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AWS SOLUTION ARCHITECT

GITHUB LINK FOR PROJECT:
https://github.com/VISH-creater11/plant-watering-remainder.git

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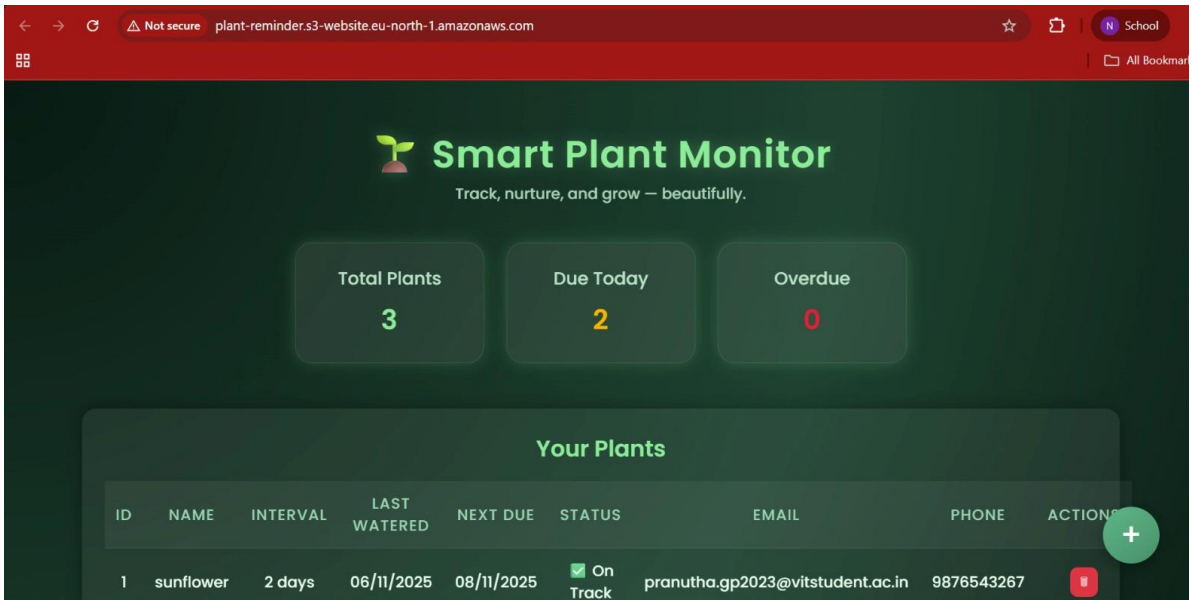
TITLE: PLANT WATERING REMINDER SYSTEM USING AWS



DESCRIPTION:

The Plant Watering Reminder System is a cloud-based application designed to help users manage their plant-watering schedules efficiently. It uses AWS Lambda functions to process plant details such as name, watering intervals, and reminder timing. The frontend interface, hosted on Amazon S3, enables users to easily add, view, and manage their plants. EventBridge triggers scheduled checks to determine when a plant requires watering. Amazon SNS sends timely email or SMS alerts to users to ensure plants are watered on time. This solution eliminates the need for manual tracking, making plant care more reliable. The project demonstrates a fully serverless approach using integrated AWS services for automated plant maintenance.

OUTCOME:

The Plant Watering Reminder System was successfully built using AWS cloud services to simplify plant maintenance. The application allows users to add and track plant details through an interactive web interface hosted on Amazon S3. Automated reminders are generated using EventBridge and sent via SNS to notify users when a plant is due for watering. The system efficiently calculates overdue plants and highlights them on the dashboard, ensuring timely care. AWS Lambda handles

backend processing, enabling a fully serverless, low-cost, and scalable design. Overall, the system provides an easy-to-use solution that automates plant monitoring and reminders, improving healthy plant management.

KEY TECHNOLOGIES:

- **AWS Lambda** – To execute backend logic for fetching and updating plant information.
- **Amazon SNS (Simple Notification Service)** – For sending automated watering reminders.
- **Amazon EventBridge** – To schedule and trigger reminder events automatically.
- **Amazon S3** – For hosting the static web frontend (HTML, CSS, JavaScript).
- **JavaScript, HTML, CSS** – For building an interactive and responsive web interface.

OVERVIEW:

1. The Plant Watering Reminder System is a cloud-based application designed to simplify plant maintenance.

2. Users can add plant details such as name, watering interval, and last watered date through an interactive web interface hosted on Amazon S3.

3. The system automatically calculates upcoming and overdue watering schedules to help users track plant care easily.

4. AWS Lambda functions handle backend processing, including determining which plants are due or overdue for watering.

5. AWS EventBridge triggers periodic checks to evaluate plant watering status at scheduled intervals.

6. Amazon SNS sends timely email notifications to remind users when watering is overdue.

7. The dashboard displays overdue plant status, enabling quick and convenient monitoring.

8. The system follows a fully serverless architecture, ensuring automation, scalability, and low operational cost.

PROCEDURE:

Step 1: Create a Static Website (Frontend)

1. Create a project folder containing: index.html, script.js, styles.css, and images.
2. The website allows users to add plant details such as name, last-watered date, and watering interval.
3. The JavaScript code handles capturing user input and sending it to AWS Lambda via a trigger (HTTPS link or custom integration).
4. Plant status (due / overdue) is calculated and visually displayed on the webpage.
5. The frontend prepares data to be sent and shows reminders dynamically.

