CPE301 – SPRING 2020

Midterm 1

Write, simulate and demonstrate using Atmel Studio 7 a C code for the AVR ATmega328p/pb microcontroller that performs the following functions:

1. Program the UART Module to interact with the ATmega328p/pb:
2. On transmitting the following keys from the host terminal, the following actions will be performed:
   1. On-reboot or ‘h’ key – help screen (list all keys and functionalities)
   2. ‘t’ display temperature in C of LM34/35 on terminal, ‘T’ – display temperature in F of LM34/35 on terminal.
   3. ‘o’ turns ON LED at PB5, ‘O’ turns OFF the LED at PB5.
   4. ‘s’ sends a string to the terminal
   5. ‘i’ sends an integer to the terminal. Use the integer as a delay in seconds to blink the LED PB2.

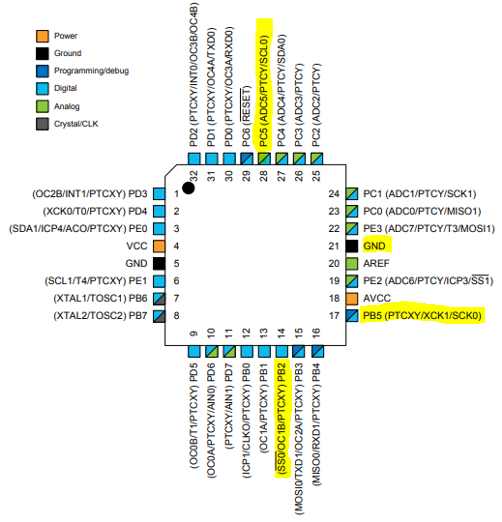
On the side note, me and the professor seems to keep having misunderstanding in regards to ‘s’ and ‘I’. In the end, I made both have the need to receive an input from a user. I tried emailing, but it just led to more confusion. If I only needed to display a string, then that’s easily done, but I put in extra work of having the need to have user input a string on terminal instead because instructions were unclear.

1. **COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS**

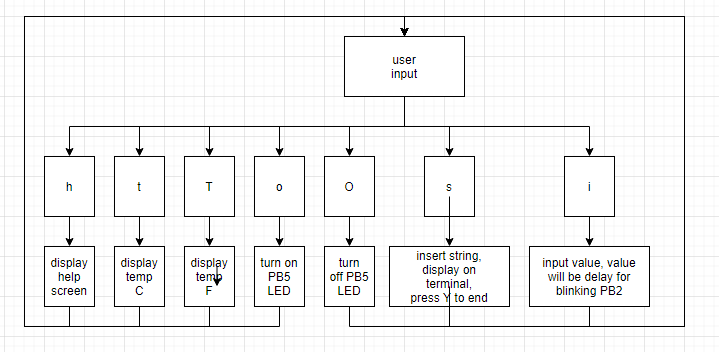
ATmega328PB Xplained mini USB cable Atmel Studio 7

