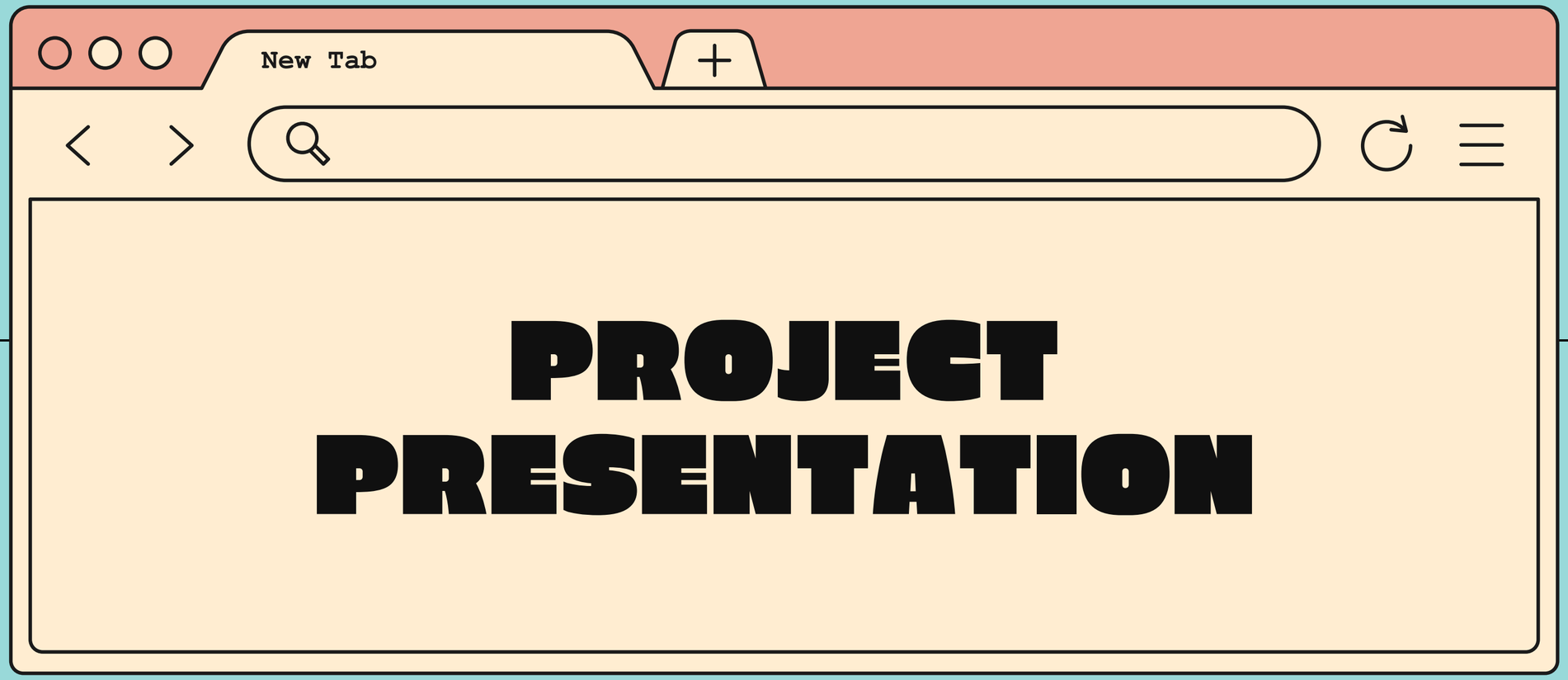
GROUP 9



PROJECT PRESENTATION

4IR: Cloud & IoT

Smart Agriculture

GROUP MEMBER

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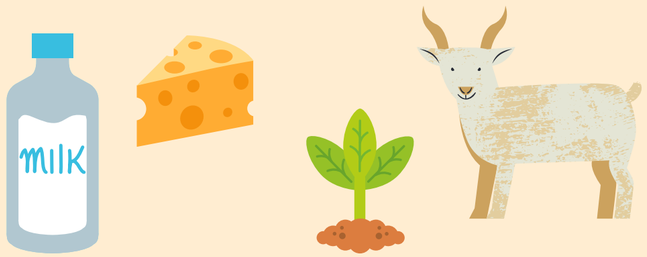
PART 1: INTRODUCTION

- What is Agriculture?
- What changes can the Fourth's Industry Revolution technologies bring to Agriculture ?

Have you ever considered what agriculture is and why it is ~~important~~?

Agriculture is the practise of raising plants and animals for food, fibre, and other purposes.



Agriculture employs estimated 28 percent of the world's workforce by 2018

Global food insecurity

Awesome Web Browser

https://www.foodaidfoundation.org

Agriculture is experiencing its “darkest days”

What I mean by "darkest days" is food insecurity or a shortage of food sources in a country.

- **Increasing global population**
- **decreased agricultural land use**

Malaysia's population would reach more than 45 million people by 2050

The goal of Agriculture 4.0 is to make farms more modern and make them smarter

Malaysia's agricultural sector is rapidly improving, but with the help of the Internet of Things (IOT), we can improve it even further

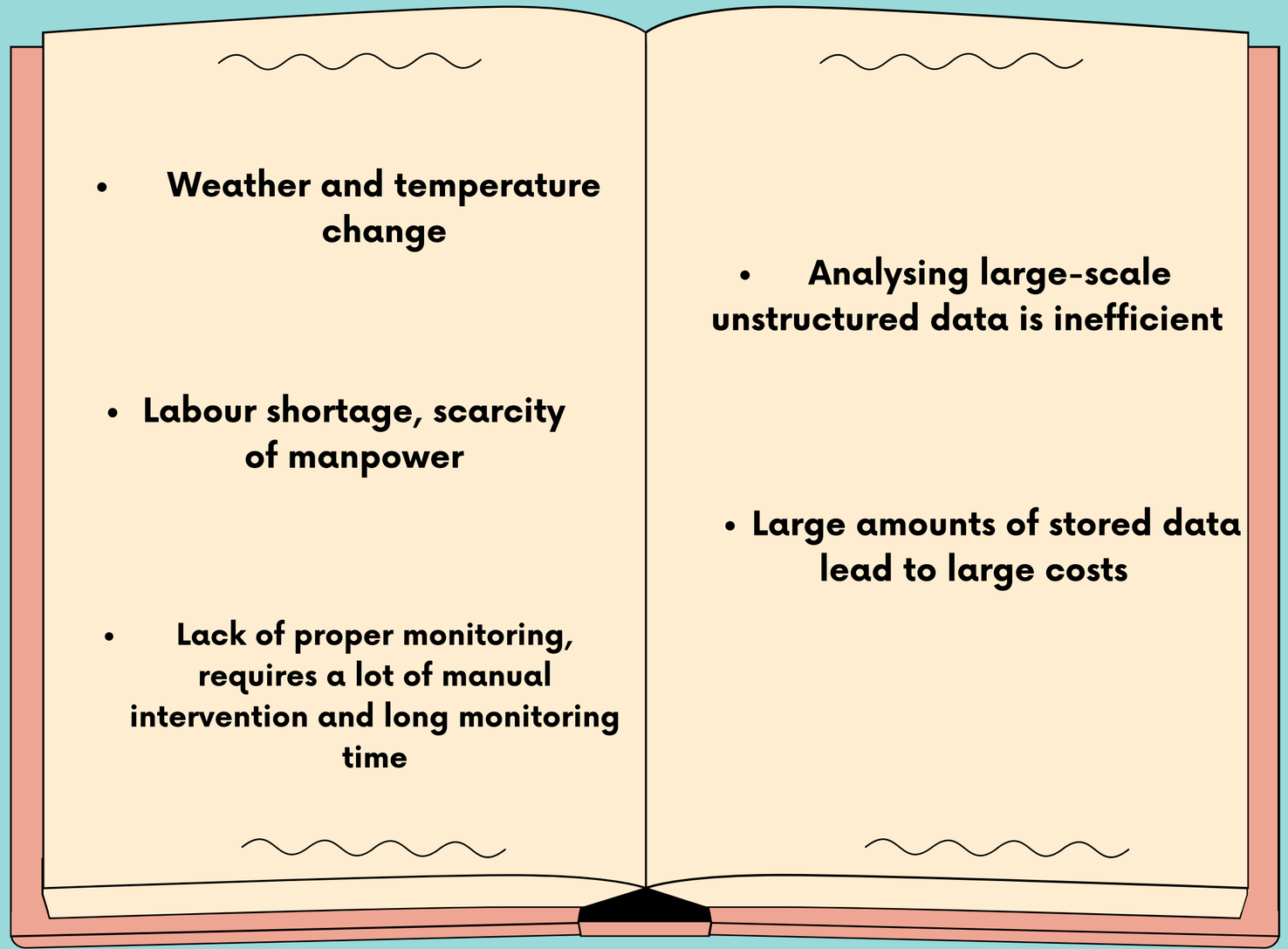
HOW CAN THE 4TH INDUSTRIAL REVOLUTION IMPROVE GLOBAL AGRICULTURE?