Figure 1.1: HTML file

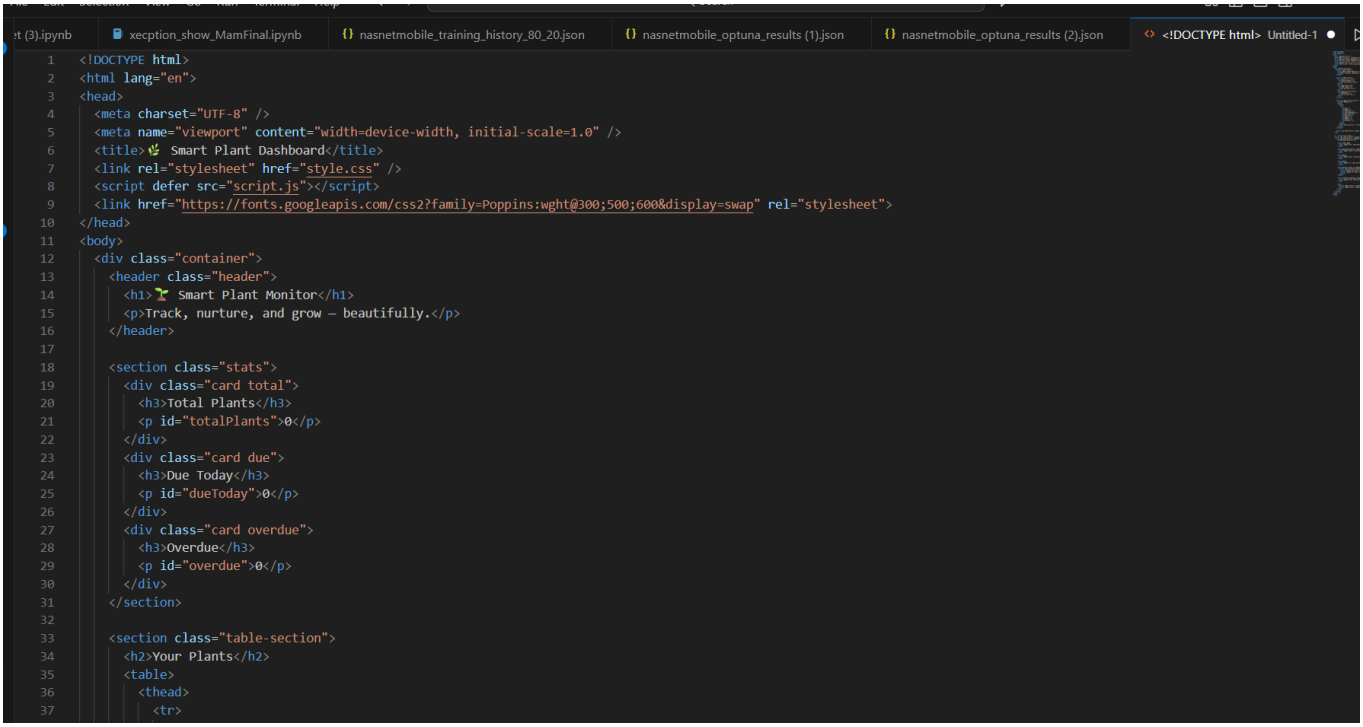


Figure 1.2 script file

```
console.log("✅ script.js is connected and running!");

document.addEventListener("DOMContentLoaded", () => {
  const plantList = document.getElementById("plantList");
  const totalPlants = document.getElementById("totalPlants");
  const dueToday = document.getElementById("dueToday");
  const overdue = document.getElementById("overdue");

  const addPlantBtn = document.getElementById("addPlantBtn");
  const addPlantModal = document.getElementById("addPlantModal");
  const addPlantForm = document.getElementById("addPlantForm");
  const cancelAdd = document.getElementById("cancelAdd");

  if (Notification.permission !== "granted") {
    Notification.requestPermission();
  }

  let plants = JSON.parse(localStorage.getItem("plants")) || [];

  const formatDate = (date) => {
    const d = new Date(date);
    return d.toLocaleDateString("en-GB");
  };

  function showNotification(plantName, type) {
    if (!("Notification" in window)) return;
    let message = "";
    if (type === "overdue") {
      message = `🚨 Your plant "${plantName}" is overdue for watering!`;
    } else if (type === "dueToday") {
      message = `💧 Reminder: It's time to water "${plantName}" today!`;
    }
    if (Notification.permission === "granted") {
      new Notification("🌿 Smart Plant Reminder", {
        body: message,
        icon: "https://cdn-icons-png.flaticon.com/512/415/415733.png",
      });
```

