

## **Raspberry Pi Final Project Title:** Caffeine Call

**Team Name:** BrewTech

### **Project Team Members:**

Saphal

Jack

**Project Summary** (Briefly summarize what your project is about include overall goals and objectives for the project.):

The project aims to develop a web-based coffee maker with an alarm system. Users will be able to set the desired amount of coffee and creamer, as well as the brewing time through an intuitive GUI. The system will then automatically brew the coffee at the specified time and trigger an alarm to alert the user when it's ready.

**Tasks** (Briefly identify your project's main tasks and objectives (i.e. break down the large project into smaller goals and list them out here, give each goal a name/identifier. You may have smaller subtasks as well.):

1. Frontend Development:
  - a. Design user interface components for inputting coffee and creamer amounts and setting the brewing time.
  - b. Implement elements to display current settings and to allow users to adjust them.
  - c. Develop an alarm notification system to alert users when the coffee is ready.  
(Could be a general brewing time)
2. Backend Development:
  - a. Set up a server? to handle user requests and store preferences.
  - b. Develop a scheduling system to trigger brewing tasks at specified times.
  - c. Be able to communicate front-end to back-end
3. GPIO and External Circuit:
  - a. Interface the web application with the coffee maker hardware using GPIO pins.
  - b. Develop a circuit to control the coffee maker's brewing mechanism and alarm system.
  - c. Ensure proper electrical safety measures are in place.
4. GUI:
  - a. Integrate an intuitive GUI for rendering on the LCD touchscreen.
  - b. Design UI components for easy navigation and interaction.
  - c. Ensure responsiveness and compatibility with various screen sizes.
5. 3D Designing for Some Parts:
  - a. Utilize CAD software to design 3D models for physical parts related to the machine.
  - b. Ensure compatibility and functionality with the overall design and hardware setup.

**GPIO** (Briefly discuss how you plan to incorporate GPIO, an external circuit, and any other external components):

1. Stepper Motor Driver (Sliding Mechanism):

The stepper motor driver receives input signals to control the sliding mechanism of the coffee maker. These GPIO pins control the direction and steps of the stepper motor, allowing precise control over the sliding action for ingredient dispensing.

2. Servo Motors (Coffee and Creamer Dispensing):

Servo motors are used to dispense coffee and creamer based on user preferences. GPIO pins connected to servo motor controllers enable the microcontroller to send signals controlling the angle and duration of rotation for precise dispensing.

3. Relay Module (Water Heater and Water Pump)

The relay module is utilized to control the water heater and water pump. GPIO pins connected to the relay module actuate the switching mechanism, allowing the microcontroller to turn the water heater on/off and control the water pump for the brewing process.

4. DC Motor (Stirrer Motor):

The DC motor is responsible for operating the stirrer mechanism within the coffee maker. GPIO pins connected to motor driver circuits enable the microcontroller to control the speed and direction of rotation for efficient stirring of the coffee mixture.

5. Temperature Sensor:

Monitors the temperature of the water before starting the brewing process. GPIO pins connected to the temperature sensor interface with the microcontroller to read temperature data of the water, allowing the system to trigger the relay when the desired temperature is reached.

**GUI** (Briefly discuss how you can plan to integrate an intuitive GUI that will be rendered on the LCD touchscreen. Feel free to provide a mock-up. (Flask, Django, Py Simple GUI)):

1. Design a user-friendly interface that allows users to input the coffee and creamer amounts, and set the brewing time
2. Incorporate visual feedback mechanisms which confirms user actions and provides status updates (ie. alarm set, brewing in progress, creamer addition in progress, brewing completed)
3. Ensure compatibility with LCD touchscreen (the potato)

**Github repository**

This project's github repository is located at: <https://github.com/Shuffle10/CaffeineCall>

**Gantt Chart (optional)**

Insert your projects Gantt Chart here. Make sure to modify the spreadsheet provided AN easy way to insert the spreadsheet is to highlight the relevant cells in the spreadsheet, copy it to the clipboard via Ctrl+C, and paste it as a Bitmap (centered and using no wrap) via Shift+Ctrl+V. Feel free to briefly discuss the schedule.