1	Easily monitor Climate Condition Crop Managment
2	Greenhouse Automation Precision Farming
3	Predictive Analytics End-to-end farm managment system

PART 2: DESCRIPTION

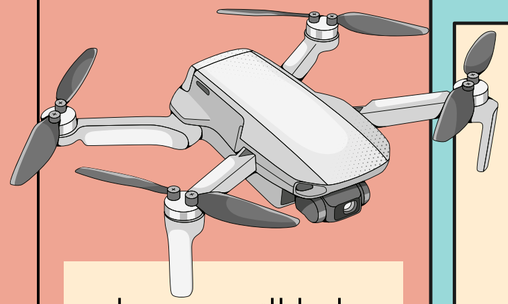
Detailed descriptions of problems, solutions, and team working.

The problems that we encountered



- Weather and temperature change
- Labour shortage, scarcity of manpower
- Lack of proper monitoring, requires a lot of manual intervention and long monitoring time
- Analysing large-scale unstructured data is inefficient
- Large amounts of stored data lead to large costs

Solutions



drones will help with physical tasks like autonomous fertiliser spraying or checking the quality of air, soil, and moisture.

Awesome Web Browser

https://www.solutions4problems.com

Sensors: soil, water, light, humidity, and temperature are all monitored and controlled.

Hardware: automatic tractor, processing equipment

Telecommunications technology: GPS, advanced network

Satellite: 24/7 data collection from the entire field

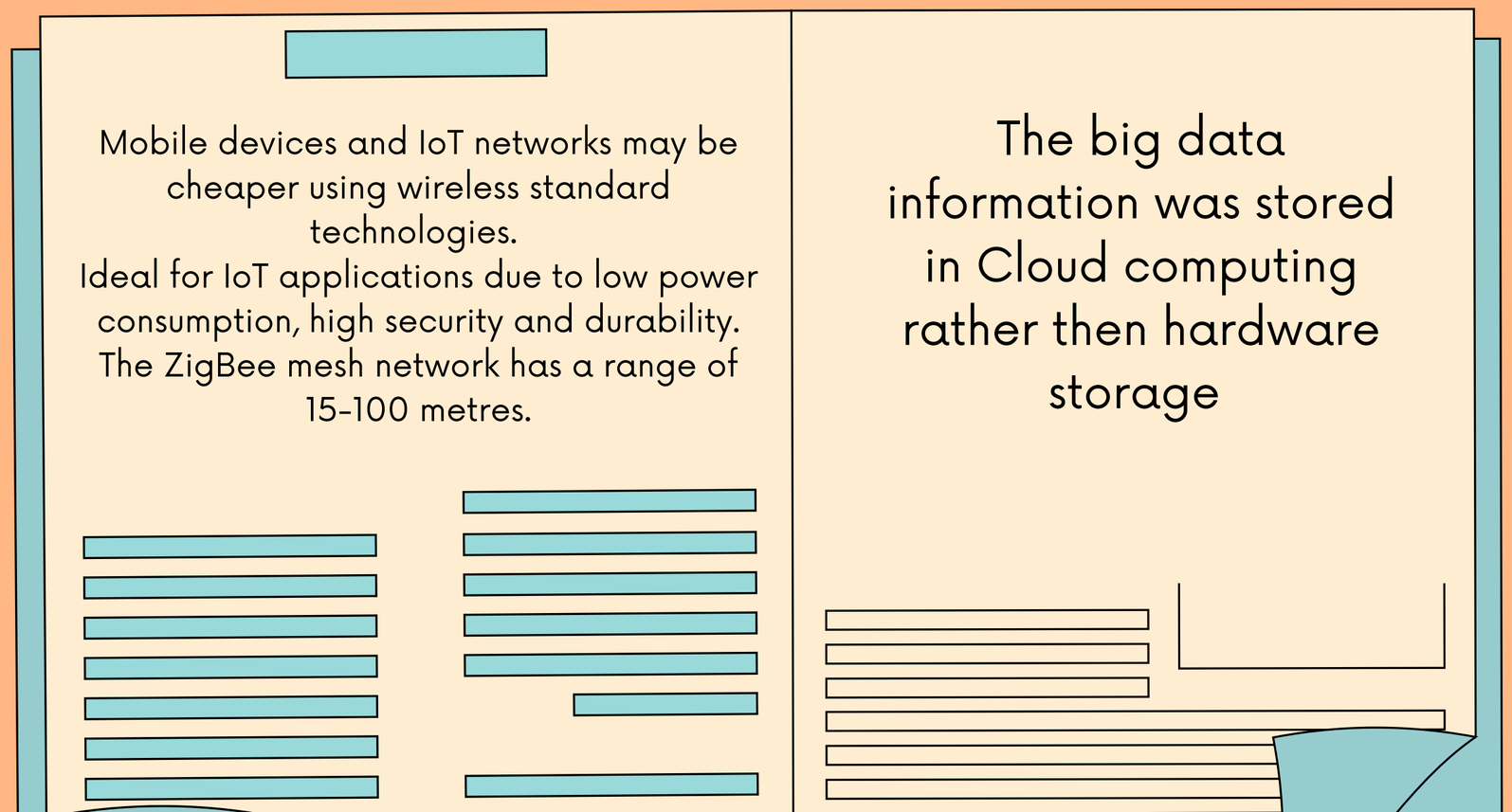
Data Analysis: Data pipelines for downstream solution

Data Collection:crop yield, soil mapping, climate change, fertilization, weather data, mechanical conditions, animal health values

ZIGBEE

Mobile devices and IoT networks may be cheaper using wireless standard technologies.
Ideal for IoT applications due to low power consumption, high security and durability.
The ZigBee mesh network has a range of 15-100 metres.

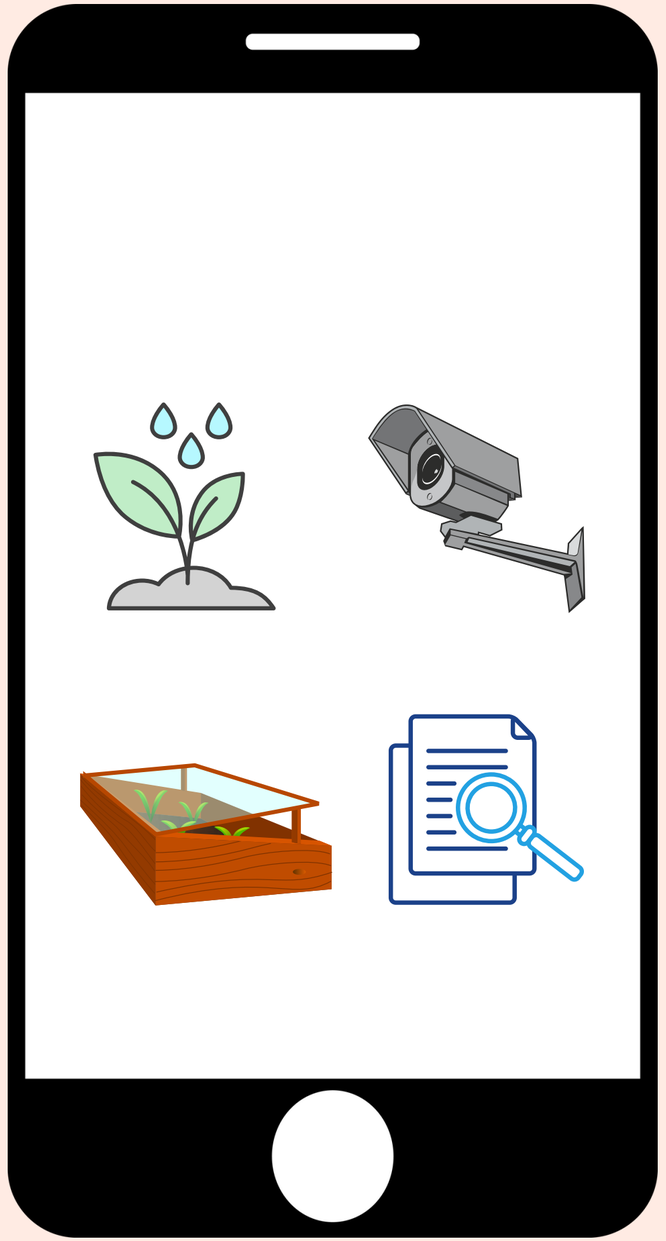
The big data information was stored in Cloud computing rather then hardware storage



SMART FARMING

The user will control and monitor anything through phone.

1	The implementation of IoT into agriculture can help farmers to increase their harvest
2	Farmers will reduce waste and enhance productivity
3	Farmers will be able to acquire more precise results from their soil management systems.



Team Working

It was quite beneficial for us to operate as a group since we were able to encourage one another. Everyone in our primary WhatsApp group was supportive, exchanging information and supporting one another. Following a thorough discussion of the contents, we shared important information and established due dates for each other's work. We sorted the activities into groups based on our preferences and began working on them as follows.

