Appendix

Design Brief Template Sample: Part 1

(NOTE: Completion is required via template, this is for reference)

School: John F. Kennedy High School

State: California
Division: Middle School High School

Team Members: Shanmukh Gakkani, Nathan Jay, Kavish Kartha, Dylan Lin

Problem Statement: Briefly describe the people who will benefit from the project and the challenges they face. Include any inequity that the project hopes to address. *(100 Words Maximum)*
Our heart rate monitor is beneficial for anybody, however our device is mainly aimed towards helping students in our school district who face stress and anxiety problems. These types of people have poor mental health, poor sleep habits, and decreased social and academic skills. In today's day-and-age, mental health problems are becoming more prevalent. Our project hopes to address the social inequity that anxiety-ridden and stressed people face.
User Research: Discuss key information about the users gathered through your research, interviews, and ongoing discussion with the users throughout the project. *(200 Words Maximum)*
From our research, we found that many students around the word face stress and anxiety, and struggle to deal with it. These problems can be a result of assignments from school, or problems at home. In our own school district, there have been incidents of students committing suicide and other self-harmful acts as a result of a rigorous workload. Ultimately, stress and anxiety can have a large toll on the mental health of many students, hence it is important to address these problems right away. The first step to solving a problem is to be aware of it. While conducting our research, we discovered that one of the most common symptoms of stress and anxiety are an increase in heart rate.
User Insight: Discuss your team's understanding of the experiences, emotions, and motivations of

the users. ***(200 Words Maximum)***

Our team completely understands the mental health toll that many students face from difficult classes at school. We understand that many students feel like giving up once their mental health gets affected by school. After observing countless friends and students in our school district suffering from stress and anxiety at school, we decided to help them by building a heart rate monitor that could help them monitor their heart rate. We hope that our device can help students handle their stress and anxiety and realize the importance of their mental health.

User Needs: Provide a list of specific user needs produced from the user insight. ***(100 Words Maximum)***

We have found that our users need to monitor their mental health. This should be done easily and quickly, as students who face stress and anxiety problems need quick feedback. In addition, we would need a method that produces quantitative data to let the user monitor their health.

Project Goals: List project goals and shows how they are linked to and will adequately meet the user's needs. ***(100 Words Maximum)***

Our project will monitor the heart rate of the user. Heart rate is quantitative data that can be used to gauge the mental health of the user. It is conventionally measured in beats per minute. In addition, heart rate can be easily measured, by touching certain parts of the body. By monitoring this, we successfully meet the user's needs.

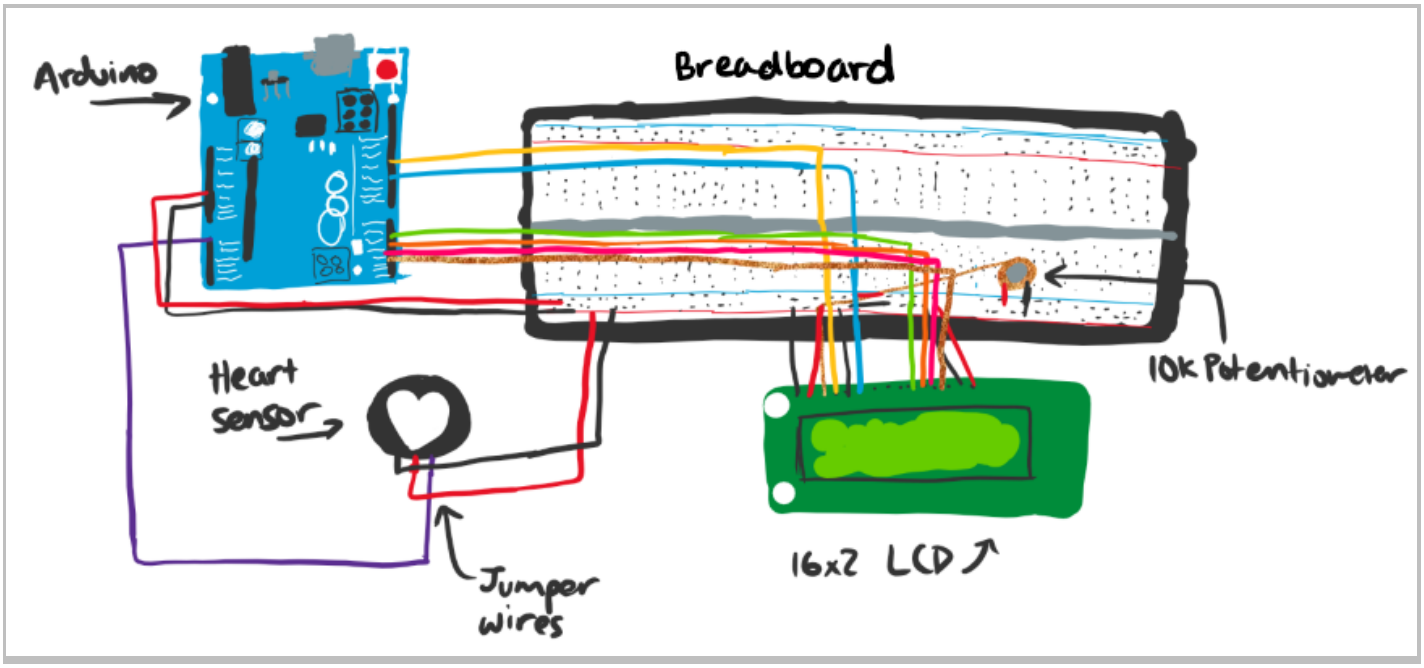
Design Brief Template Sample: Part 2 (NOTE: Completion is required via template, this is for

