Thermometer with PIC16F688 and LM35

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Introduction:

In this project ADC module of PIC16F688 is used to convert voltage output of temperature sensor LM35.The converted data into digital is then manipulated and used to print the measured temperature with LM35 to two 7-segment displays.Only one ADC channel of the PIC is used.The coding has been done on MikroC Pro for PIC and the compiler's functions for ADC setup and data reading have been used.74LS48 BCD to 7-segment decoder has been used to minimize pin use of the PIC.Two BC237 NPN transistors supply the current necessary for the 7-segment displays.
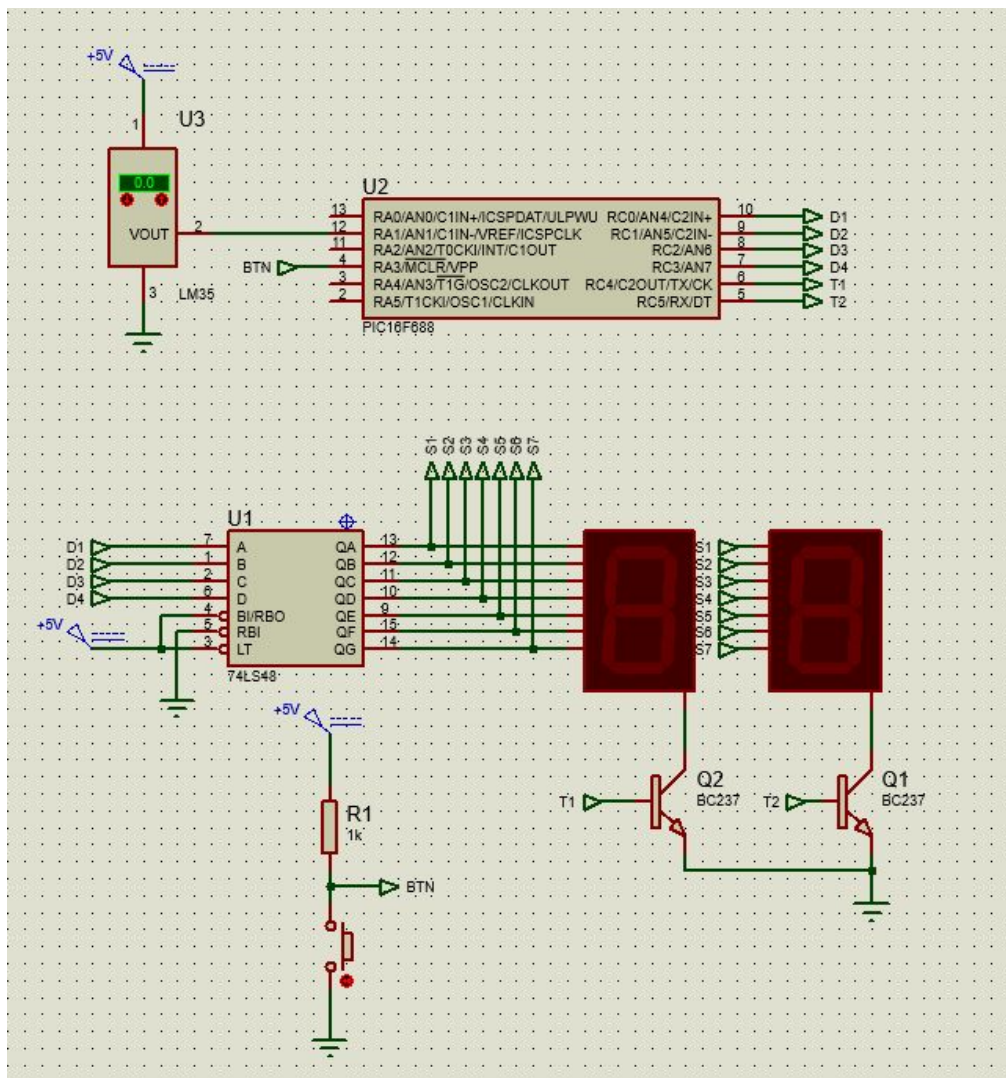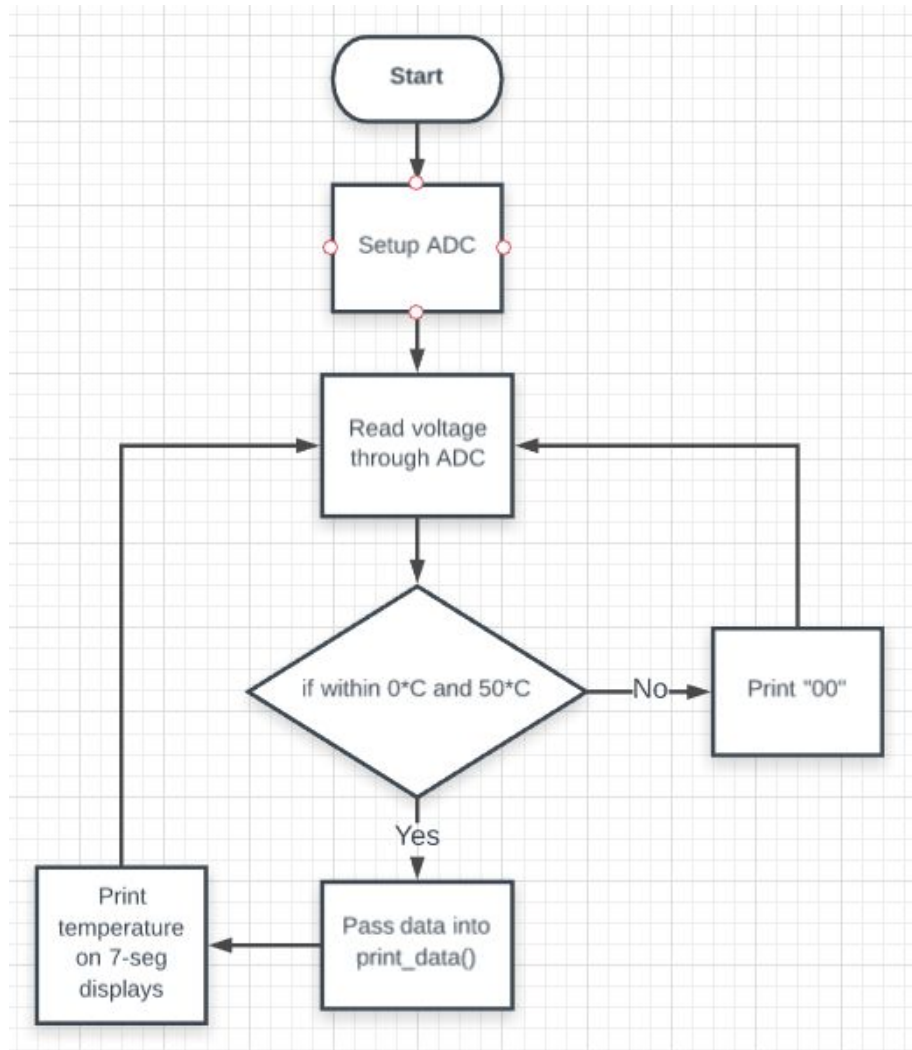
Schematic:

Figure 1 : Project schematic

Pseudocode Algorithm:

Figure 2 : Code algorithm

Note : C code of the project can be found in the same repository as this PDF file.

Results:

      Thermometer project with LM35 and PIC16F688 has been successfully completed.From this project the following lessons have been learned.First of all,connecting the 7-segment displays to turn on and off directly using two pins of the PIC may be dangerous because drawing too much current,beyond 0.1A from PIC's pins may burn the associated mosfet to the pin.So two appropriate NPN transistors,BC237 was chosen in this case,should be used.Also there should be enough delay to turn on/off both 7-segment displays appropriately to display manipulated data.This delay,of course,in real-time can be different and should be adjusted.If the temperature is below 0 degrees celsius or 50 degrees celsius,the system can be optimized to display temperatures but for the ease of this project,only temperature between 0 to 50 were displayed.