1. Introduction

Detail steps and descriptions related to the project e.g use the video, image, and log journal, team progress, brainstorm idea, and others. (Edip)

2. AWS Architecture Design (Sukanja a/p Somsak)

3. business process flow diagram and description (Ten li Sin)

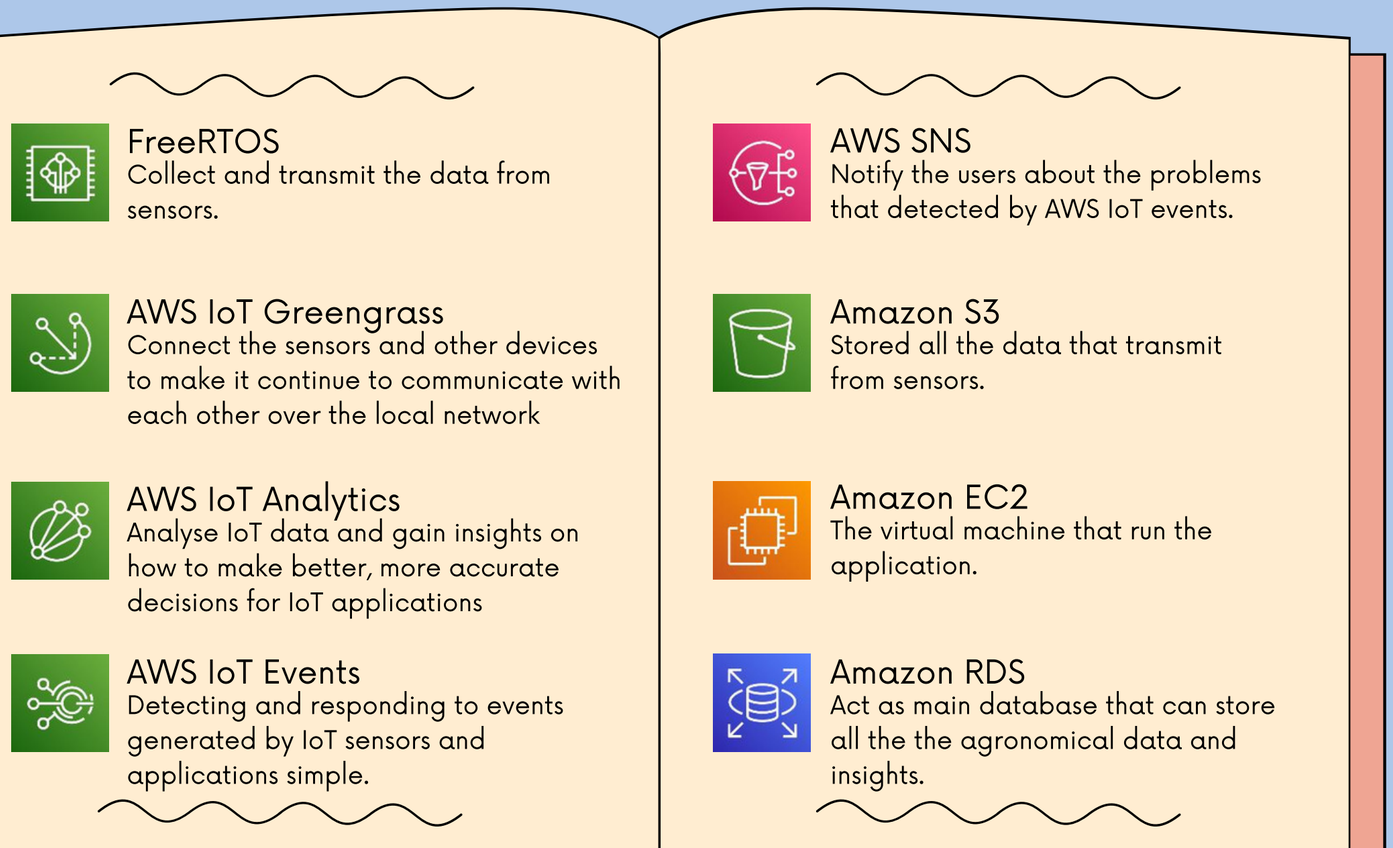
4. Provides low-fidelity mock-ups (Yen Ting)

PART 3: LOW-FIDELITY PROTOTYPE

We create low-fidelity prototypes for our software to help inspire creativity and innovation. We made rough sketches on paper to make changes easier.

AWS ARCHITECTURE DESIGN

Deciding which services will be used from AWS.



FreeRTOS
Collect and transmit the data from sensors.

AWS IoT Greengrass
Connect the sensors and other devices to make it continue to communicate with each other over the local network

AWS IoT Analytics
Analyse IoT data and gain insights on how to make better, more accurate decisions for IoT applications

AWS IoT Events
Detecting and responding to events generated by IoT sensors and applications simple.

AWS SNS
Notify the users about the problems that detected by AWS IoT events.

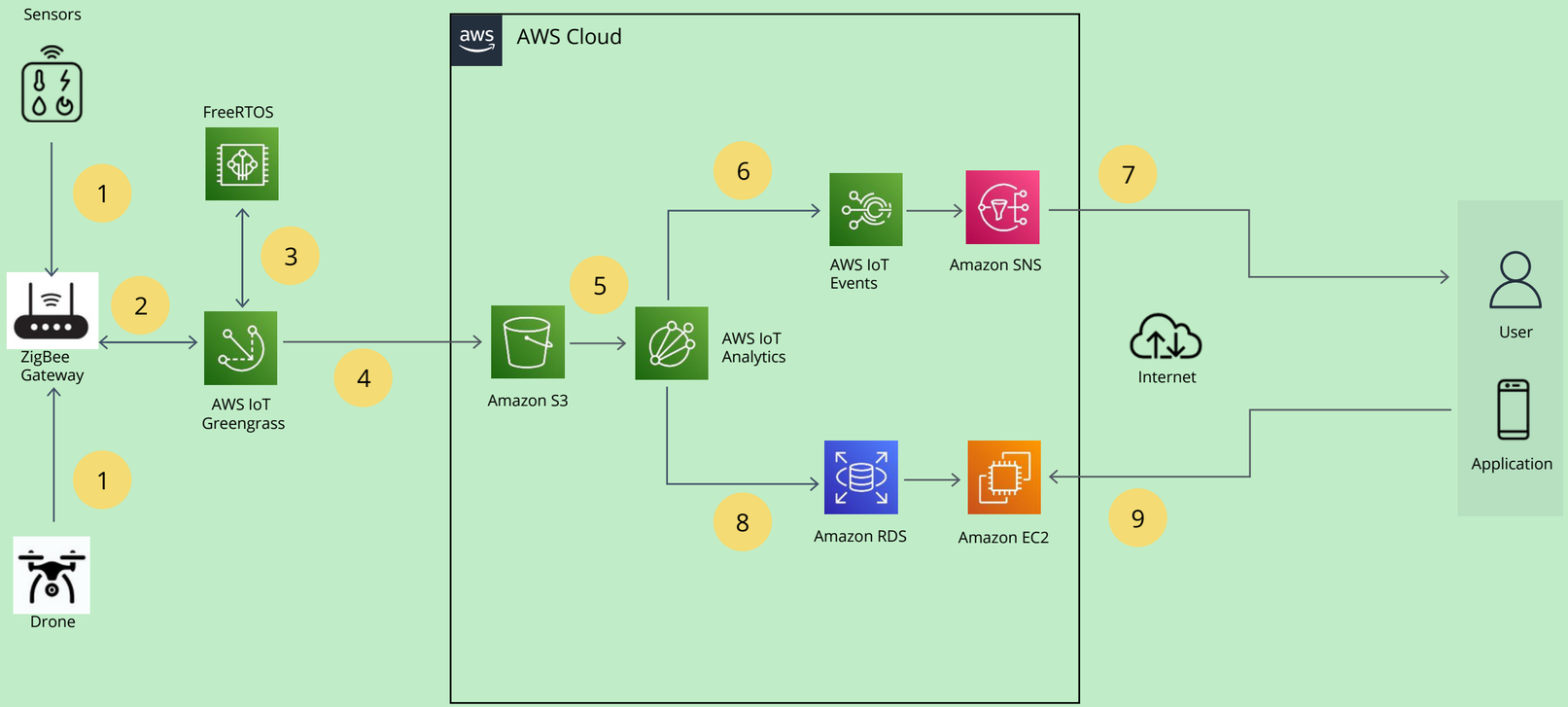
Amazon S3
Stored all the data that transmit from sensors.

Amazon EC2
The virtual machine that run the application.

Amazon RDS
Act as main database that can store all the the agronomical data and insights.

AWS ARCHITECTURE DESIGN

The workflow of the ecosystem using IoT.