Figure 1.3: css file:

```
C: > Users > vishn > AppData > Local > Temp > 4b7dcbf4-685a-4cdf-913f-452e7c4562af_awsproj[1].zip.2af > # style.css > ...
1   * { margin: 0; padding: 0; box-sizing: border-box; font-family: 'Poppins', sans-serif; } body { background: radial-gradient(circle at top left, #081c15, #1b4332 60%,
2   /* Existing CSS unchanged above */
3
4   .plant-modal select,
5   .plant-modal input[type="time"] {
6     width: 100%;
7     padding: 8px;
8     border-radius: 8px;
9     border: 1px solid #ccc;
10    margin-top: 4px;
11    font-size: 14px;
12  }
13
14  /* Button for "Watered Today" reset */
15  .watered-btn {
16    background-color: #52b788;
17    color: white;
18    border: none;
19    padding: 6px 10px;
20    border-radius: 8px;
21    cursor: pointer;
22    font-size: 13px;
23  }
24
25  .watered-btn:hover {
26    background-color: #40916c;
27  }
28  .delete-btn {
29    background-color: #e63946;
30    color: white;
31    border: none;
32    padding: 6px 10px;
33    border-radius: 8px;
34    cursor: pointer;
35    font-size: 13px;
36  }
37
```

Step 2: Deploy Frontend Using Amazon S3 (with commands/actions)

1. Search for Amazon S3 in AWS Console
    - Open AWS Console → search S3 → click Amazon S3.
2. Create an S3 Bucket
    - Click Create Bucket

- Enter a unique bucket name → example:
- plant-reminder-frontend
- Choose a region → EX: us-east-1
- Click Create bucket

3. Enable Static Website Hosting
   - Open your created bucket → Go to Properties
   - Scroll to Static website hosting
   - Click Edit → Enable
   - Enter:
   - index.html
   - error.html
   - Click Save changes
4. Configure Public Access Permissions
   - Go to Permissions → Block Public Access
   - Turn OFF → “Block all public access”
   - Confirm → Save
   - Now open Bucket policy → paste policy:

```
{
 "Version": "2012-10-17",
 "Statement": [
  {
   "Sid": "PublicRead",
   "Effect": "Allow",
   "Principal": "*",
   "Action": "s3:GetObject",
   "Resource": "arn:aws:s3:::plant-reminder-frontend/*"
  }
 ]
}
```

- Click Save

5. Upload Website Files
    - Go to Objects → Upload
    - Upload your project files (HTML, CSS, JS, images)
    - index.html
    - styles.css
    - script.js
    - sapling.jpg
    - Click Upload
6. Get Website Link
    - Go to Properties → Static website hosting
    - Copy Bucket Website Endpoint, e.g.:
    - http://plant-reminder-frontend.s3-website-us-east-1.amazonaws.com
    - Open it in browser → Website Live

