Electrical Electronics Engineering

Microprocessor Systems

Experiment: 4

Group: 21

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TASKS

- 2 LEDs and 1 adjustable resistor (potentiometer) will be used.

- Potentiometer will be connected to an analog input.

- Read values (from potentiometer) will be fed through serial output.

- Take care of data representation.

- Led1 will turn on when read voltage values are less than 1.6 volts

- Led2 will turn on when read voltage values are more than 1.6 volts

- This procedure goes indefinitely.

SOLUTION

```cpp
#include "mbed.h"  // Include the "mbed.h" library

AnalogIn potentiometer(ARDUINO_UNO_A0);  // Create an AnalogIn object for the potentiometer
DigitalOut led1(ARDUINO_UNO_D5);  // Create a DigitalOut object for LED1
DigitalOut led2(ARDUINO_UNO_D6);  // Create a DigitalOut object for LED2

int main() {
    while (1) {  // Start an infinite loop
        float voltage = potentiometer.read() * 3.3;  // Read the potentiometer value and convert it to voltage

        // Print the voltage value to serial output

        if (voltage < 1.6) {  // If the voltage is less than 1.6V
            led1 = 1;  // Turn on LED1
            led2 = 0;  // Turn off LED2
        } else {  // If the voltage is greater than or equal to 1.6V
            led1 = 0;  // Turn off LED1
            led2 = 1;  // Turn on LED2
        }

        HAL_Delay(500);  // Add a delay for a short duration before reading again (adjustable as needed)
    }
}
```

This code serves the purpose of controlling two LEDs based on the voltage value read from a potentiometer. Here's an explanation of what the code does and how it operates:

At the beginning of the code, the "mbed.h" library is included, and an AnalogIn object named "potentiometer" and two DigitalOut objects named "led1" and "led2" are created. The potentiometer is connected to pin A0, and led1 and led2 are connected to pins D5 and D6, respectively.

Inside the main function, an infinite loop is started. In each iteration of the loop, the following actions are performed:

1. The voltage value is read from the potentiometer and converted to a value between 0 and 3.3, which is stored in the "voltage" variable.

2. The voltage value can be printed to a serial output. These parts should be commented in the code.

3. If the "voltage" variable is less than 1.6V, led1 is turned on and led2 is turned off. If the voltage value is greater than or equal to 1.6V, led1 is turned off and led2 is turned on. Thus, the two LEDs are controlled based on the threshold set by the potentiometer.

4. Afterwards, a delay of 500 ms is introduced using the "HAL_Delay(500)" function before the next reading. This provides a short wait period before the potentiometer value is read again.

This code allows the control of two LEDs based on the voltage value obtained from a potentiometer. As the potentiometer value changes, the LEDs will turn on, turn off, or change their states accordingly. It serves as a simple example of using analog input and digital output on a microcontroller platform.