1. The sensors and drones that are not using FreeRTOS will transmit the data through the ZigBee gateway.

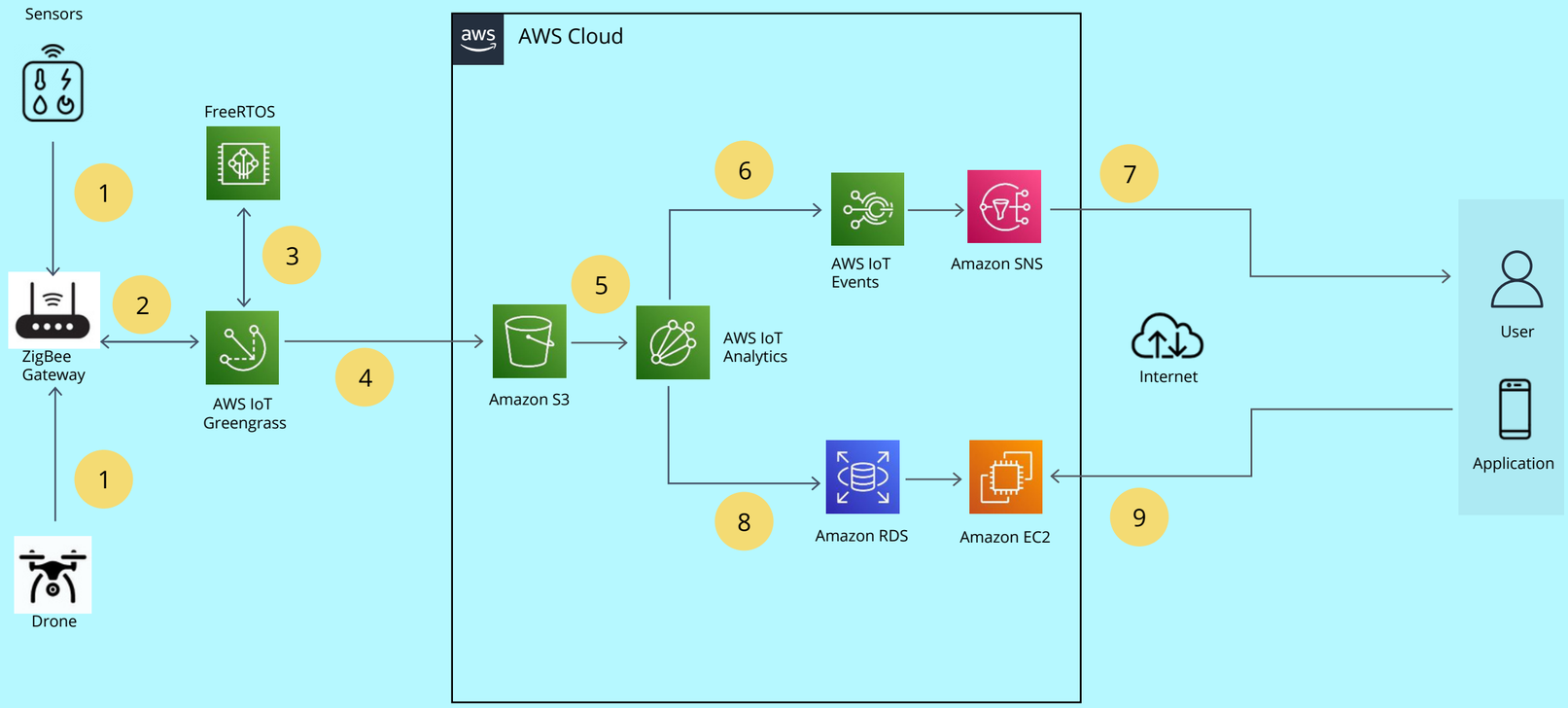
2. ZigBee will act as wireless protocol to make a protocol conversion and send the data to AWS IoT Greengrass.

3. The sensors that use FreeRTOS will send data AWS IoT Greengrass as it operates to avoid intermittent connection.

4. AWS IoT Greengrass sends the data such as temperature, soil's moisture, pH, nutrients and drone's picture or video to store at Amazon S3.

AWS ARCHITECTURE DESIGN

The workflow of the ecosystem using IoT.



5 AWS Iot Analytics will use the data recorded in the Amazon S3 to analyze the corps conditions and make the insights to report the user.

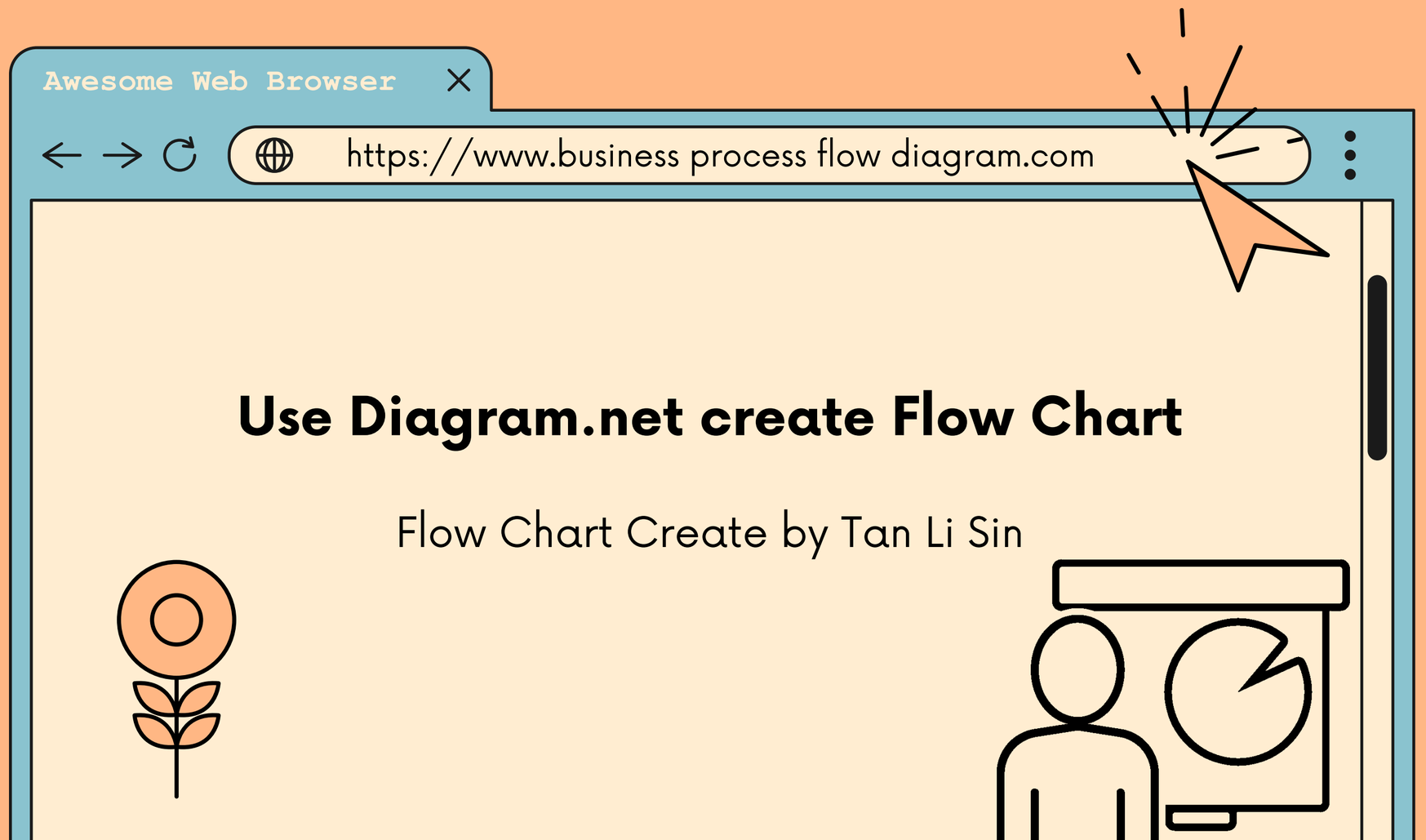
6 AWS IoT Events will detect the problems of the analyzed data according to the user settings and will produce the signal.

7 Amazon SNS will notify the users.

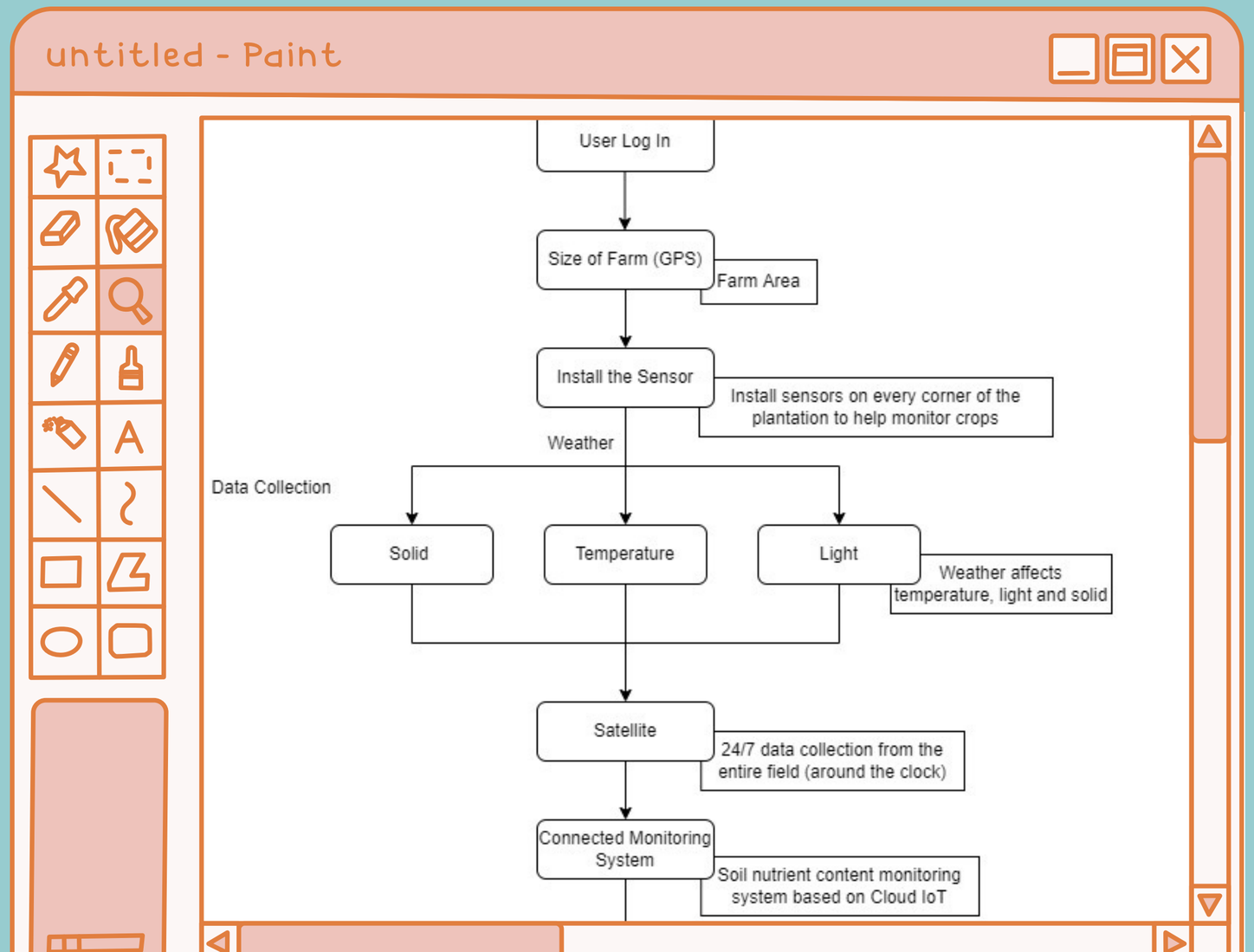
8 All analyzed data was kept in Amazon RDS.

9 Users can use the application in order to view the insights of the crops and the video by accessing the data from Amazon EC2 instance.

BUSINESS PROCESS FLOW DIAGRAM



Smart Agriculture Flow Diagram & Description



Step 1: User logs in to the app

Step 2: Detect farm size by GPS

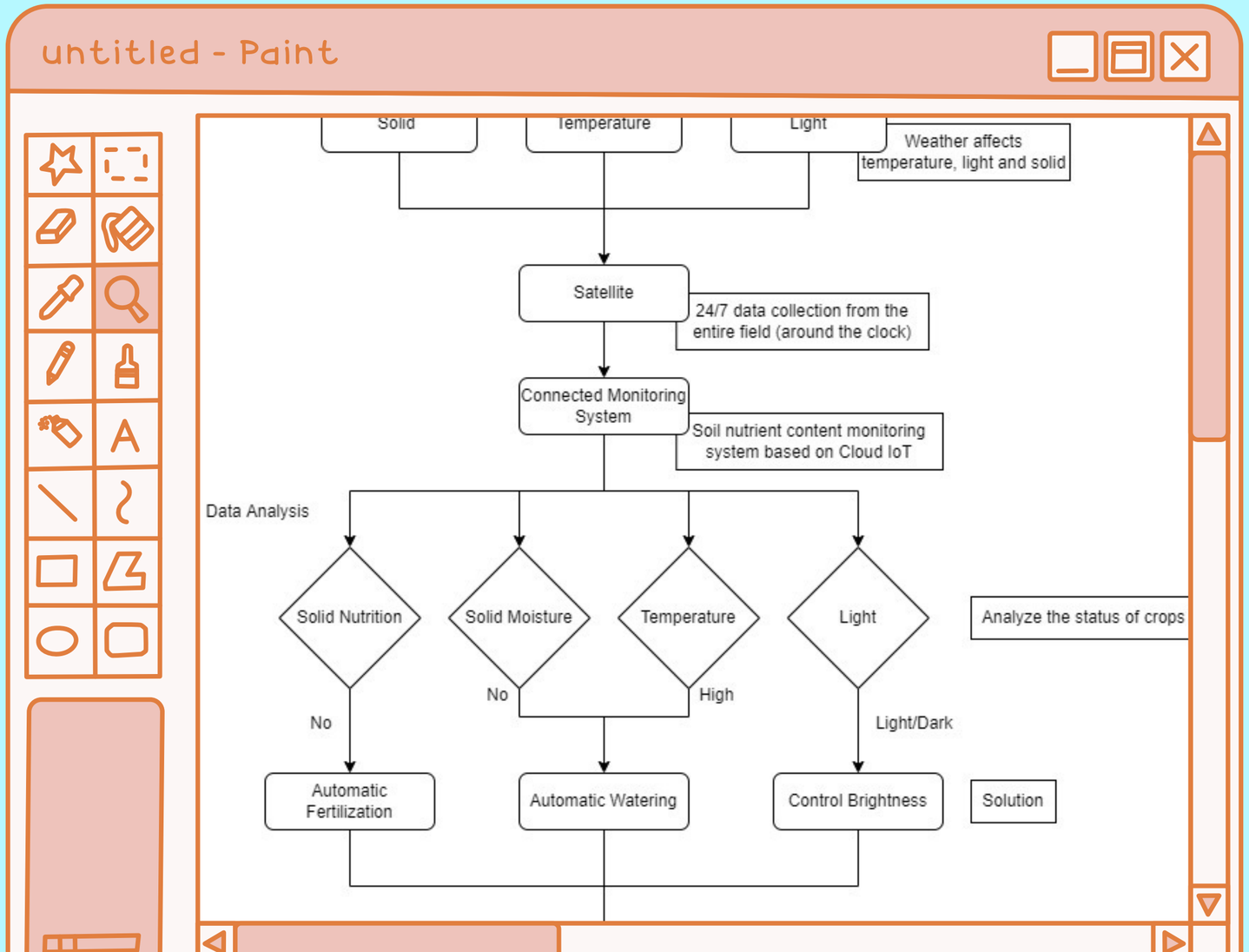
Step 3: The user need install sensors in every corner of the plantation

Step 4: Sensor while detecting solid status, temperature and light are affected by weather

Step 5: Satellite data collection 24/7

Step 6: Data will be linked to monitoring systems, enabling users to gain real-time insights