reference)

Key Features of Design: List key features of the design and show how they adequately meet project goals. ***(200 Words Maximum)***

We have a pulse sensor that reads blood flow in capillary tissue and sends the information back to the Arduino. We chose to use Arduino because it is relatively inexpensive, and many of us already had some experience with its use. The source code that is uploaded on the Arduino receives raw data from the Arduino pulse monitor, and performs mathematical operations on this data, to provide the user with an accurate reading of their heart rate. Then, the LCD displays the heart rate in beats per minute. This adequately meets the first project goal of accessibility as the pulse sensor can be used by anyone on any part of their body, as long as there is capillary tissue, so that the pulse sensor will record data. Some of these places include fingertip, side of the nose, lower lip. In addition, it solves the second project goal because source code and LCD displays beats per minute, a quantitative type of data that can be easily used to gauge stress levels.

Prototype Graphic: Include a graphic is easy to understand. All key parts of prototype should be labeled.



Status of Project: Describe the current status of the project and discuss potential next steps. ***(200 Words Maximum)***

At the moment, our project is almost finished. Our project displays the beats per minute in short bursts. It is highly dependent on the location the pulse sensor is placed on. However, we would need to modify the pulse sensor itself to fix this. In addition, we would like the LCD to display a waveform function to visually accompany the data. In terms of presentation, we want to place our prototype in a modified cardboard box from which the Arduino pulse monitor and LCD are easily accessible. By doing this, our prototype's jumper wires will be hidden, and the overall product will be much more aesthetically appealing. A possible upgrade would be a 3D printed case, making it much more accessible and compact. A portable power source would also be ideal to solve user needs, as they can use it anywhere.

Impact: Discuss how design may improve inequity and/or remove barriers for the user. ***(200 Words Maximum)***

Our design improves inequity by making the user aware of a possible high stress level. Being aware of any problem is the first step in solving a problem. Our prototype acknowledges this problem by clearly displaying the user's heart rate on a 16 x 2 LCD monitor. By being able to monitor their heart rate, students are able to estimate their stress/anxiety level. From there, they can take steps to actively lower their heart rate, such as engaging themselves in deep breathing exercises, or meditation. Our prototype destroys the major barrier of money for many students. This is because many accurate heart rate monitors on the market are incredibly expensive for students to afford, however our prototype is much cheaper to build and provides accurate readings.

Reflection: Discusses personal growth and insights about designing for others and helping them overcome challenges. Also, include discussion of any increased understanding of Human Centered Design. ***(200 Words Maximum)***

Through the process of designing and building the heart rate monitor, we have learned the true extent of how many students, primarily from high school, suffer from stress and anxiety related problems. Many of them don't know how to manage their anxiety and stress, which makes it easy for them to become overwhelmed by the challenges they face. We also discovered that it is important to be aware of such problems and address them immediately. While working on this project, we realized how stressed we have become, ourselves, and how important it is to possess efficient time management skills. We learned that balancing distance learning, and school clubs consume a significant amount of time in our schedules, which results in a direct path towards stress and anxiety from deadlines that are approaching us rapidly.