Analysis and Results

Analysis

For prototype 2, our group focused on the circuitry subsystem and getting it to work. For the circuitry subsystem, our idea was to hook up an LCD screen and a heartrate sensor to an Arduino, and use the heartrate sensor to determine the user's heartrate. From there, the LCD screen would light up with a picture of a gear on every heartbeat. The LCD screen would sit in the middle of the chest piece, and the flashing gear would symbolize the user's beating heart.

Test 1: LCD screen flashing gear

For this test, the group focused on getting a picture of a gear to flash on and off on the LCD screen. We did this in order to determine if it was feasible to have the LCD screen flash a picture with every heartbeat.

Once the code was finished and the screen was set up, we began implementing this function and seeing how fast we could get the gear to flash on the screen. This was done to determine how many BPM the LCD screen could handle.

When timing the loading of the screen, it was determined that the delay between the picture of the gear flashing on and off is about 1.5 seconds. Therefore, at an average heartrate of 80 beats per minute, it would not be feasible for the LCD screen to flash a picture at this pace.

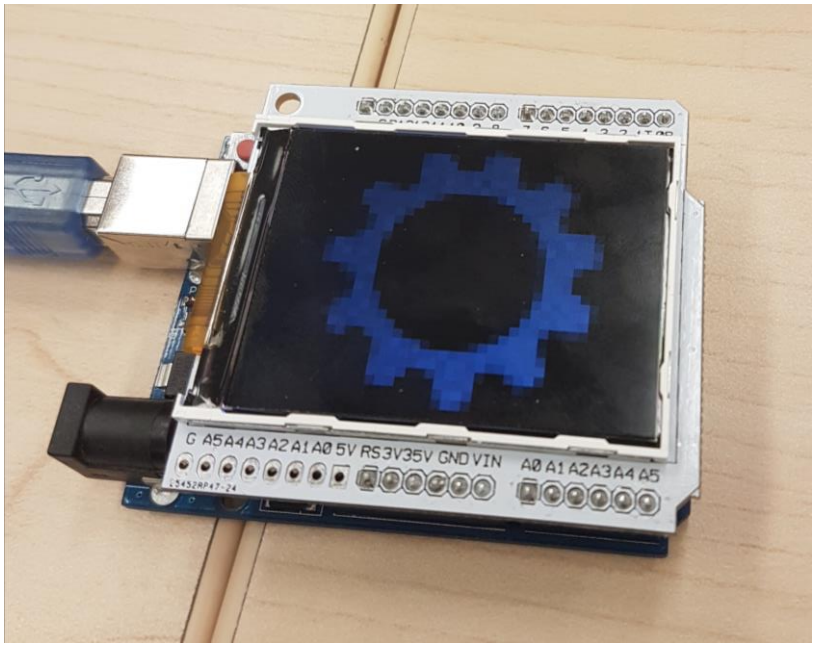

Figure 1: LCD screen displaying the gear picture.

Figure 2: LCD screen displaying a black screen between the gear picture flashing.

Test 2: Heartrate data collection and use through heartrate sensor

For this test, the group set out to determine how to connect the heartrate sensor to the Arduino and implement code that will make the heartrate sensor work.

We designed a code that would light up an LED pin with every heartbeat to see how the heartrate sensor works. The code was fairly accurate, and the LED lit up at a good rhythmic pace. The best spot for placing the heartrate sensor was determined to be either the user's finger, or the user's earlobe.

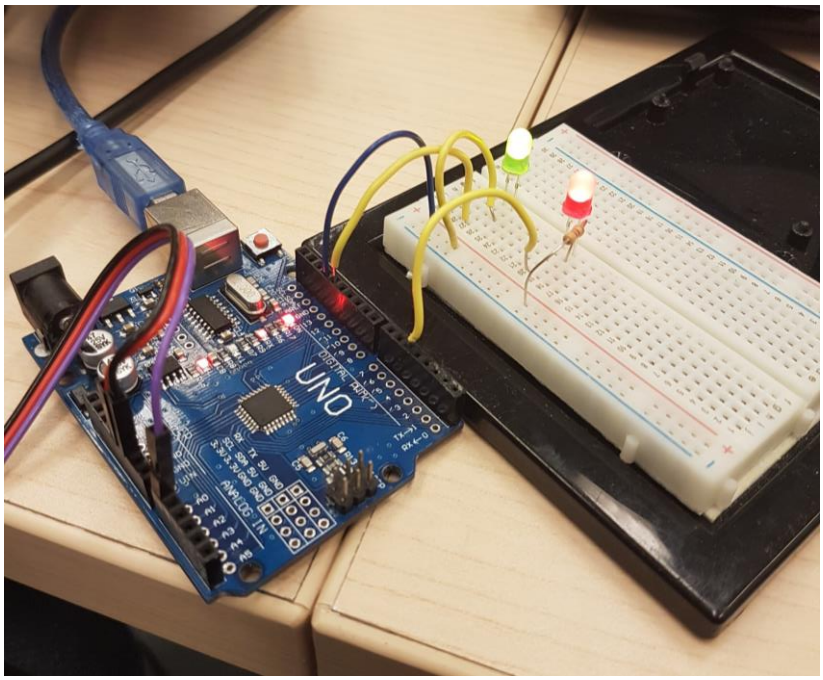

Figure 3: Setup of the LED pins being lit up from the user's pulse.

