Project 2
By: Santiago Palomares and Ben Boben

In our project we developed a digital clock using the ATmega32 microcontroller. The clock features a keypad for input and a 16 by 2 LCD for displaying the time and date. The biggest objective was to create a functional digital clock that displayed the date in MM/DD/YYYY on the top row and the time HH:MM:SS on the bottom row of the LCD. Additionally the clock includes a user interface with the keypad that allows users to set the date and time manually.

The circuit is built around the ATmega32 microcontroller, which is connected to the LCD and the keypad. The LCD is used to display time and date, while the keypad is the user interface that allows the user to input set time and date. In our program we have multiple files in which avr.h contains the microcontroller methods. Then lcd.h contains the lcd display control methods. Finally we have main.c which contains the majority of the code. Here we wrote code that would allow the microcontroller to be able to translate the inputs from the keypad and then output it on the display. In there we also programmed what each button should and how and when the values should be incremented and updated.

We handle invalid date and time, making sure that the user would not be able to enter more days, months, hours, seconds, or minutes there are in a month or day of the year. This clock that we implemented is able to even minimize the number of days in the month of February to 29, if it's on a leap year. The user is able to start and stop the clock by pressing A. The user is also able to adjust whether the interface is shown to them on military time or not. To increment the date, the user can increment the month up with 1, the day with 2, and the year with 3 on the keypad. Finally the user can increment the hour with 4, minutes with 5, and seconds with 6. This allows the user the full flexibility to change all dates and times to their own personal preference.