ENG1013 Milestone 1 Submission

Team D09

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Table of contents

Subsystem One (Control)

Function Main (Polling Loop):

Inputs: Start and end time of polling loop
Outputs: Time of a polling loop
Function:
1. **Obtain temperature input from input subsystem**
2. **Process given temperature and send a signal to the output system to open or close the ventilation depending on the the input temperature**
3. **Print the time for this process to occur on the console**
4. **Return back to step 1 in a polling loop between 1-3 seconds**

Subsystem Two (Services)

Function Main menu

Description: Allows the user to pick which menu the want to go to
Inputs: Services to go to
Outputs: Send to one of the services function
Function:
5. **Show the user an a main menu for options for which one they want to go to**
6. **Ask the user which menu they wanna go to**
7. **Check if it's a valid option**
   a. **If yes, head to the system chosen**
   b. **If not, tell the user to pick a valid input and go back to line 5**

Function Turn on/off or stop

Description: Starts and stops the system
Inputs: Start, Stop
Outputs: Starts the system, stops the system
Function:
8. **Ask the user if the user wants to turn on, stop, or off the system**
   a. **If the user wants to start, the control subsystem starts**
   b. **If the user wants to stop, the program terminates and the entire system turns off**
   c. **If the user wants to stop the program, then the system turns off but the program remains and returns to the main menu**

Function Maintenance

Description: Allows user to change temperature range, menu, and start/stop the system
Inputs: PIN, Number for Menu
Outputs: Change in temperature range, Manual control
Function:
9. **Asks the user to enter PIN**
   a. **If PIN is correct then ask user which menu the user wants to go to**
   b. **If PIN is incorrect then give the user another chance (maximum 3 chances)**
      a) **If 3 chances are already used, then lock user out for some seconds**
10. **Show M on the seven seg display to indicate that the user is in maintenance mode and that temperature might change**
11. **Shows the user the current temperature range and fan speed**
12. **Allow user to either:**
    a. **Change current temperature range**
    b. **Set the vent speed to either level 1 or 2**
13. **Save the new settings and send the data to the outputs system**
14. **Ask if user wants to change something else**
    a. **If yes, go back to step 11**
    b. **If no then go back to main menu**

Function Data Observation

Description: Process data in form of graph/show on terminal/seven seg display
Inputs: Data from control subsystem
Outputs: Graph, temperature
Function:

15. Get temperature data of the last 20s from input subsystem
- **a. If there's not enough data yet, make a graph with the maximum number of seconds that have elapsed but inform the user that there's not enough data to generate a full graph**
- **b. If there's enough data, print the temperature data on the X-axis and time on the Y-axis**

16. Ask if user wants to check something else
- **a. If yes, go back to step 15**
- **b. If no then go back to main menu**

Subsystem Three (Inputs)

Function **Converting Raw Input to Temperature Value**

Description: Converts raw thermistor data into cleaned, usable data.
Inputs: raw input from thermistor
Outputs: calculated/calibrated temperature value in deg C
Function:

17. **Receive input from thermistor**
18. **Get a raw converted temperature value by applying the conversion from thermistor reading to deg C**
19. **Filter the raw value to a cleaned version that will be output by this function**

Function **Rate of Temperature Change**

Description: Converts a list of the last two consecutive filtered readings and determines the rate of change of temperature given time.
Inputs: List of filtered temp (2 values, from previous function), poll rate
Outputs: dTdt
Function:

20. **Takes in input of a list of 2 filtered values and the poll rate**
21. **Calculates the difference between the first and second temperature values and divides this figure by the poll rate to determine the rate of temperature change, which is the output of the function**

Subsystem Four (Outputs)

Function External fan status

Description: Decides which - if any - external fan will be triggered and at what vent speed.

Inputs: current temperature, set temperature range, set ventilation speed
Outputs: red LED status, blue LED status
Function:
1. **Check if the current temperature is greater than, less than or within the goal temperature range.**
    a. **If temp is in the goal range**
        a) **Show Temperature is within goal range in the console**
    b. **If the temperature is greater than goal**
        a) **If the set vent speed is 1, turn on 1 blue LED.**
        b) **Otherwise turn on 2 blue LEDs.**
    c. **If the temperature is less than**
        a) **If the set vent speed is 1, turn on 1 red LED**
        b) **Otherwise turn on 2 red LEDs**

Subsystem Five (Failure Alert)

Function check power level

Description: Checks to see if power levels are not too low or too high

Inputs: voltage power
Outputs: voltage
Function:
22. **Check systems power (voltage)**
23. **See if the power (voltage) falls between 2 certain amounts (not too high or too low)**
    a. **If the power (voltage) is too high or too low, send voltage to the alarm**
    b. **If power is within acceptable range, do nothing.**

Function activate alarm sound

Description: Activates alarm sound for when there's a power failure
Inputs: signal from check power level
Outputs: alarm sound
Function:
24. **If signal (voltage) is received, activate alarm**
25. **If not do nothing**