State Management Overview

This section defines the **state-based control system** for **CoffeeTime**, handling user interactions and system operations. It ensures a **structured execution flow**, transitioning between different **machine states** based on user input and scheduled actions.

State Machine

The system operates through **seven main states**, each responsible for a specific function:

State	Description
`STATE_INITIAL_SCREEN`	Displays system status, resources, and real-time clock.
`STATE_SELECT_CUPS`	Asks the user for the desired number of coffee cups.
`STATE_SCHEDULE_OR_NOW`	Asks if brewing should start immediately or be scheduled.
`STATE_BREWING`	Executes the coffee brewing process.
`STATE_SCHEDULING`	Handles coffee scheduling via the **RTC module**.
`STATE_WAITING`	Monitors time and initiates brewing when the **scheduled time is reached**.

Function:

`manage_state()`: Controls the execution flow by managing state transitions.

Scheduling & Real-Time Clock (RTC)

- **Allows the user to schedule coffee preparation**.
- Uses the **RTC module** to compare the **current time** with the **configured schedule**.
- Once the scheduled time is reached, the machine **automatically starts brewing**.

Functions:

- `configure_schedule()`: Captures and stores the **scheduled time**.
- `rtc_read()`: Reads the **current date and time** from the RTC module.

Condition for brewing:

```
if (current_day == scheduled_time.day &&
    current_month == scheduled_time.month &&
    current_hour == scheduled_time.hour &&
    current_minute == scheduled_time.minutes) {
    current_state = STATE_BREWING;
}
```

Global Variables

Variable	Purpose
`water_ml`	Tracks the remaining **water quantity**.
`coffee_beans_g`	Tracks the remaining **coffee beans**.
`cups`	Stores the **number of selected coffee cups**.

`play_pressed`	Flags if the **PLAY button** was pressed.
`scheduled_time`	Stores the **user-defined brewing time**.
`current_state`	Controls the **active system state**.

This section ensures that **CoffeeTime** operates efficiently, managing **user input, scheduling, and coffee brewing logic** through an optimized **state machine**.