This past week was productive in many areas and frustrating in others. The microcontroller we had purchased did not work with the compiler available to us. This was a problem since we had the code written but no way to apply it. Luckily we were able to borrow a microcontroller from another group until our microcontrollers arrived. This allowed us to proceed with the project and not lose precious time.

The only problem with the microcontroller that we were given is that the group that gave us the microcontroller was unsure if there was a glitch in the microcontroller or if it was damaged when programming was tried earlier. We decided that we would find out for ourselves whether the microcontroller was usable.

We had written code earlier in the week and were eager to test it out. When we initially programmed the microcontroller we observed movement in the motors. We saw this as a good sign meaning that the motor was responding to the microcontroller. One problem with the motion of the motor was that the motor did not respond correctly to the code. We wrote a program to move the motors from 0 degrees, to 45 degrees and finally 90 degrees. This was done using a delay function within the microcontroller code. By changing the up-time and down-time while keeping the same period we should be able to control the motors. Figure 1.1 shows the wave that we hoped to create with our code.

Figure 1.1- Wave created by code
We had many trials of programming with no success. We decided there was no way to initialize the motor control and that was the reason we did not observe the correct motion. I decided to put a switch function in the code while Chris set up the switch hardware. I wrote a program to only allow motor movement when the input to PORTB is high. When the switch is on a signal is sent to PORTB to turn it high. Once this is high, the motors should have begun to move. Still there was no movement by the motors. We then began to check the hardware connections. Figure 1.2 shows how the motors were connected to the PIC16F877. After careful review we determined that there were no problems with the connections.

![Motor Connections](image)

**Figure 1.2- Motor Connections**

We used a scope to check the signal coming out of the output port. This would allow us to check to see if the code was written correctly and accomplished the tasks it was supposed to. The signal seen on the scope was the signal we hoped to produce which means the code was correct. Our next goal is to troubleshoot why the motors were not running correctly. We think it may be a problem with the microcontroller because it is difficult to program at times and the debugger does not work. This leads us to believe that there is a glitch in the microcontroller. We will explore all other possibilities but this is most likely the problem. We do not anticipate many problems once we receive our microcontrollers.

I also have learned a great deal about UART programming. This will be helpful in programming the Bluetooth device. I have heard from people who have established
interaction between a microcontroller and the Bluetooth module. This will be my next major undertaking once motor control is optimized.

**Future Work**

I do not plan on taking the next week off in the project. We have made a great deal of progress and I do not want our momentum to be slowed. From past experience I have learned that time seems to pass quickly after spring break. Stopping work for a week would prove detrimental to the success of our project. I have worked extensively with Chris as of late. We have established tasks that each of us must accomplished. I will be working on a push button control of the motors as well as interaction with the Bluetooth module. Chris will be working on I2C programming. I truly believe that we will have most of the programming done by the end of the week following spring break. Following the programming through the PIC will come the creation of the Pharmacist Interface. Through LabVIEW we will create a way for someone to program the times and e-mail addresses. Finally we will program a way for the device to send information to a computer and then to another computer or phone through e-mail.

**Project Overview**

I believe we have made a great amount of progress this week. We are very close to finishing work with the motors and can turn our attention to other matters. In trying to control the motors we have learned a lot about programming microcontrollers which will help us in working with the other devices. I hope the group can get a lot accomplished over spring break and keep the momentum we established this week.

**Hours Worked**

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