Data Visualizer LM35 sensor Breadboard

Multifunction shield



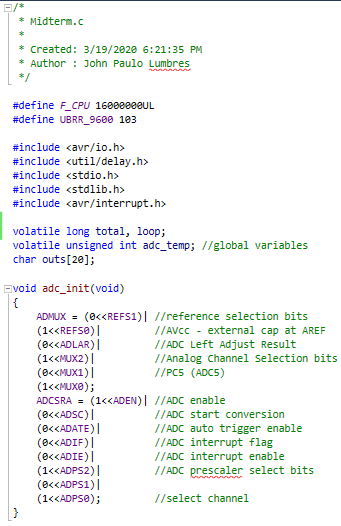
Wires connected to:  
PC5, GND, 5V

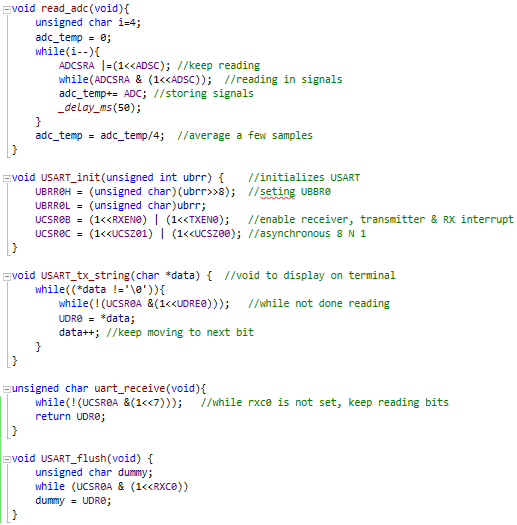


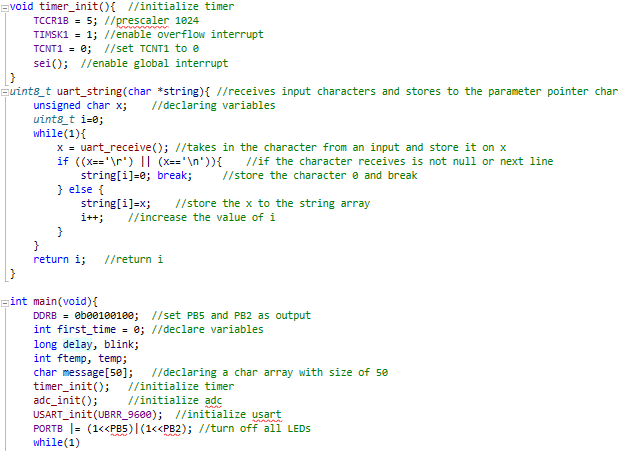
Did this because apparently we are supposed to do a flowchart.

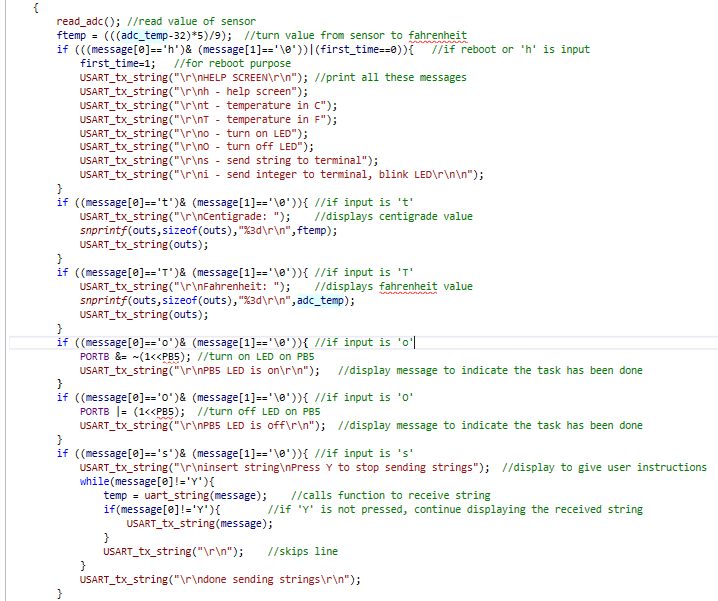
1. **INITIAL/MODIFIED/DEVELOPED CODE OF TASK 1/A**

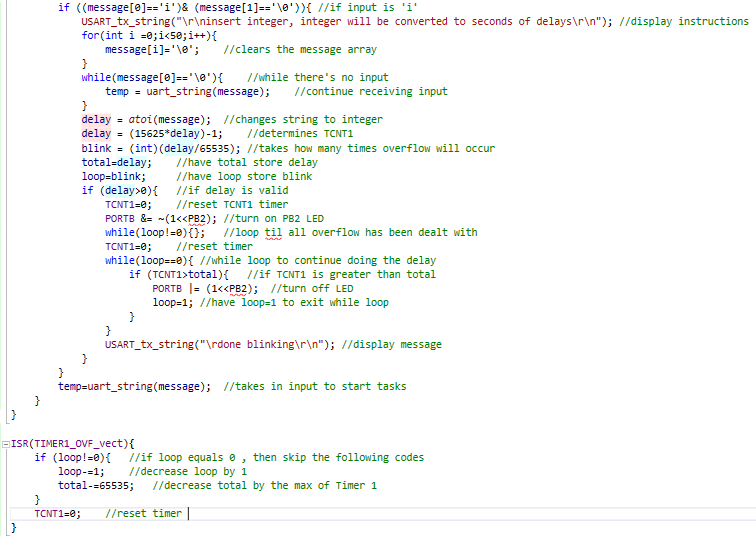
There’s only 1 task, but there’s multiple requirements for that.



