Activity 1: Simulation of Electrical Switch

Research Methodology and Resources

For this project I focused on two main things: how an electrical switch works and how to model that in C. I reviewed my class notes and beginner engineering texts to understand that a closed circuit (switch ON) can be treated as “1” and an open circuit (OFF) as “0.” Quick checks on Google Scholar and sites like The Engineering ToolBox helped confirm the binary logic.

To turn this into code, I used references like cplusplus.com and cppreference.com to learn the syntax for printf(), scanf(), and the if…else structure. Forums such as Stack Overflow guided me on handling invalid input, like when someone enters a letter instead of a number.

Overall, the project showed that a simple switch can be modeled with binary input (1 = ON, 0 = OFF) and that C’s conditional statements make it easy to interpret those states and manage errors.

References:
https://www.tutorialspoint.com/cprogramming/index.htm
https://www.programiz.com/c-programming
https://cplusplus.com/reference/clibrary/

Soil Moisture Monitoring – Analysis

Analysis:
The idea is to check soil moisture and give simple guidance:

- If soil is **dry** → “Water the plants.”
- If soil is **moist** → “No need to water.”

Why It Works

- **Binary logic:** Just like ON/OFF or yes/no decisions. Dry = action needed, Moist = no action.
- **Easy implementation:** Only one input (soil status) and a simple `if-else` statement are required.

- **Practical relevance:** Useful for home gardening or small farms; demonstrates real-life application of sensors.

Step-by-Step Algorithm – Soil Moisture (0–10 Scale)

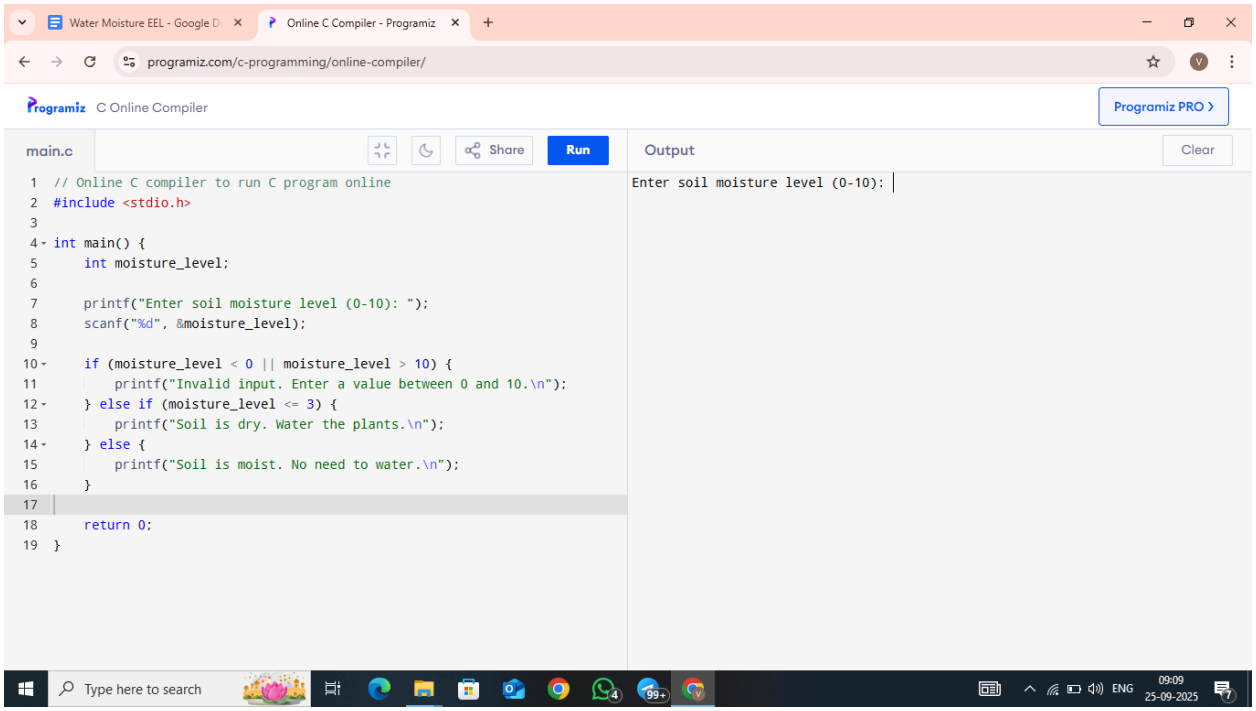
1. **Start Program**
    - Ask the user to enter the soil moisture level (0–10).
2. **Read Input**
    - Store the value in a variable called `moisture level`.
3. **Validate Input**
    - If the value < 0 or > 10 → print “Invalid input” and exit.
4. **Check Moisture**
    - If `moisture level <= 3` → print “Soil is dry. Water the plants.”
    - Else if `moisture level >= 4` → print “Soil is moist. No need to water.”
5. **End Program**