Smart Agriculture Flow Diagram & Description



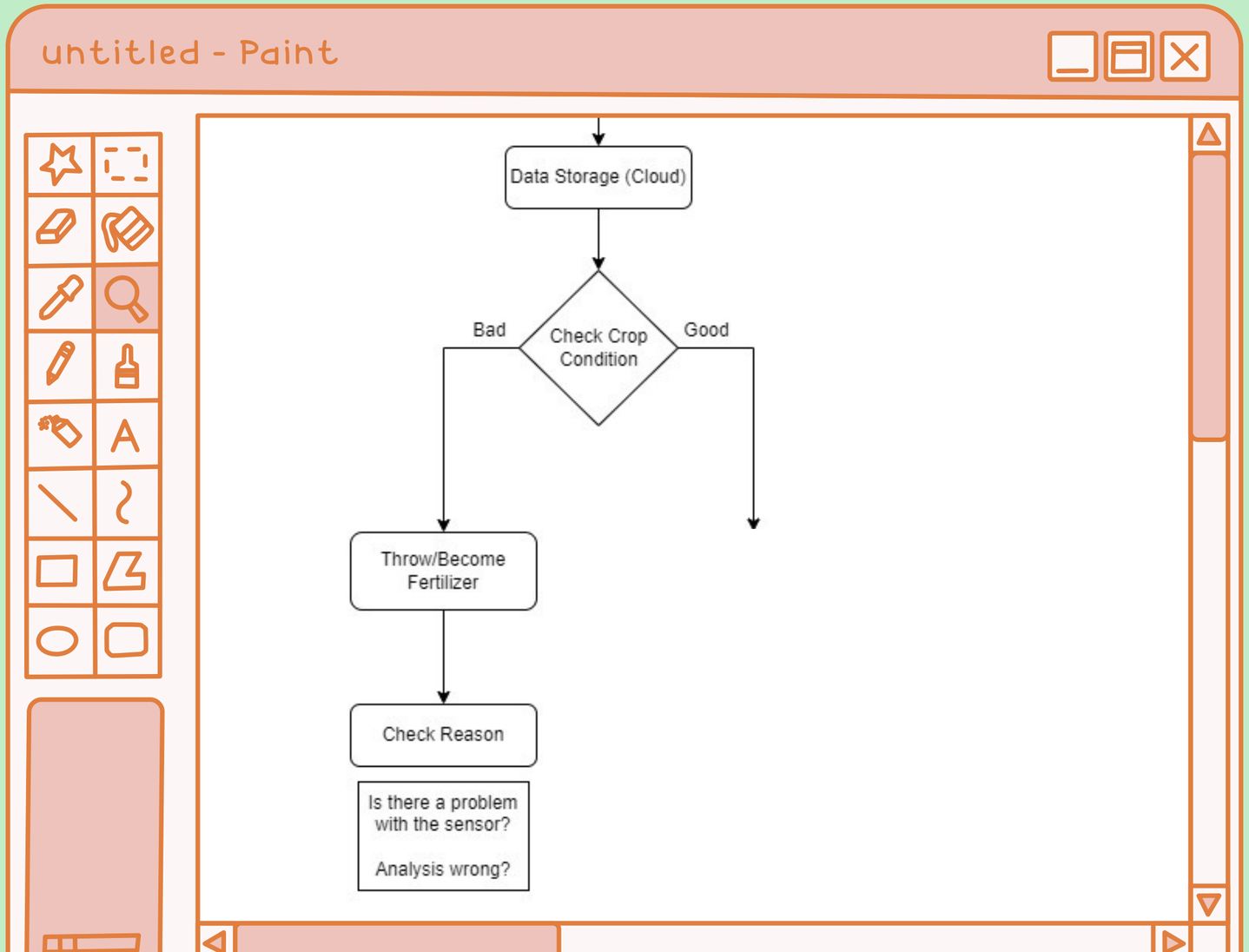
Step 7: Selection condition

--------When data analysis--------
Solid Nutrition-NO enough, may turn on Automatic Fertilization function

Solid Moisture & Temperature-INSUFFICIENT, weather HOT, temperature HIGHT, water DRY, please turn on Automatic Watering

Light-Too BRIGHT will dry out crops, too DARK will unable to photosynthesize, you can Control the Brightness

Smart Agriculture Flow Diagram & Description



Step 8: The data you analyze and the data collect are stored in the Cloud

Step 9: Observe whether crops are mature, and Detect the quality of crops

_____BAD_____

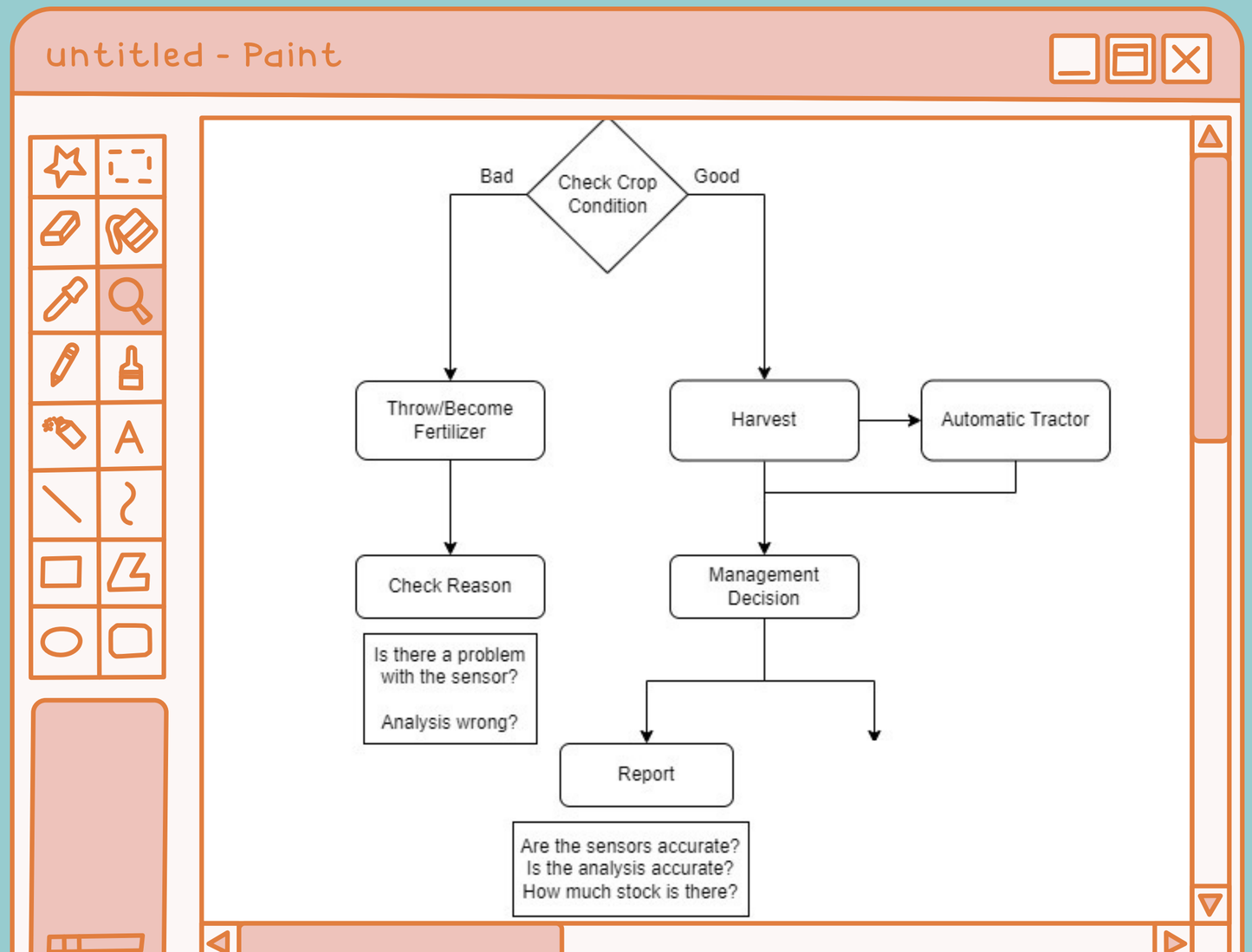
Step 9.1: Crop can be thrown away or used as fertilizer

Step 9.1.2: Check reason

<<<<<<< Faulty Sensor? >>>>>>>

<<<<<<< Analysis Error? >>>>>>>

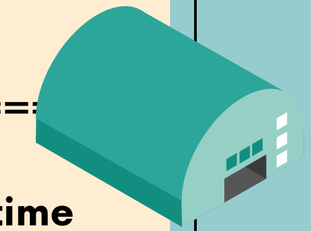
Smart Agriculture Flow Diagram & Description



_____GOOD_____

Step 9.2: Can harvest them with Automatic Harvesters

Step 9.2.1: Management Decision
Let the user choose whether to sell or store it in a warehouse

