Digital Temperature Sensor & PIC

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Overview

The task is about interfacing a Digital Temperature Sensor(LM35) with a PIC (PIC16F877) microcontroller. These types of temperature sensors can be used for various purposes like measuring temperature in boilers, measuring and maintaining ambient room temperature etc. In this task we will learn more about the I/O ports, registers, timers, ADC available within PIC.

Task 1.1 - Introduction

Installation & introduction

On day 1 the team members are supposed to install the necessary software and libraries required for completing the tasks.

1. Proteus Professional
2. MP-Lab X-IDE

Also the team members are advised to stage up their GitHub account before the commencement of the task .

LED blinking in Proteus

Team Members should refer to the datasheet of the PIC16F877 for implementing a simple sequential display of 3 leds.

The pattern is as follows:
1,2,3
3,2,1
1,2,3
3,2,1

Interfacing seven segment display

In this section you will be interfacing Seven Segment LED with PIC. After successfully interfacing the Seven Segment LED your task will be to display any number on the display (without using encoder and inbuilt library).

Task 1.2 - Interrupts

Increment display number using timer interrupt

In this task you will be using timer based interrupts for incrementing the digits on the Seven Segment Display with a time delay of 1 sec.

Add same LED pattern in polling mode

Extend its functionality by adding a blinking led pattern same as before in the polling mode (display will be incrementing in timer interrupt mode).

Task 1.3 - Temperature sensor

Interfacing LM35

The team will have to learn and interface the LM35 temperature sensor. For observing the correct output,

Output	**Condition**
LED 1 (Blinking)	35°C < Temperature > 45°C
LED 2 (Blinking)	Temperature < 20°C
All the LEDs should be ON	If the temperature reaches either of the extremes *(***hint** refer the datasheet)*

Display Temperature on 2 digit display

In this subtask, You will have to display the Temperature (0-99) using two Seven Segment Display connected with MCU with only 9 digital I/O pins. If the value of the temperature does not fall in this range, allocate a specific led which will turn on.