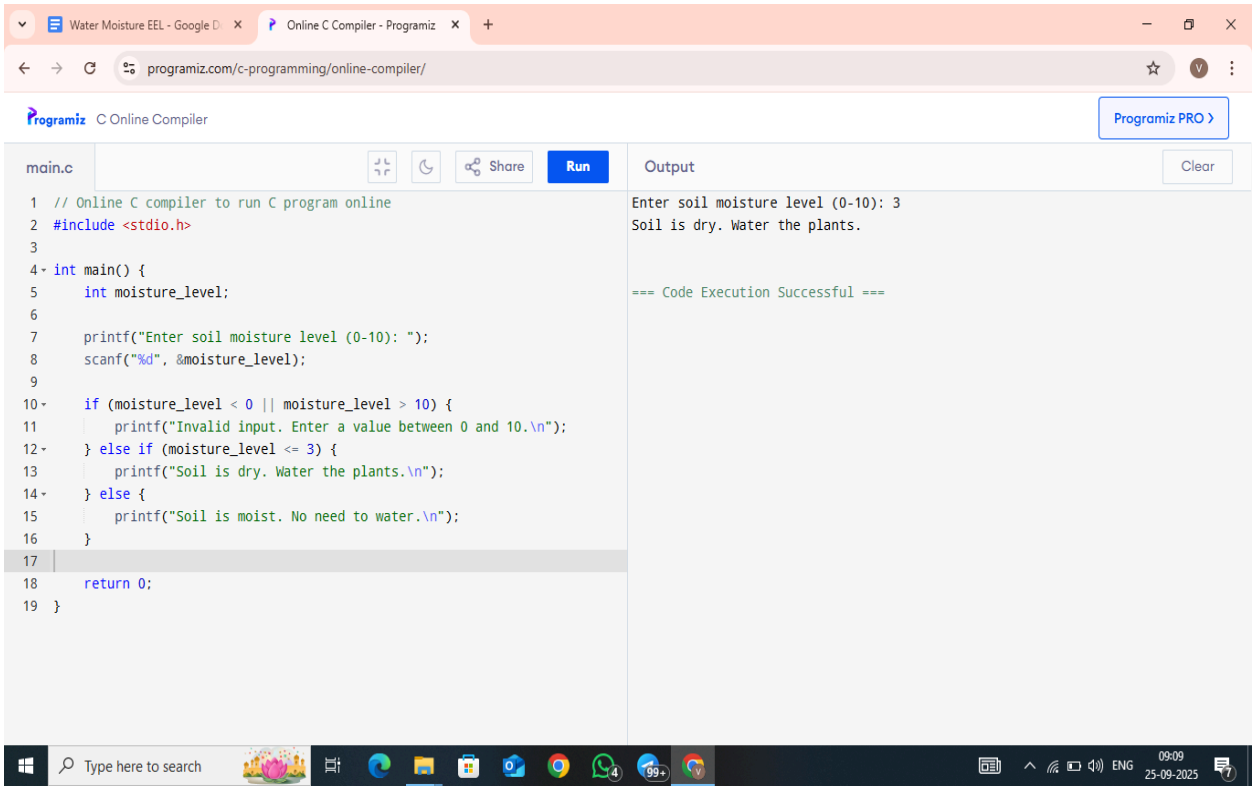
Build:

```
// Online C compiler to run C program online

#include <stdio.h>


int main() {

   int moisture_level;


   printf("Enter soil moisture level (0-10): ");
```

```
    scanf("%d", &moisture_level);


    if (moisture_level < 0 || moisture_level > 10) {
        printf("Invalid input. Enter a value between 0 and 10.\n");
    } else if (moisture_level <= 3) {
        printf("Soil is dry. Water the plants.\n");
    } else {
        printf("Soil is moist. No need to water.\n");
    }
    return 0;
}
```