Figure 2.1. creation

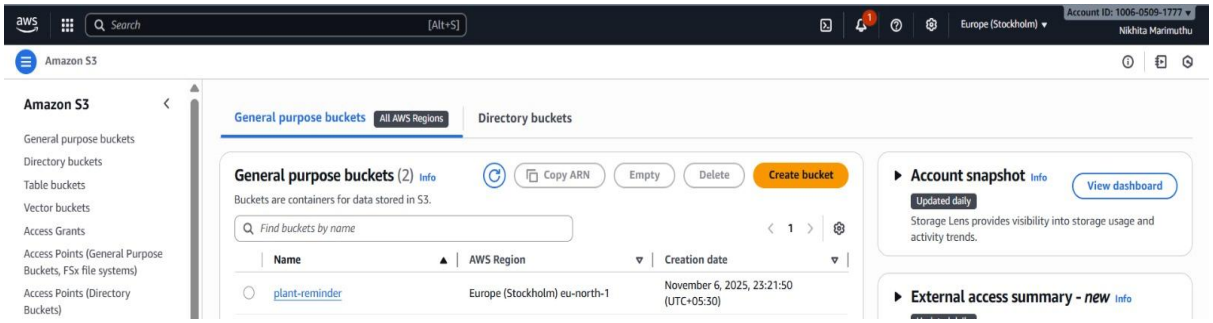


Figure 2.2: configuration

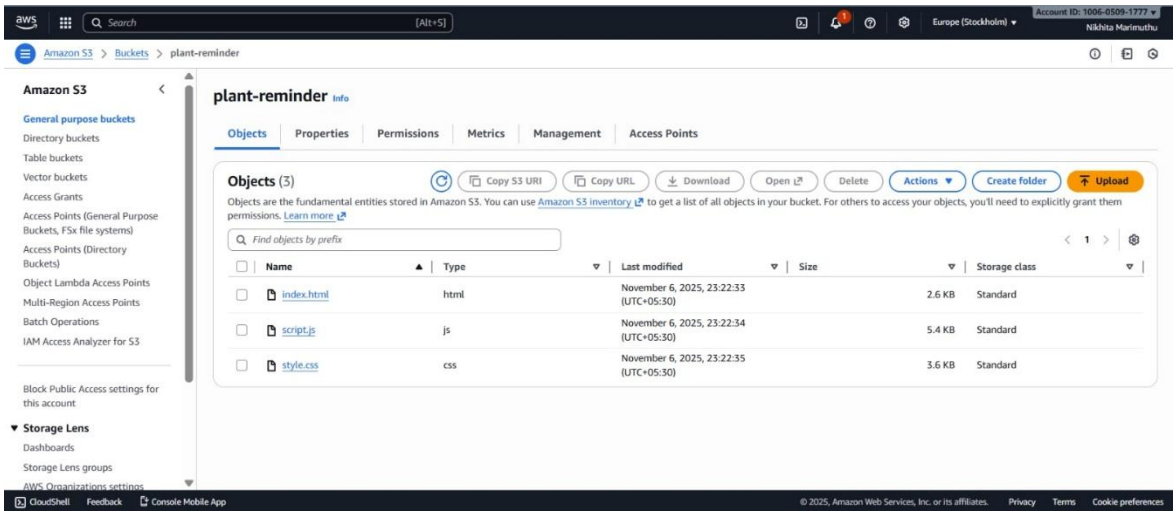
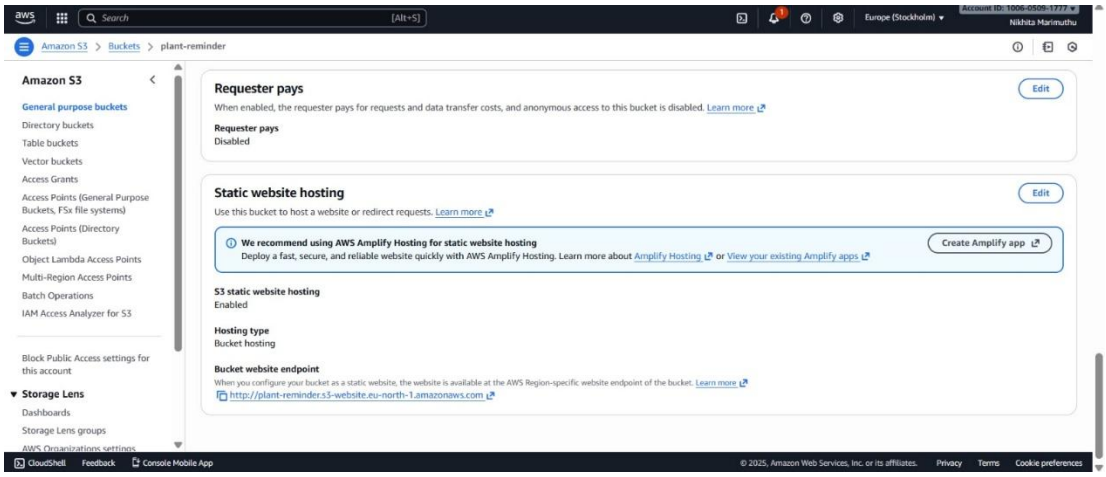


Figure 2.3.creating connection



Step 3: Create AWS Lambda Function (Plant Management + Reminder Logic)

1. Open Lambda → Create Function
   - Go to AWS Console → search Lambda
   - Click Create function
2. Configure Function
   - Choose → Author from scratch
   - Enter function name: *PlantReminderManager*
   - Select runtime:Python 3.x OR Node.js
   - Click Change default execution role → Create a new role with basic Lambda permissions
   - Click Create Function

3. Add Lambda Code
   - Scroll to Code → Code editor
   - Paste your Lambda logic to:
     a).Temporarily store plant data (in memory or S3)
     b). Calculate due/overdue based on date + interval
     c). Send SNS notifications

Example (Python)

```
import json
import boto3
from datetime import datetime, timedelta

sns = boto3.client('sns')
TOPIC_ARN = "arn:aws:sns:REGION:ACCOUNT_ID:PlantReminderTopic"

def lambda_handler(event, context):
    plants = event.get("plants", [])
    today = datetime.now().date()

    due_plants = []

    for p in plants:
        last = datetime.strptime(p['lastWatered'], "%Y-%m-%d").date()
        next_due = last + timedelta(days=p['intervalDays'])

        if next_due <= today:
            due_plants.append(p)

    if due_plants:
        message = "Plants due for watering:\n" + "\n".join([p['name'] for p in due_plants])
        sns.publish(
            TopicArn=TOPIC_ARN,
            Message=message,
            Subject="Watering Reminder!"
        )

    return {
        'statusCode': 200,
        'body': json.dumps({"duePlants": due_plants})
    }
```

4. Add SNS Permission to Lambda

Go to Configuration → Permissions → Execution Role → Add Permissions

- Attach policy*: AmazonSNSFullAccess*

5. Test Lambda

- Click Test
- Create test event

Example event:

```
{
  "plants": [
    {
```

```
    "name": "Tulsi",
    "lastWatered": "2025-01-01",
    "intervalDays": 3
   }
 ]
}
```

- Click Test → View output

6. Deploy

Click: Deploy

Lambda Handles

✓ Processing plant input data
✓ Checking watering due/overdue logic
✓ Triggering SNS reminders