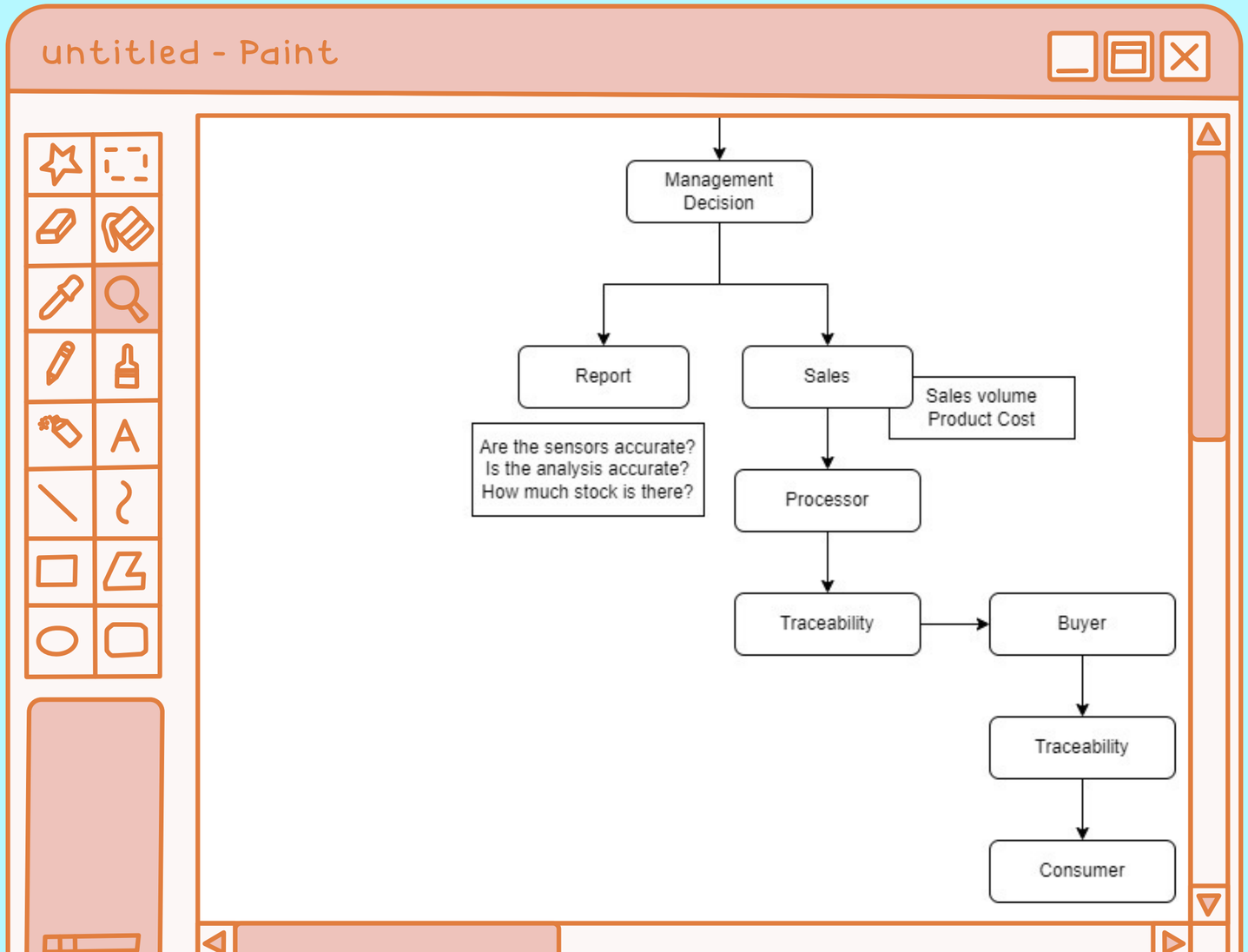


=====STORE=====

Sep 9.2.1.1: Report
Various measures taken this time and the number of crops in the warehouse for statistics

<<<<<< Sensor Accurate? >>>>>>
<<<<< Analysis Accurate? >>>>>
< How much Stock in warehouse ? >

Smart Agriculture Flow Diagram & Description



_____GOOD_____

Step 9.2: Can harvest them with Automatic Harvesters

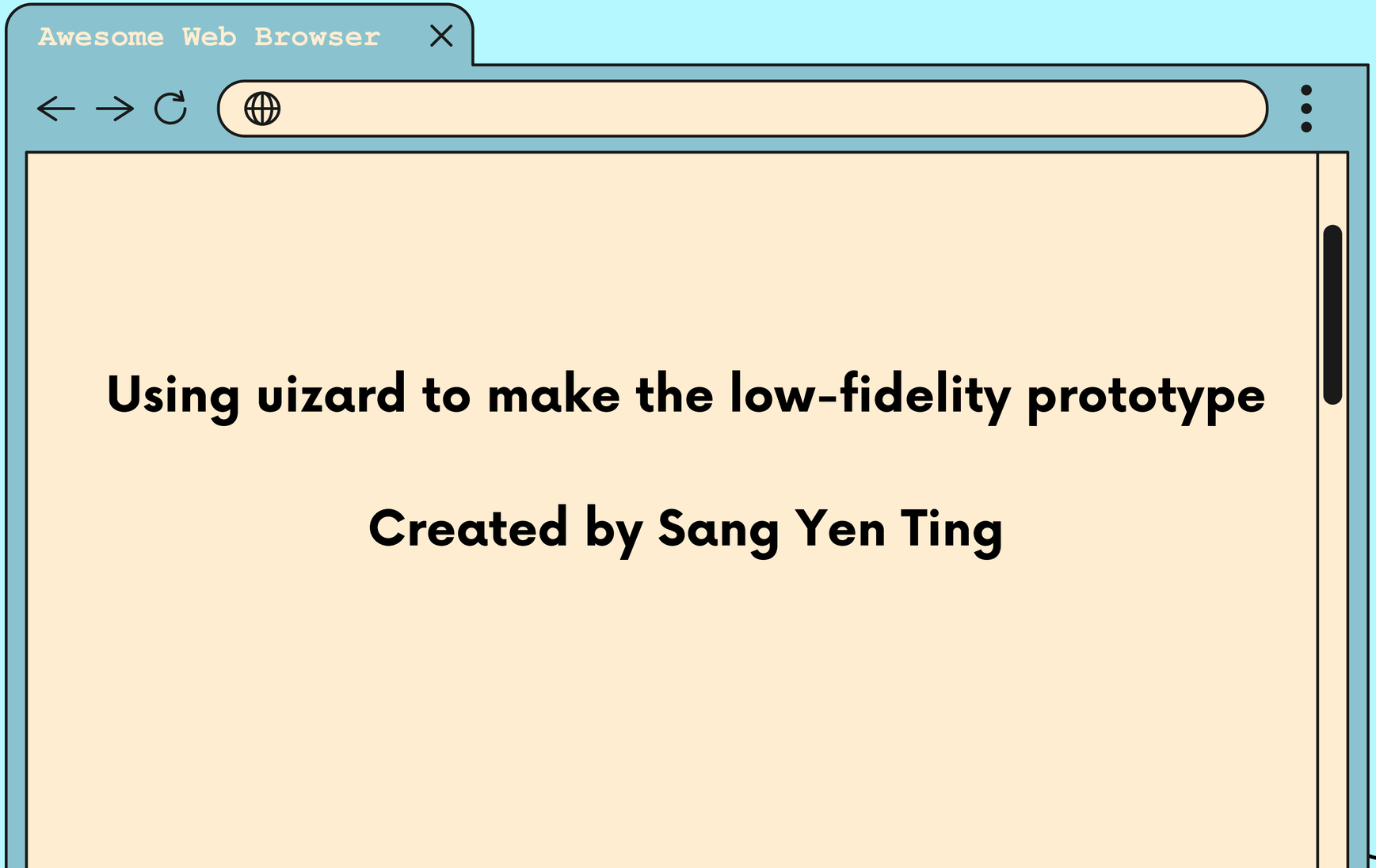
Step 9.2.1: Management Decision
Let the user choose whether to sell or store it in a warehouse

=====SELL=====

Sep 9.2.1.2: Sales
Decide how many quantities and prices to sell

Step 9.2.1.3-9.2.1.7:
pass these associations through the processor to the buyer, who in turn sells it to the consumer

Process of making low-fidelity prototype



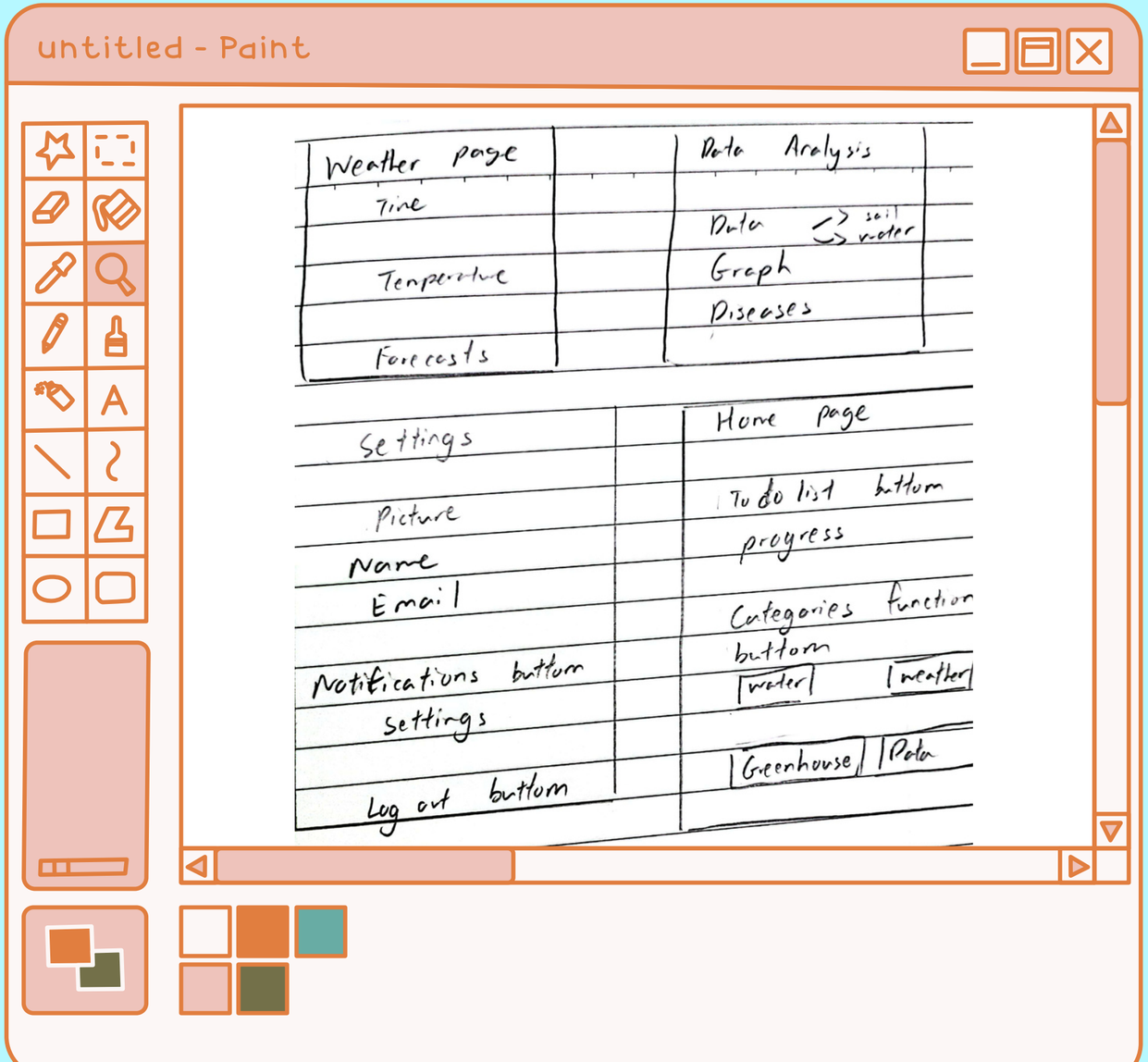
Process of making low-fidelity prototype