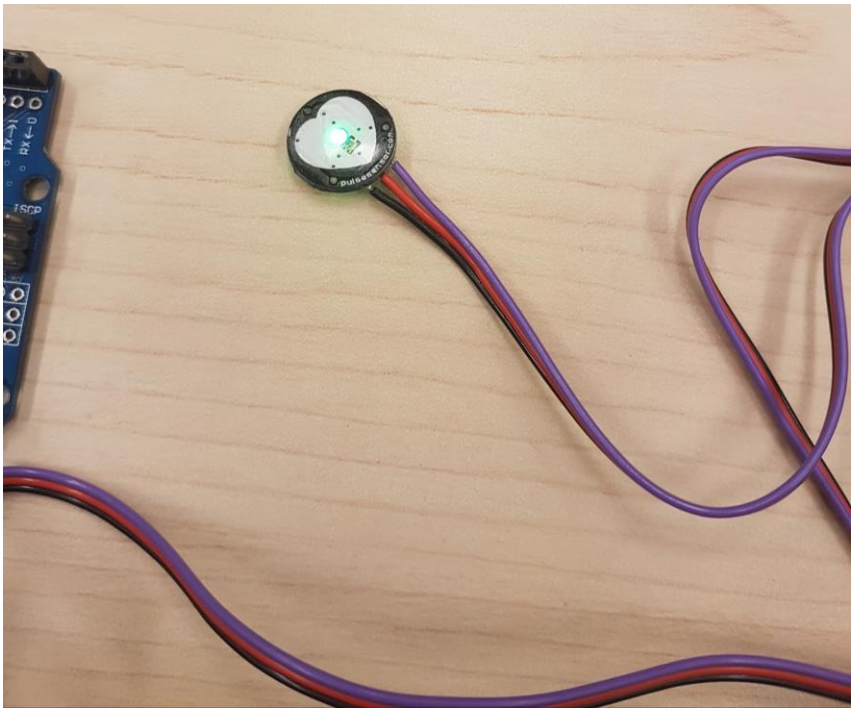

Figure 4: Heartrate sensor connected to the Arduino and turned on.

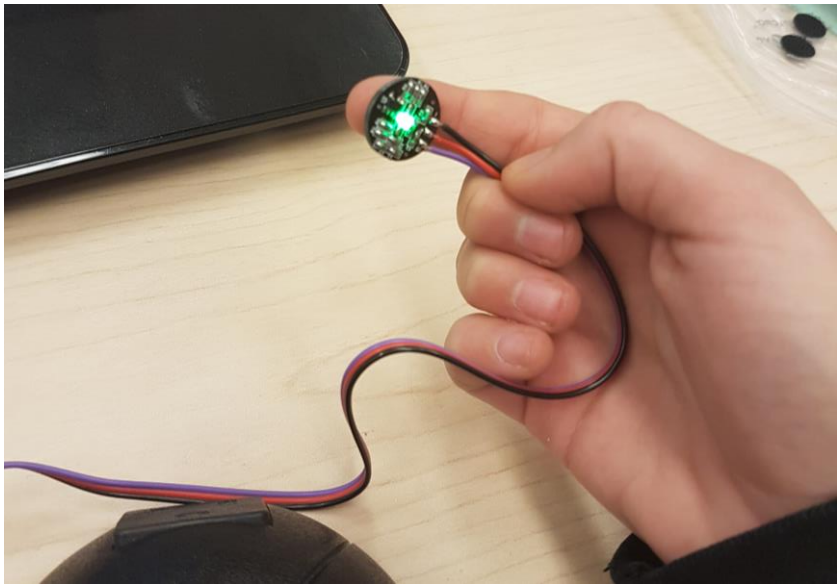

Figure 5: Heartrate sensor picking up the pulse of the user from the user's index finger.

Results

From the two tests run on the circuitry, it was determined that the original idea to have the LCD screen flash a gear with every heartbeat will not work. Therefore, we have modified our original design to accommodate this issue. Now, the heartrate sensor will be connected to a series of LED's, which will flash with every heartbeat. These LED's will be put on the centre of the chest piece surrounding the LCD screen, which will still sit in the middle of the chest piece. The LCD screen will display the gear continuously, and we will try to make the gear rotate on the screen.