Figure3.1 .SendPlantRemainder creation

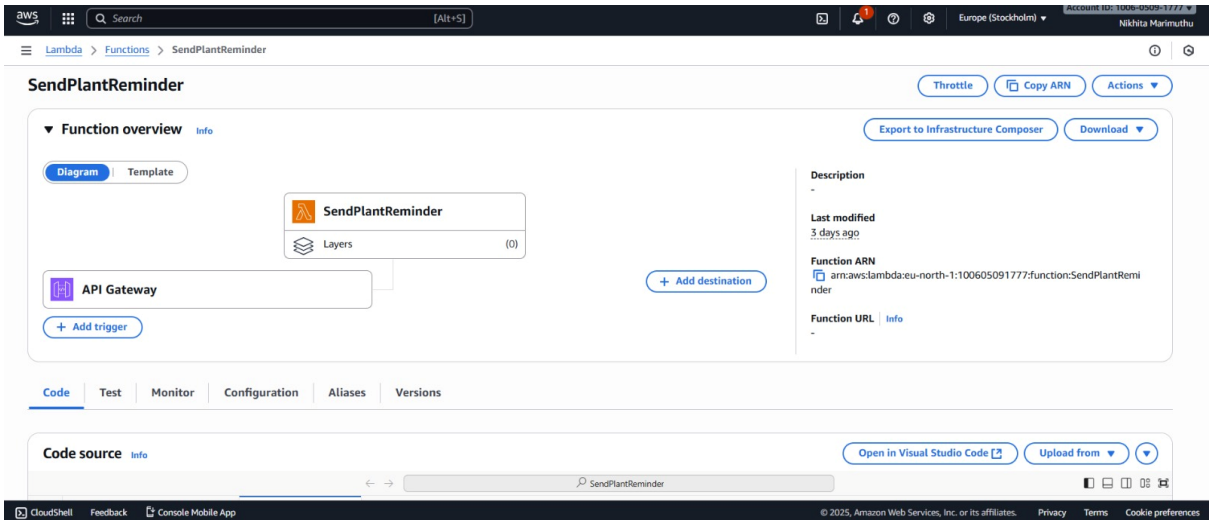
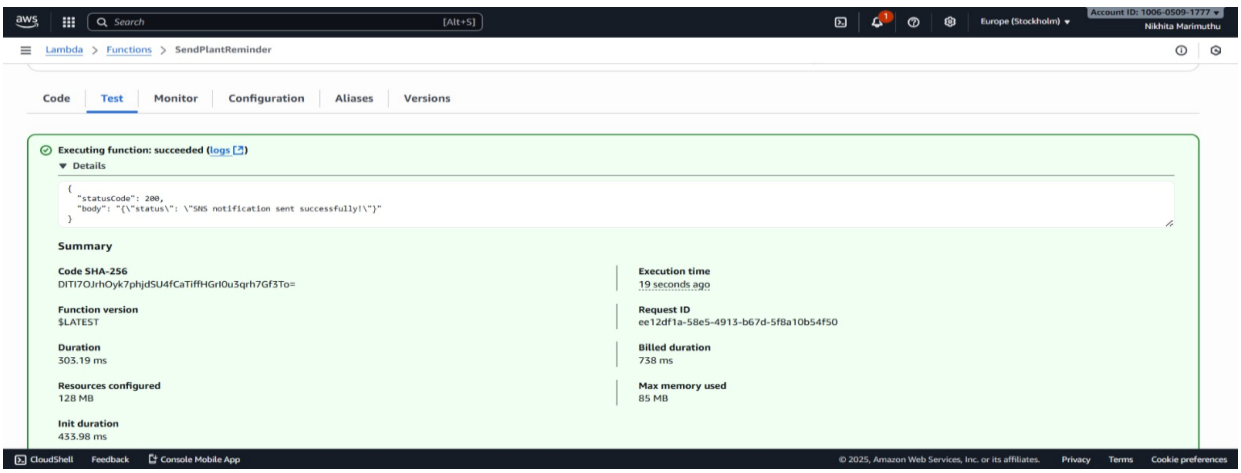


Figure 3.2.lambda function creation



Step 4: Configure Amazon EventBridge (Schedule Processing)

1. Search for EventBridge → Click Create rule.
2. Rule name example: PlantScheduleChecker.
3. In Schedule pattern, choose:
    - Rate: 1 day (or custom interval)
4. Choose target → Select your Lambda function PlantReminderManager.
5. Save the rule.

EventBridge will now automatically trigger the Lambda function regularly.

Figure 4.1.set_Rules

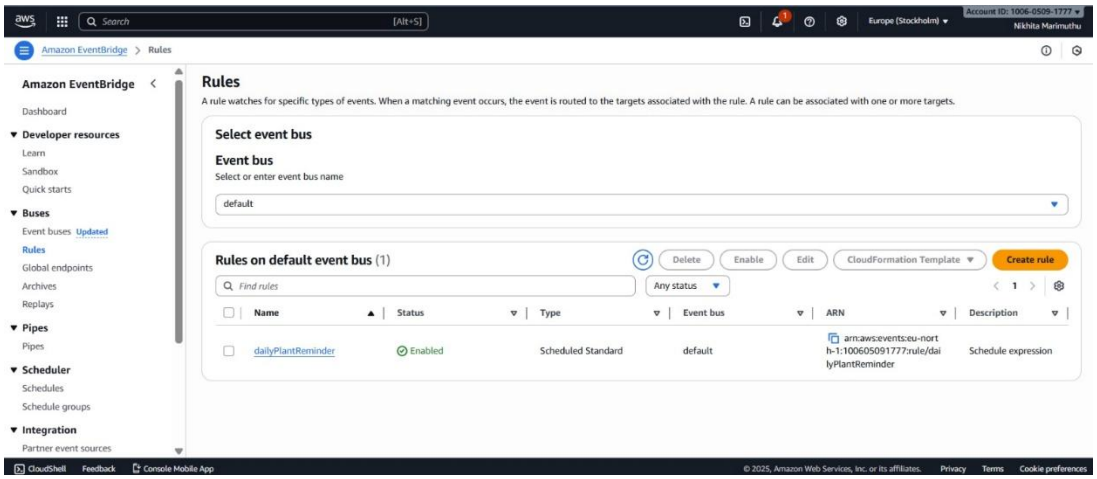
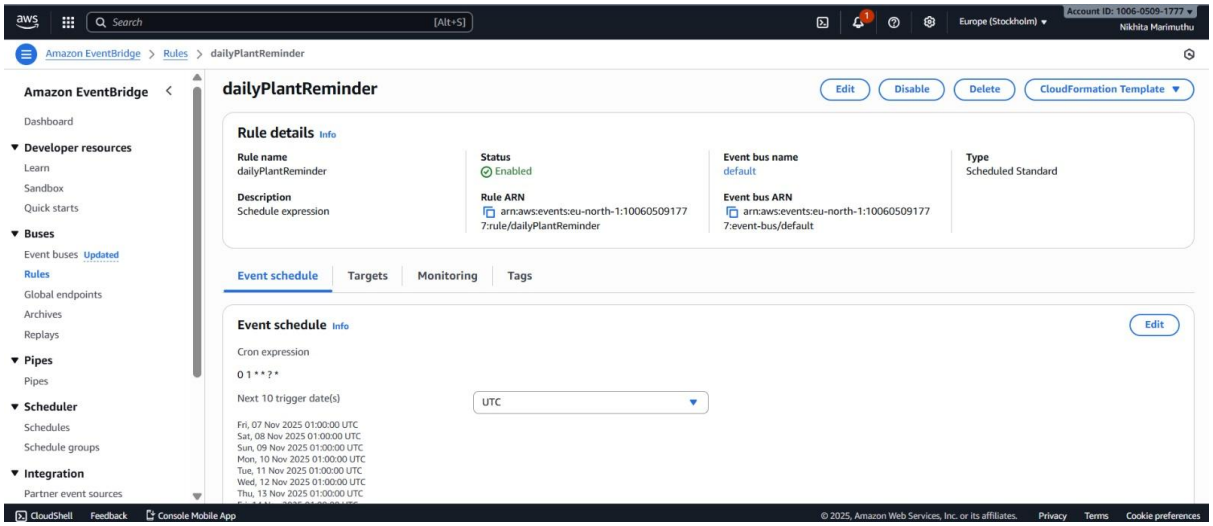


