#### Dev Shah

#### WEEK 13:

**Date:**4/8/22  
**Total hours:** 9  
**Description of design efforts:**  
My work this week mostly consisted of completing the Ethical and Environmental Analysis (A11). This assignment required me to research how each component that is being used in our project can affect the environment. I found that most components we are using have little affect while a few hurt the environment. In my research, I discovered that hard hats are made using high-density polyethylene, a type of plastic that is highly recyclable. After they get damaged or have been used for 5 years and should be replaced, they can simply be melted down and molded into new ones. One component I found that can really hurt the environment is LCD. LCDs use toxic materials and emit a large amount of greenhouse gasses into the atmosphere. They are also accompanied by backlights, most of which have mercury in them. Damaged backlights can release mercury vapor and dust and LCDs have been found to leak chemicals into the environment. I also discovered that the process of manufacturing PCBs uses a lot of water and the wastewater that is generated is contaminated with metals.  
  
Another part of A11 was explaining the ethical challenges we would have in bringing Noggin to market. Most of the challenges we have revolve around not using the product properly and the warning labels/instructions that would need to be present. There are a few loose objects, like the pulse sensor and the batteries, that would be choking hazards, but if this product were used in a construction zone as intended, there would not be any children near it.  
  
The last task I did this week was starting to calculate a beats per minute value from the pulse sensor data. The program still needs work to be able to accurately calculate this value, however. Currently, it reads the wearer’s pulse almost every second and displays the BPM after 10 seconds, like in Image 13.1 below. It gets this BPM by counting how often the pulse gets above an arbitrary value and then multiplies it by 6 after the 10 seconds have finished. In the future, we want to implement a sliding window to replace the arbitrary value. This will allow us to get better BPM readings.

A picture containing text, scoreboard

Description automatically generated

Image 13.1