Test and Outputs:

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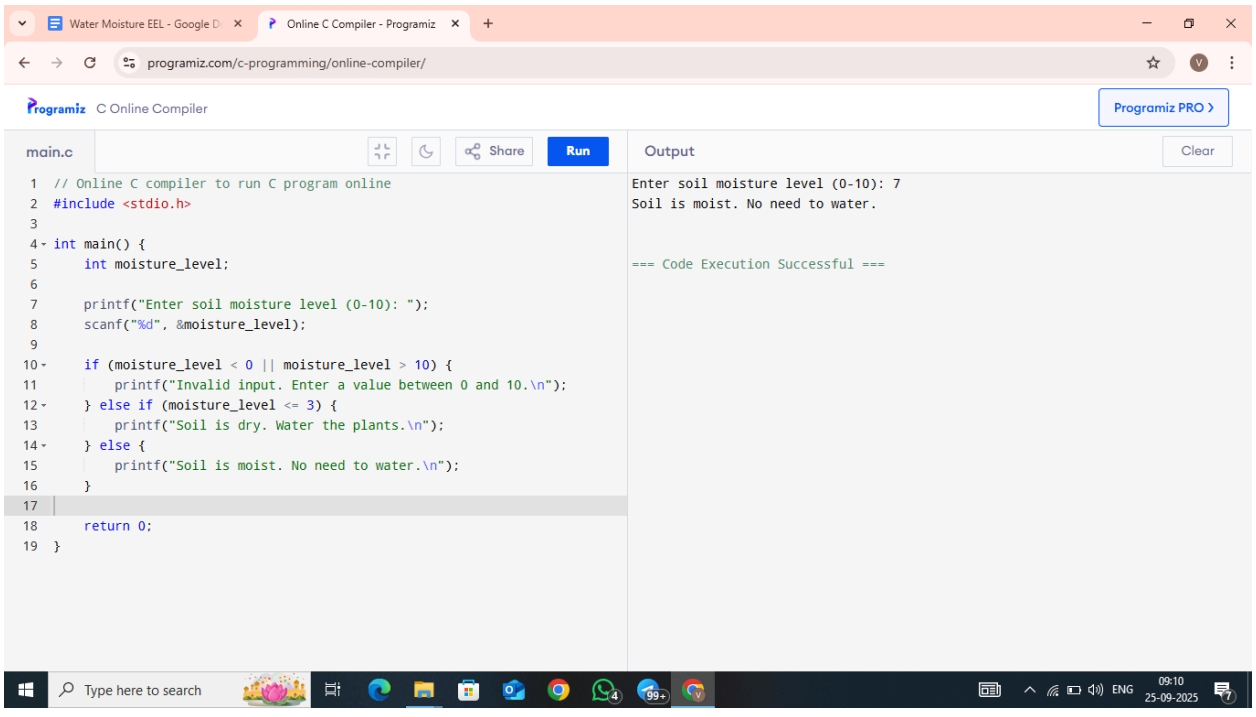
Programiz PRO
main.c
Share
Run
Output
Clear
// Online C compiler to run C program online
#include <stdio.h>
int main() {
int moisture_level;
printf("Enter soil moisture level (0-10): ");
scanf("%d", &moisture_level);
if (moisture_level < 0 || moisture_level > 10) {
printf("Invalid input. Enter a value between 0 and 10.\n");
} else if (moisture_level <= 3) {
printf("Soil is dry. Water the plants.\n");
} else {
printf("Soil is moist. No need to water.\n");
}
return 0;
}
Enter soil moisture level (0-10): 3
Soil is dry. Water the plants.
=== Code Execution Successful ===
Type here to search
ENG
09:09
25-09-2025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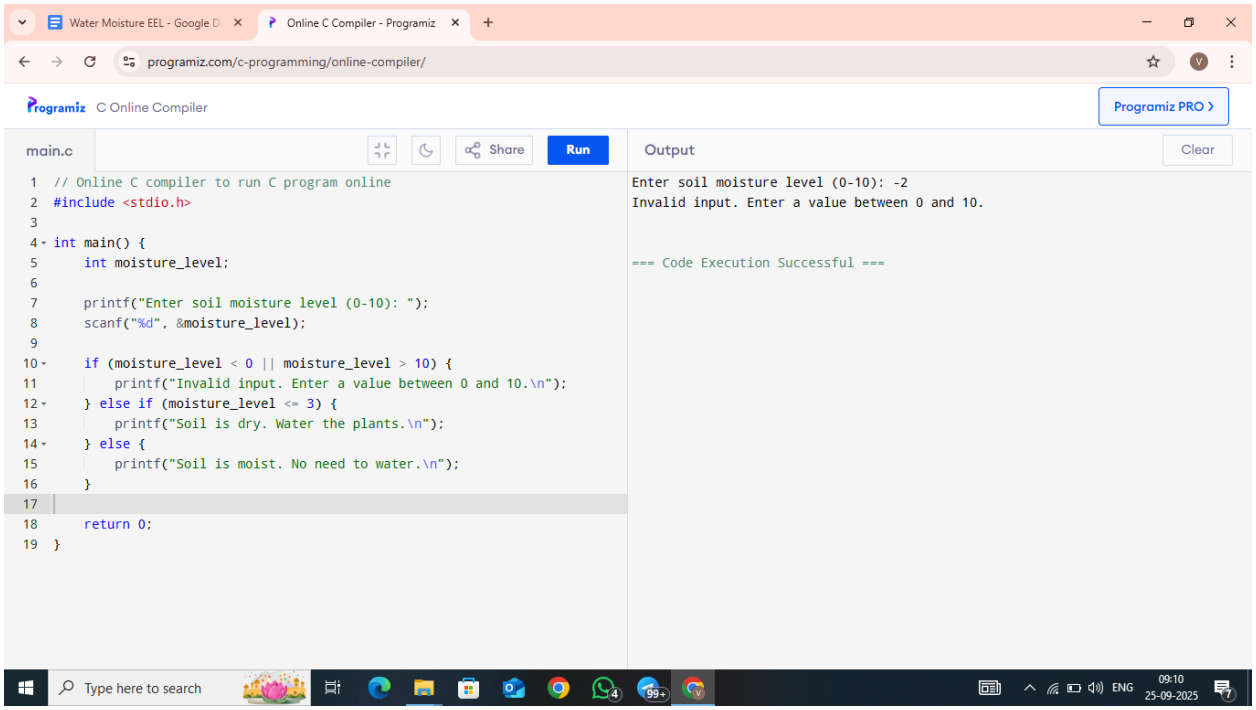
#include <stdio.h>
int main() {
int moisture_level;
printf("Enter soil moisture level (0-10): ");
