

- Reliability – loss of data
- Speed – data transfer delay
- Ease of use – user-friendly
- Power usage – operational duration
- Operational cost



User-friendly Interface



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Introduction

- Background
- Research Gap
- Research Problem
- Specific

Research Gap

- Children cannot perform learning without external supervision and guidance.
- Existing solutions are specific for narrow learning areas.



Research Problem

- How to develop an interactive, child-friendly UI/UX which is easily understandable for children?
- How to develop the learning activities suitable for required learning outcomes in early childhood development?

Specific and Sub Objectives

- Main Objective

Development of child-friendly UI/UX and interactive learning activities for early childhood development.

- Sub-Objectives

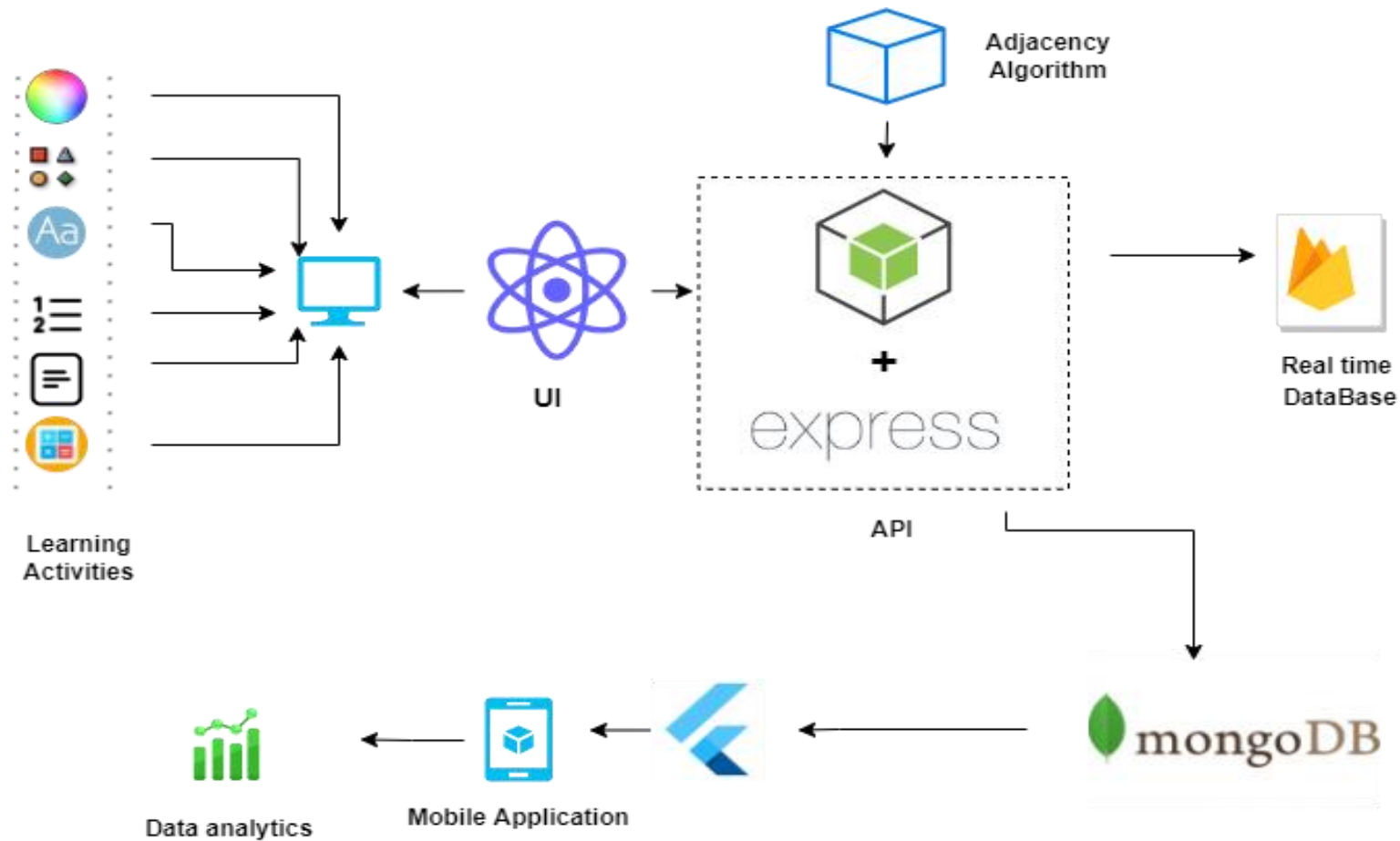
- UI/UX design for the web application .
- Implement the mobile application.
- Development of the learning activities suitable for required learning outcomes.