Figure 4.2. event schedule

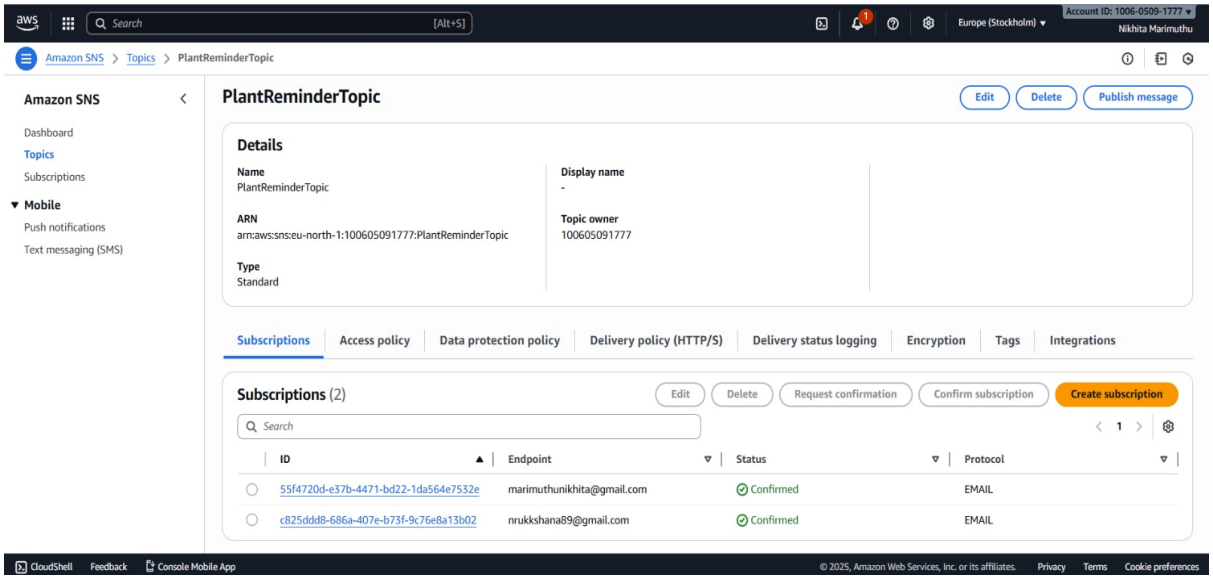


Step 5: Configure Amazon SNS for Notifications

1. Open Amazon SNS → Create topic.
2. Choose Standard, name it PlantReminderTopic.
3. Open created topic → Click Create subscription.
4. Choose Protocol: Email, then enter your email.
5. Confirm using the link sent to your inbox.

SNS will now send email reminders when Lambda produces an alert.

Figure 5.1. configuration step



Step 6: Connect Webpage to AWS Services

1. In your script.js, store Lambda invocation endpoint / logic.
2. When a plant is added, the webpage triggers Lambda.
3. Lambda processes plant info, checks schedule, and (if due/overdue) sends notifications via SNS.
4. Frontend shows updated plant status visually (Due Today / Overdue / Healthy).
5. Direct calling of Lambda is used → no API Gateway required.

Step 7: Test Entire System

1. Open your website from the S3 public endpoint.

2. Add plant details and verify:
   a). Plant is displayed on UI
   b).Due/overdue calculation works
   c). Email reminder arrives when plant watering is due
3. Confirm EventBridge triggers Lambda daily.

WEBSITE VIEW:

Figure 6.1 Website UI

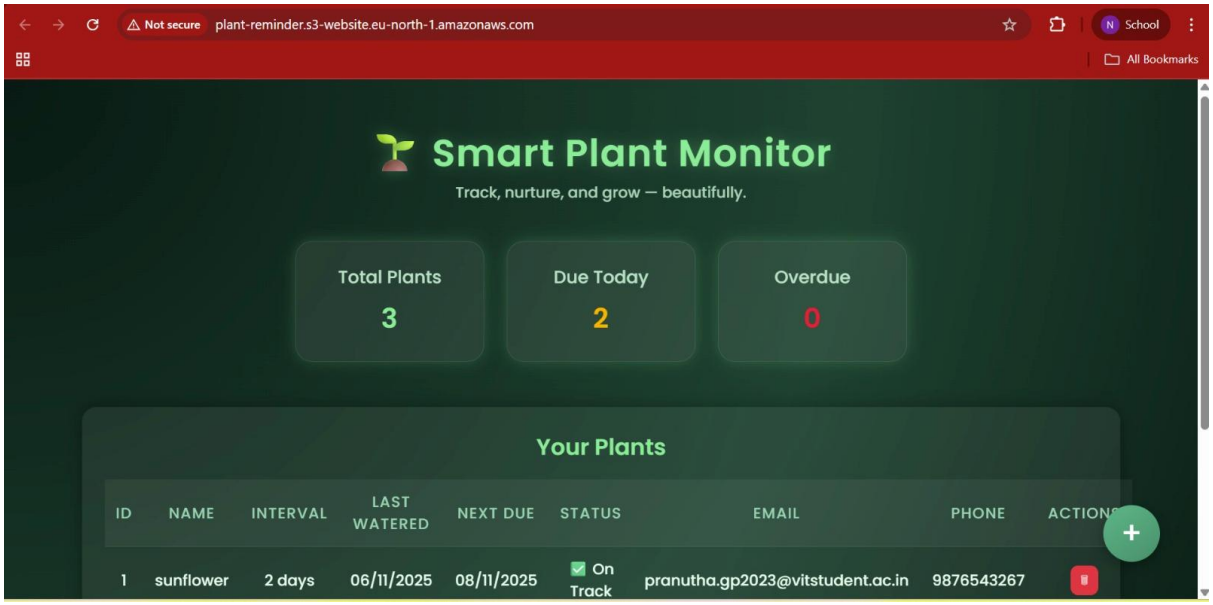


Figure 6.2. Add new Plant details

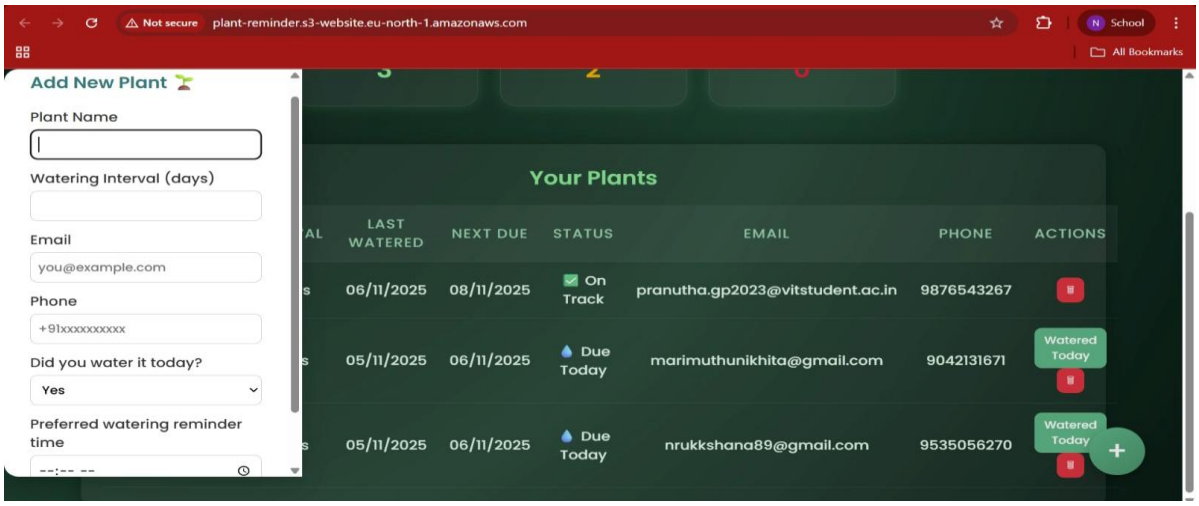
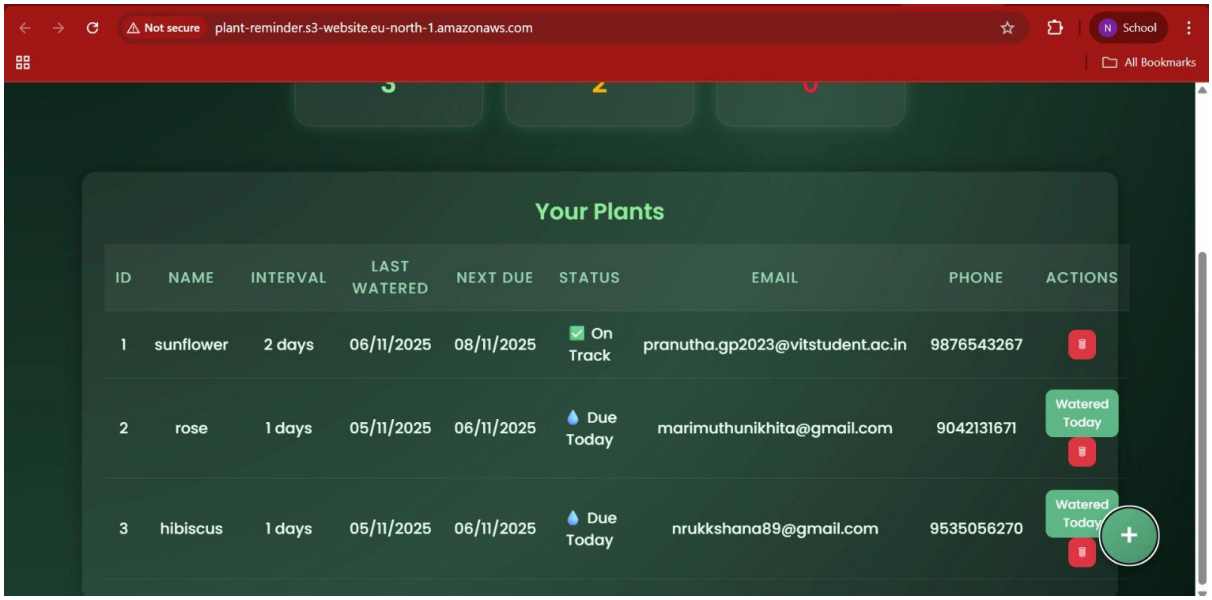


Figure 6.3 .working of website



WORKING OF WEBSITE (STEP-BY-STEP)

1. **User Opens the Website**
    - The user accesses the web application via the S3 bucket hosting link.
2. **Add Plant Details**
    - The user clicks **"Add Plant"** and enters:
        - Plant name
        - Watering interval (days)
        - Last watered date
        - Email & phone (optional)
3. **Store & Process Plant Data**
    - The details are passed to the backend Lambda function.
    - Lambda automatically processes the plant data.
4. **Calculate Next Watering / Overdue Status**
    - The system compares today's date with last-watered date + interval.
    - It then marks plants as:
        - ✅ Healthy
        - 🟡 Due
        - 🔴 Overdue
5. **Visual Display on Dashboard**

- The dashboard shows:
  - Total plants
  - Due today
  - Overdue count
  - Current plant list with status badges

6. **Automated Daily Check via EventBridge**
   - EventBridge triggers Lambda daily.
   - System scans all plants to find which ones need watering.
7. **Send Notification via SNS**
   - For plants marked **due or overdue**,
     SNS sends an **email reminder** to the user automatically.
8. **User Waters Plant & Updates the Record**
   - The user can update last-watered date.
   - Status becomes **healthy** again.
9. **Continuous Monitoring**
   - The entire cycle repeats daily automatically—NO manual tracking needed.