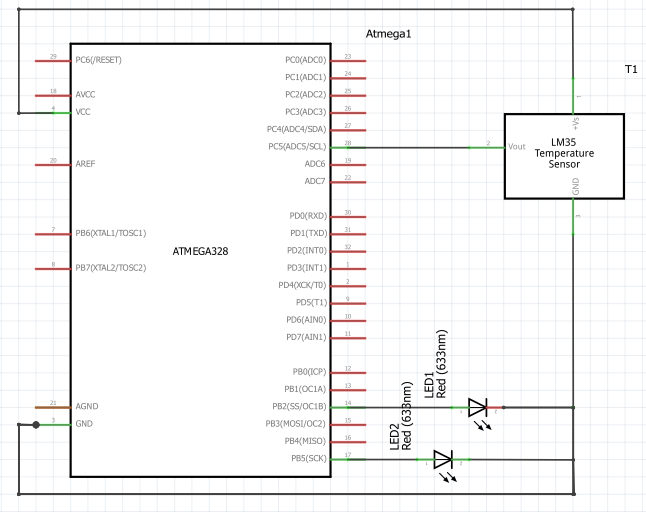




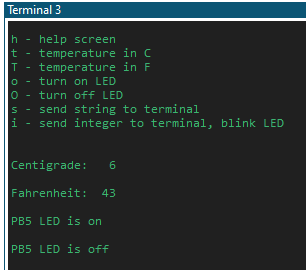




1. **SCHEMATICS**



1. **SCREENSHOTS OF EACH TASK OUTPUT (ATMEL STUDIO OUTPUT)**



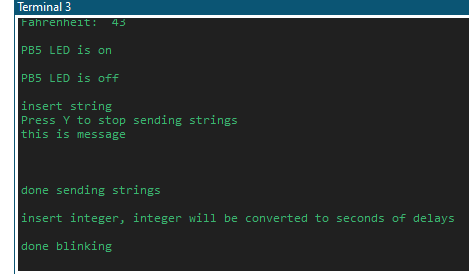
When ‘O’ is pressed

When ‘o’ is pressed

When ‘T’ is pressed

When ‘t’ is pressed

When ‘h’ is pressed or on reboot

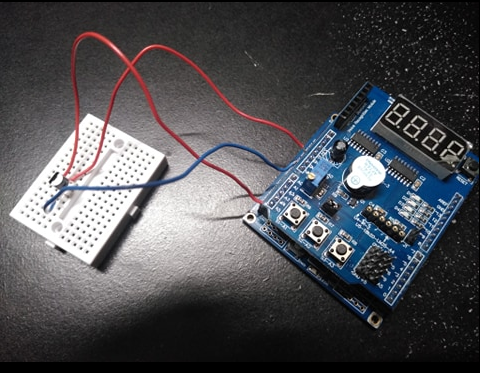


When ‘i’ is pressed

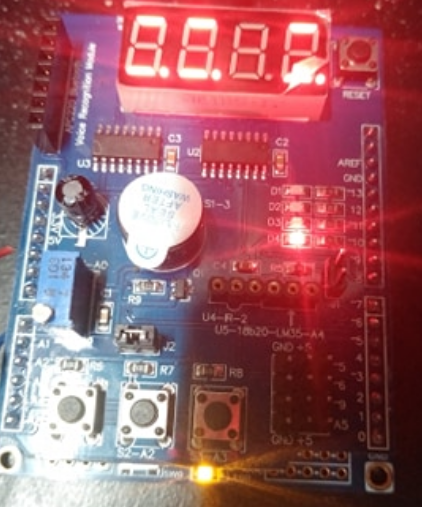
When ‘s’ is pressed

1. **SCREENSHOT OF EACH DEMO (BOARD SETUP)**

The sensor starts heating up fast when I tried plugging it in the multi-function shield, so in order to prevent issues from happening, I used a breadboard to connect the sensor instead.



For turning on PB5 LED For blinking PB2

1. **VIDEO LINKS OF EACH DEMO**

<https://youtu.be/ZPpPr1tTiAc>

1. **GITHUB LINK OF THIS DA**

<https://github.com/lumbrj1/submission/tree/master/Midterms>

**Student Academic Misconduct Policy**

<http://studentconduct.unlv.edu/misconduct/policy.html>

“This assignment submission is my own, original work”.

John Paulo Lumbres