Methodology

- System Diagram
- Technologies
- Requirements
- WBS

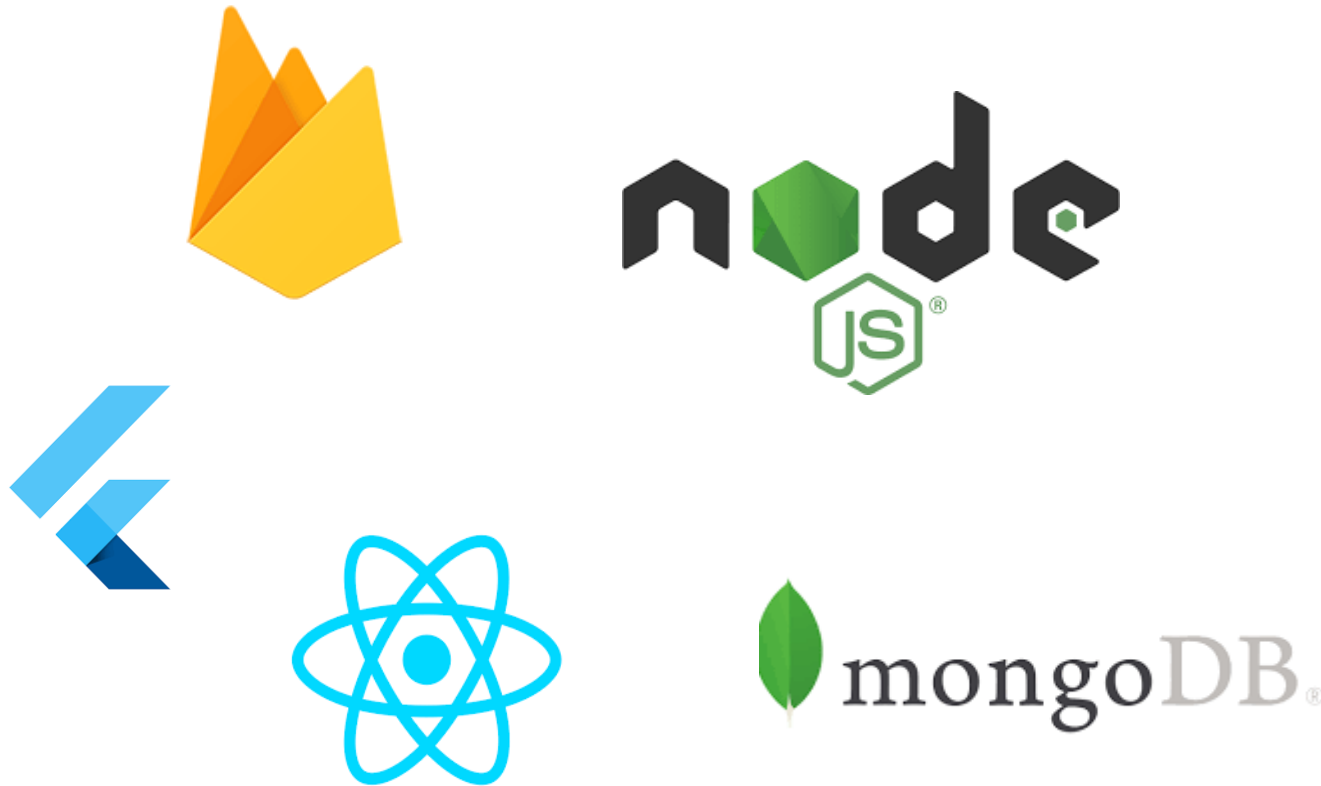
System Diagram



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Technologies

- React JS
- Node JS
- Express JS
- Firebase
- MongoDB
- Flutter



Requirements

Functional

- Real-time data transfer
- Quick Feedback
- Automated guidance
- Automated evaluation