scanf("%d", &moisture_level);
if (moisture_level < 0 || moisture_level > 10) {
printf("Invalid input. Enter a value between 0 and 10.\n");
} else if (moisture_level <= 3) {
printf("Soil is dry. Water the plants.\n");
} else {
printf("Soil is moist. No need to water.\n");
}
return 0;
}
Enter soil moisture level (0-10): 7
Soil is moist. No need to water.
=== Code Execution Successful ===
Type here to search
ENG
09:10
25-09-2025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1 // Online C compiler to run C program online
2 #include <stdio.h>
3
4 int main() {
5 int moisture_level;
6
7 printf("Enter soil moisture level (0-10): ");
8 scanf("%d", &moisture_level);
9
10 if (moisture_level < 0 || moisture_level > 10) {
11 printf("Invalid input. Enter a value between 0 and 10.\n");
12 } else if (moisture_level <= 3) {
13 printf("Soil is dry. Water the plants.\n");
14 } else {
15 printf("Soil is moist. No need to water.\n");
16 }
17
18 return 0;
19 }
Enter soil moisture level (0-10): -2
Invalid input. Enter a value between 0 and 10.
=== Code Execution Successful ===
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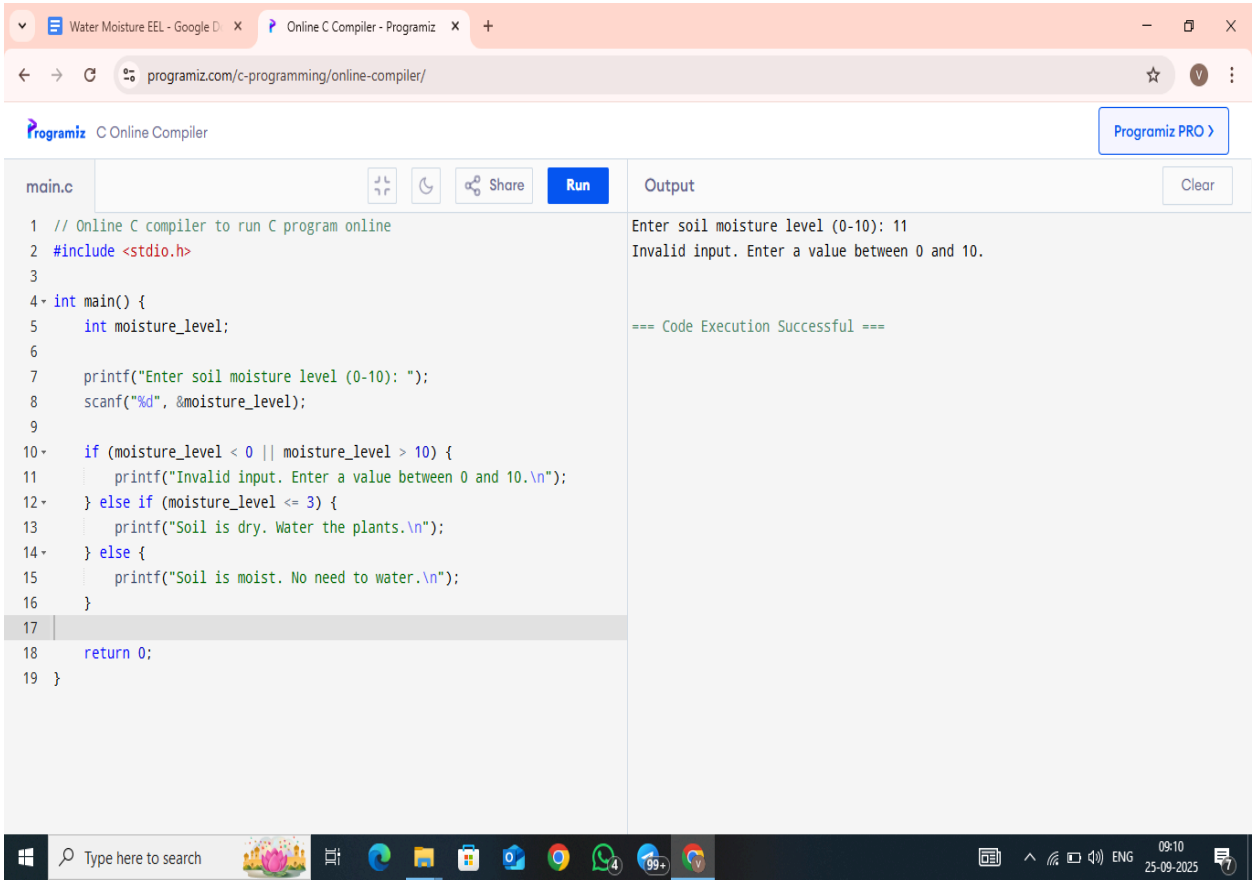
25-09-2025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2 #include <stdio.h>
3
4 int main() {
5 int moisture_level;
6
7 printf("Enter soil moisture level (0-10): ");
8 scanf("%d", &moisture_level);
9
10 if (moisture_level < 0 || moisture_level > 10) {
11 printf("Invalid input. Enter a value between 0 and 10.\n");
12 } else if (moisture_level <= 3) {
13 printf("Soil is dry. Water the plants.\n");
14 } else {
15 printf("Soil is moist. No need to water.\n");
16 }
17
18 return 0;
19 }
Enter soil moisture level (0-10): 11
Invalid input. Enter a value between 0 and 10.
=== Code Execution Successful ===
Type here to search
ENG
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Implementation: