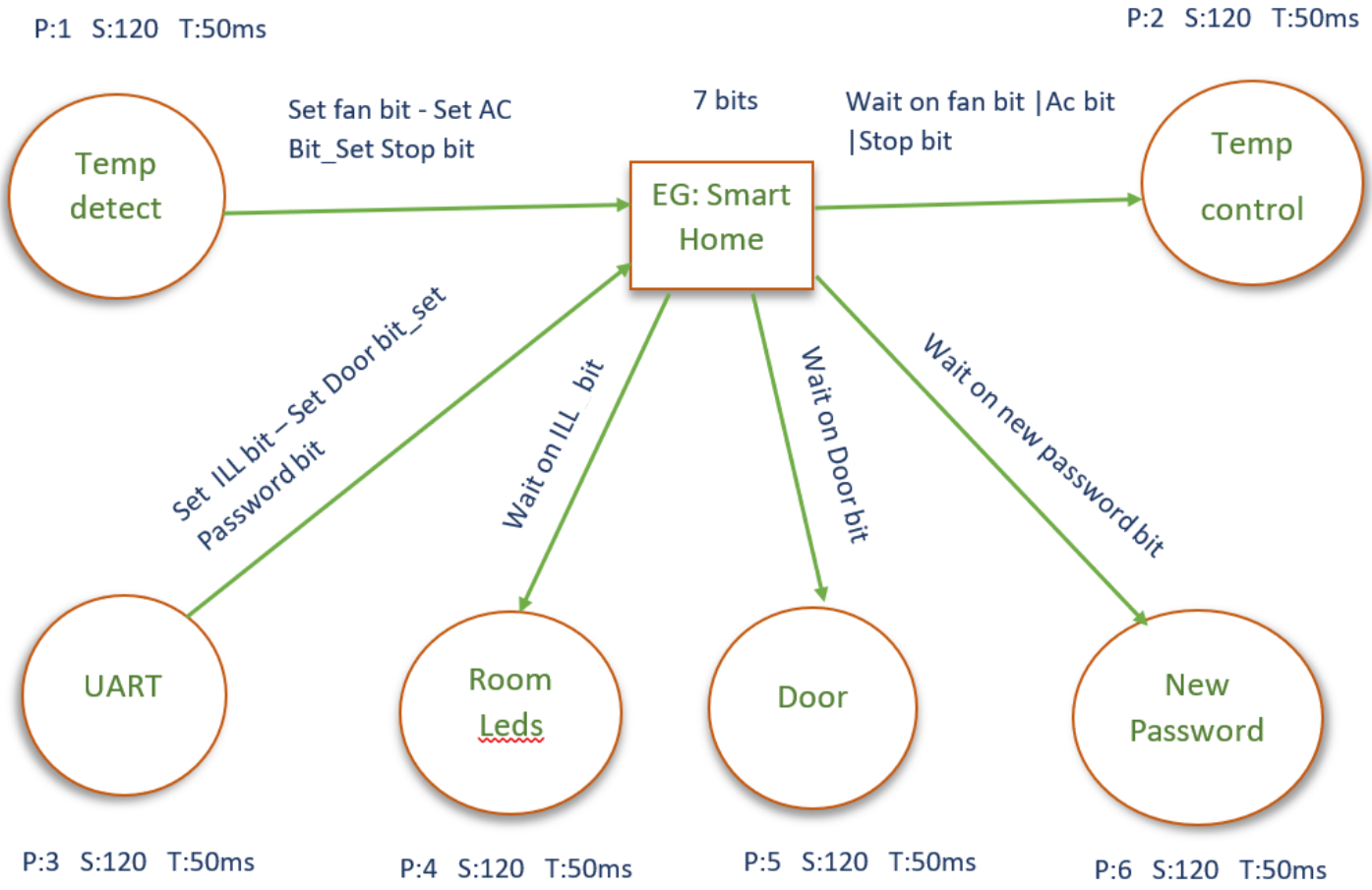
Task design:



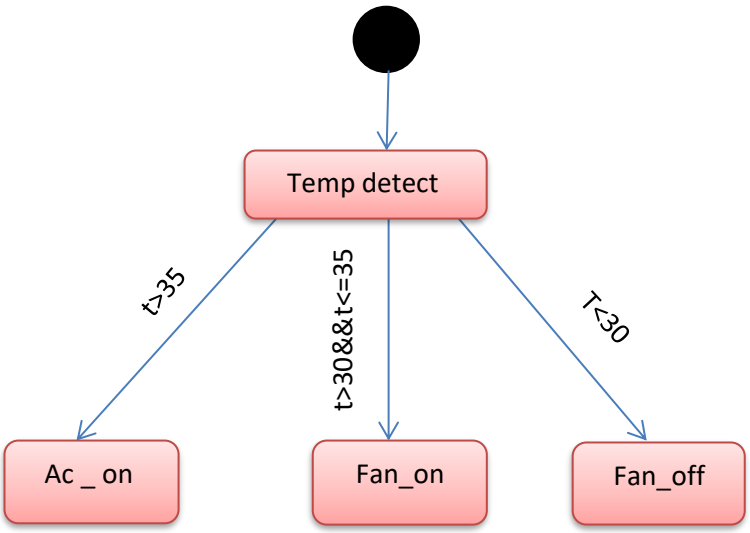
P: Priority.

S: Stack Size.

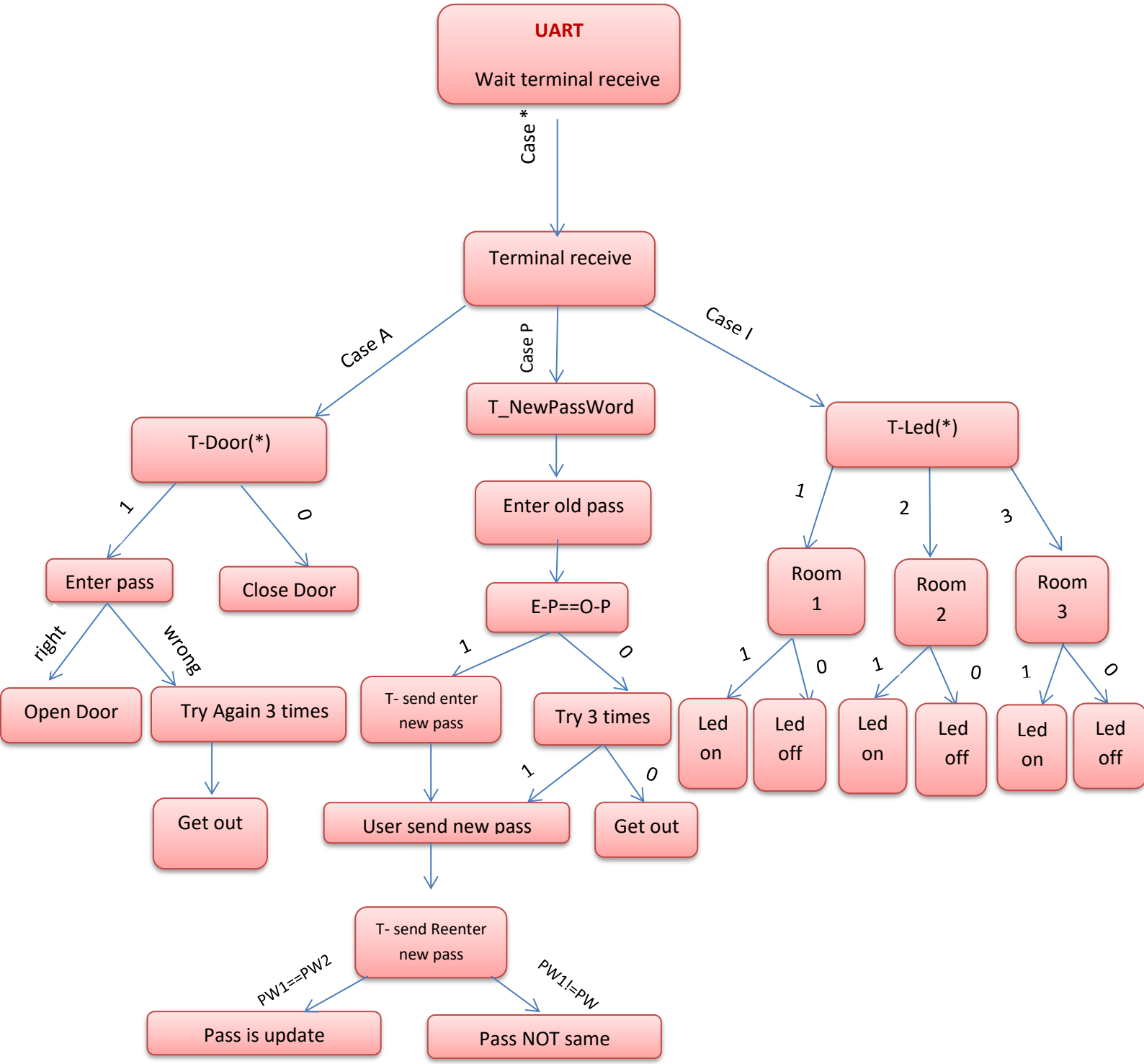
T: Task delay

State machine:

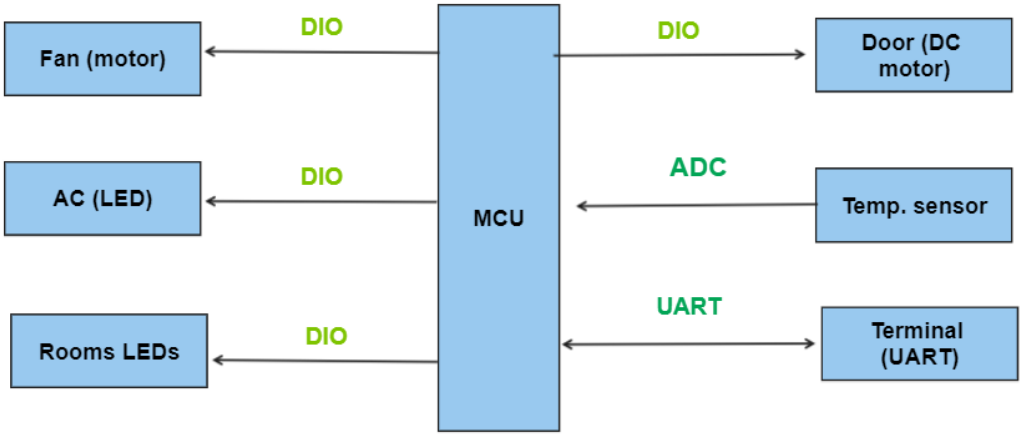
1- Temp Detect & Control:



2- UART, RoomLeds, Door & NewPassword:



Hardware Design:



MCAL:

--> ADC
--> DIO
--> UART

HAL:

--> LEDs
--> Motors
--> LM35

Tasks:

Temp. detect:

- Calculate current Temp.
- Check if (30 <= temp < 35)
  - Set fan_bit, Clear AC_bit, Clear Stop_bit.
- Check if (temp >=35)
  - Set AC_bit, Clear fan_bit, Clear Stop_bit.
- Check if (temp <30)
  - Set Stop_bit , Clear fan_bit.

Temp. Control:

- **Event group wait on fan_bit | AC_bit | Stop_bit**
- **Check if fan_bit is set**
  - **Turn on the fan and turn off AC**
- **Check if AC_bit is set**
  - **Turn on AC LED and turn off the fan.**
- **Check if the Stop_bit is set**
  - **Turn off fan and AC**

UART:

- **Check the receive from terminal**
- **if user sent *.**
  - **switch on the terminal receive:**
    - **Case I :**
      - **Set ILL_bit.**
    - **Case A:**
      - **Set Door_bit.**
    - **Case P:**
      - **Set Pass_bit.**

Rooms LEDs:

- **Wait on ILL_bit:**
- **Check the receive from terminal**
- **if user sent *.**
- **switch on the terminal receive:**
  - **Case 1 :**
  - **if user sent *:**
    - **switch on the terminal receive:**
      - **Case 1:**
        - **LED1 ON.**
      - **Case 0:**
        - **LED1 OFF.**
  - **Case 2:**
    - **if user sent *.**
    - **switch on the terminal receive:**
      - **Case 1:**
        - **LED2 ON.**
      - **Case 0:**
        - **LED2 OFF.**
  - **Case 3:**
    - **if user sent *.**
    - **switch on the terminal receive:**
      - **Case 1:**
        - **LED3 ON.**
      - **Case 0:**
        - **LED3 OFF.**

Door:

- **Wait on Door_bit:**
- **Check the recieve from terminal**
- **if user sent *.**
  - ➢ **switch on the terminal recieve:**
    - ▪ **Case 1:**
      - • **ask user to enter password**
        - ○ **if password is right**
          - ✓ **Motor Clockwise.**
        - ○ **if password is wrong:**
          - ✓ **user has 3 tries to enter it.**
        - ○ **if user didn't enter password within 5 sec**
          - ✓ **Send "Timeout" on UART.**
    - ▪ **Case 0:**
      - • **Motor Anticlockwise.**

NewPassword:

- **Wait on PassWord_bit**
- **ask user to enter password**
- **if password is right**
  - ➢ **ask user to enter new password.**
  - ➢ **ask user to enter new password again.**
    - ▪ **If user entered new password right.**
      - • **Update the password to new password.**
    - ▪ **If user entered new password wrong.**
      - • **Reenter new password.**
        - ○ **If right**
          - ✓ **update the password**
        - ○ **If wrong**
          - ✓ **get out of the task**
- **if password is wrong:**
  - ➢ **user has 3 tries to enter it.**