Awesome Web Browser

I draft before making the low-fidelity prototype I listed out which functions should I include in:

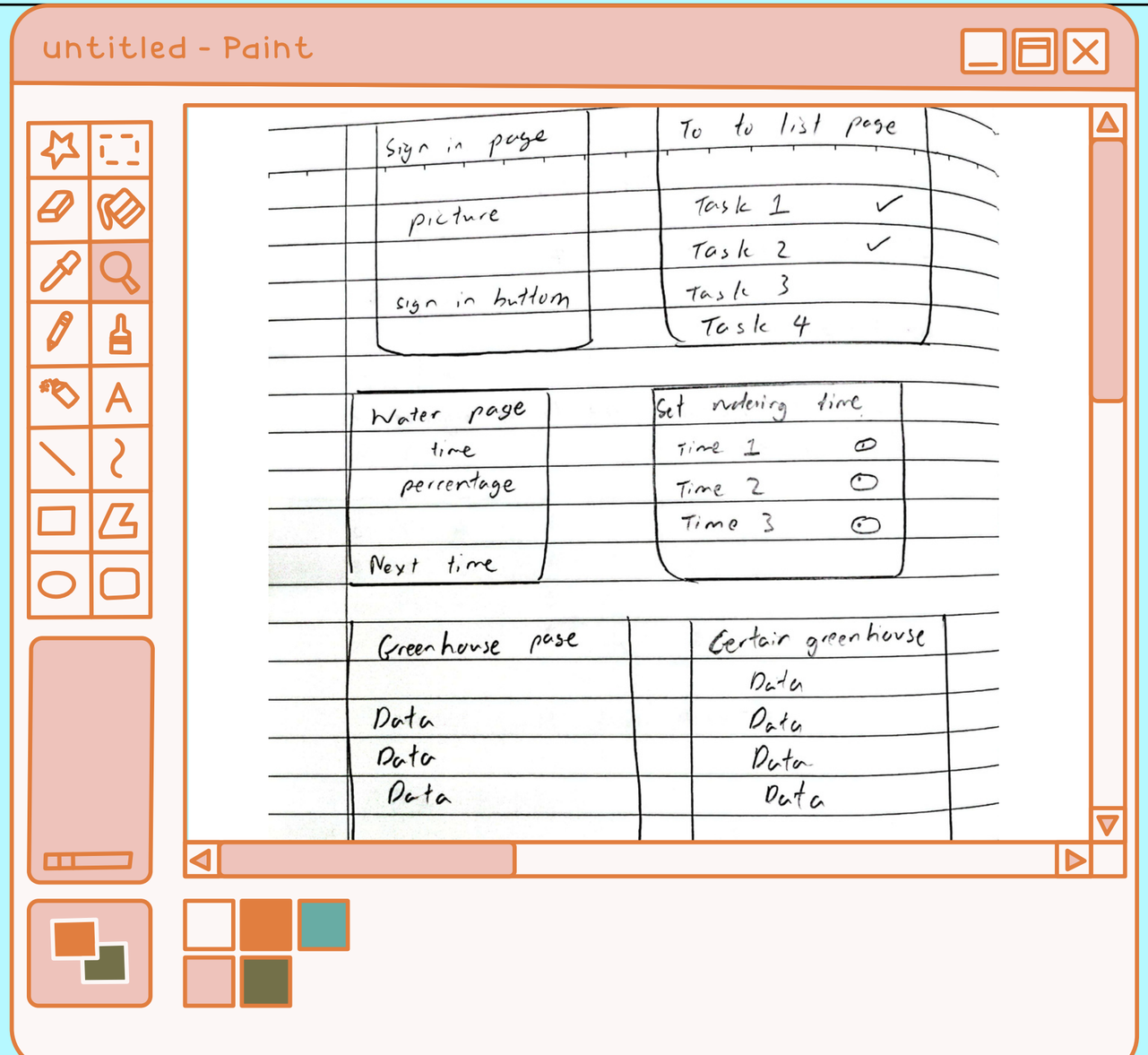
- Watering system
- Timing
- Weather forecasts
- Greenhouse control
- Data of crops
- Disease faced by crops
- Sign in page
- Home page
- Profile page

Process of making low-fidelity prototype



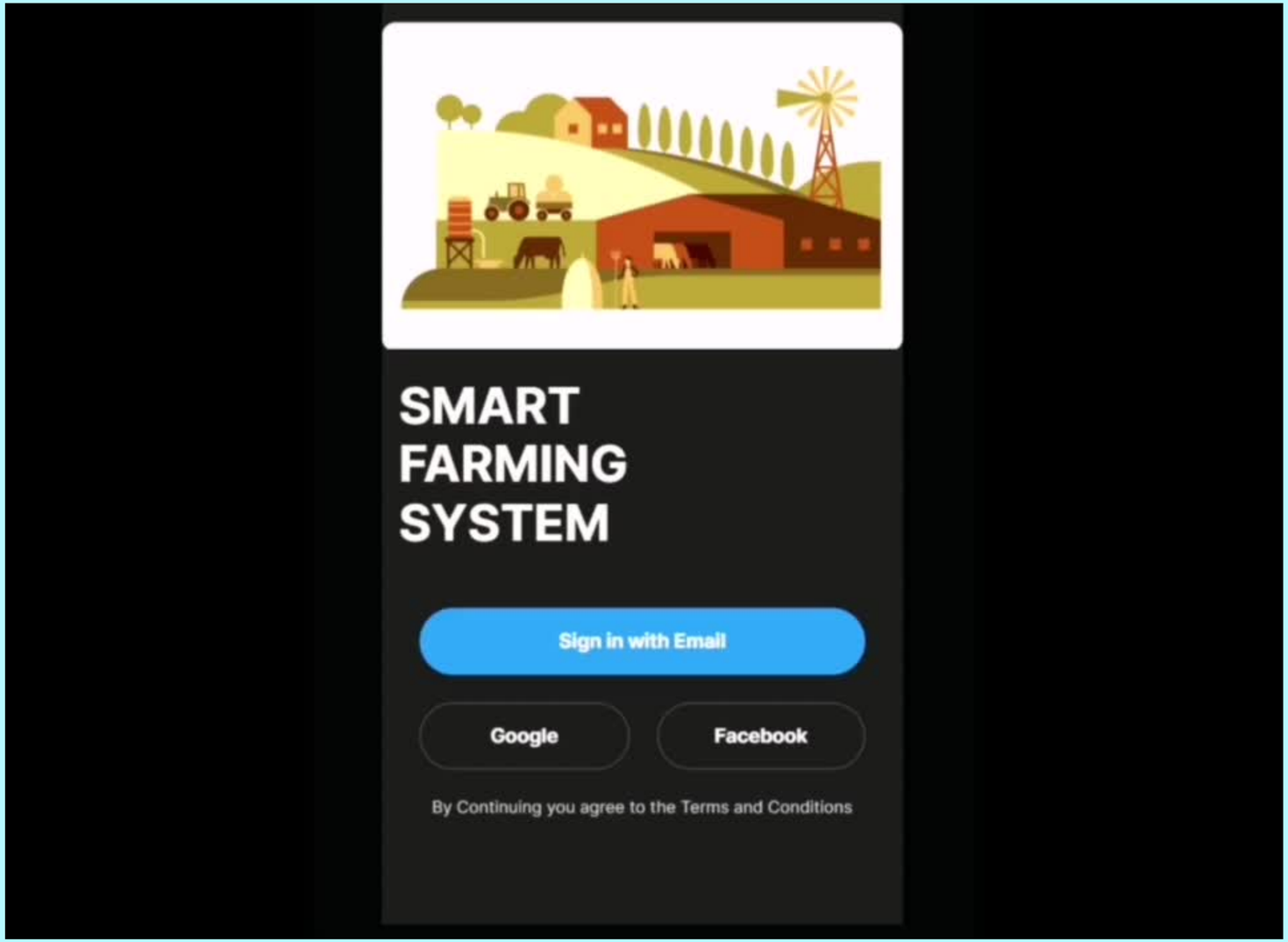
DRAFT 1

Process of making low-fidelity prototype



DRAFT 2

Final products of low-fidelity prototype



New Tab

THANK YOU PAY ATTENTION!

If you have any questions, please leave a message in the chat box

Here's wishing everyone a happy new year in advance

HAPPY CHINESE

NEW YEAR

Best wishes for
happiness and well-being