Non - Functional

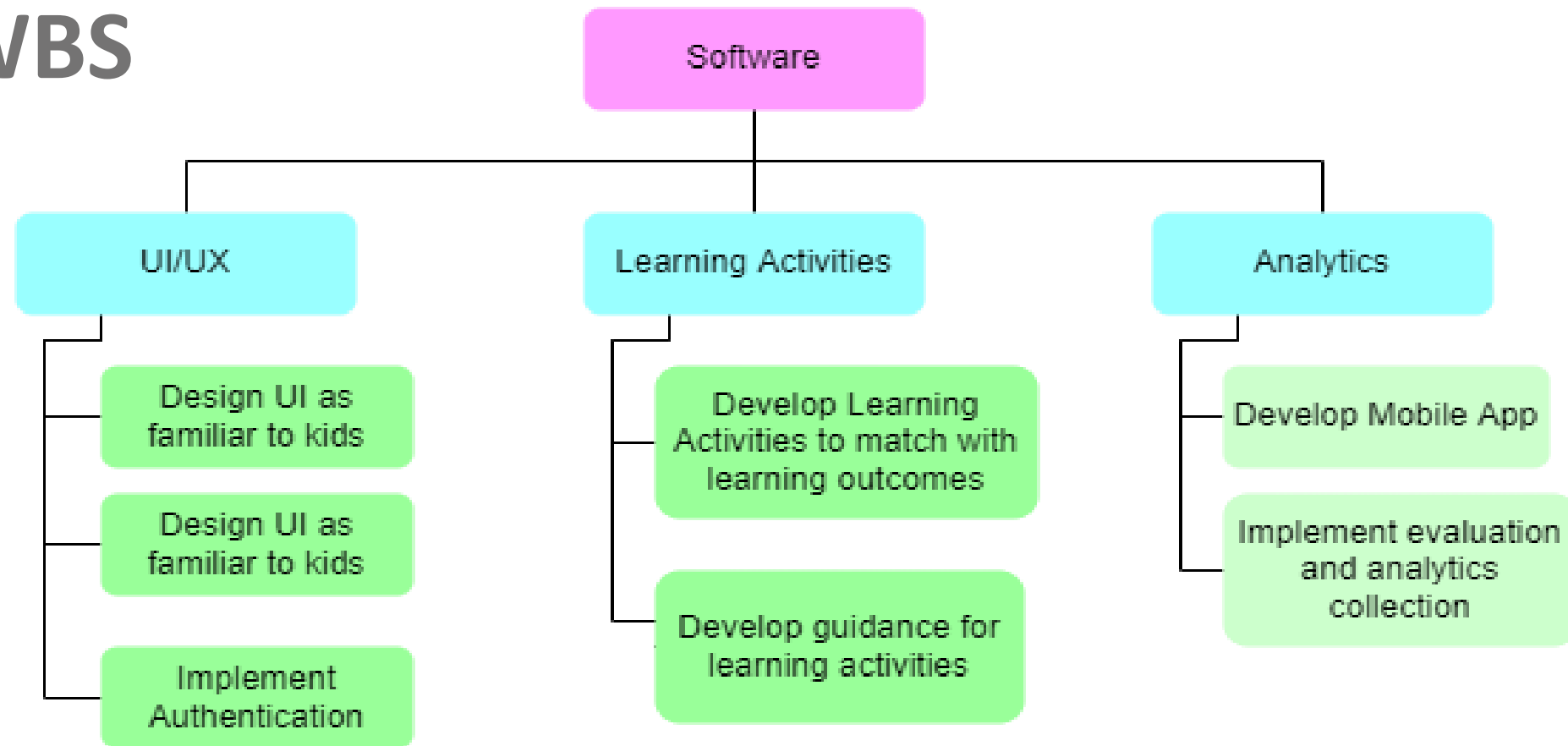
- Enhanced the capability to recognize colors
- Ex- Learning videos
 - Child friendly UI
 - Intractive Q & A
 - Drag & Drop

Gantt Chart



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WBS



- Completed



- To Be Completed

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Evaluation

- Develop Marking Systems in UI which capable to allocate marks for every learning activity.
- Evaluate how they performed and how many activities they have completed and incomplete
- Evaluate whether the expected learning outcomes have been reached or not
- Identify activities that are suitable for relevant age gaps



Demonstration

TangiGuru: Cloud-Based Tangible Learning Solution

User-friendly Interface



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- In the UI ,Learning activities can interactively work with tangibles

Communication



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Tangible Interaction



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Thank You!



Questions?