# Day 1 Project Definition and Customer Needs

Sunday, July 9, 2023 6:31 PM

**Goals**
By the end of this lab, you should have accomplished or have a plan to accomplish the following:

- Define a problem, your customers, and your device. There are two assignments (due at the beginning of lab week 3) for your group to help guide this process.
  - Market Research
  - Customer Needs
- Project plan – your project plan is due at the beginning of your lab week 4. Get started now because there will be a bit of a learning curve for Microsoft Project.
- Team roles / responsibilities
- Action items for the next couple of week

Action Items:
- Figure out Project
- TinkerCAD some ideas
- Go research arduino

**Constraints**
While working on your project this semester, you will have to operate within the following constraints:
- The device must be portable.
- A prototype of your device should cost less than $100.
- Because your device is still a prototype (whether your build a physical prototype or not), it is not expected to be the "final" device with optimized hardware, so some over- and under-engineering is expected.
- If you make a smartphone-compatible device, you can design the device to interface with your own personal smartphone, rather than have to worry about both Android and iOS and compatibility with all possible devices.
- Your device should be a complete solution. You will need to have some sort of way to display and evaluate the data you collect.

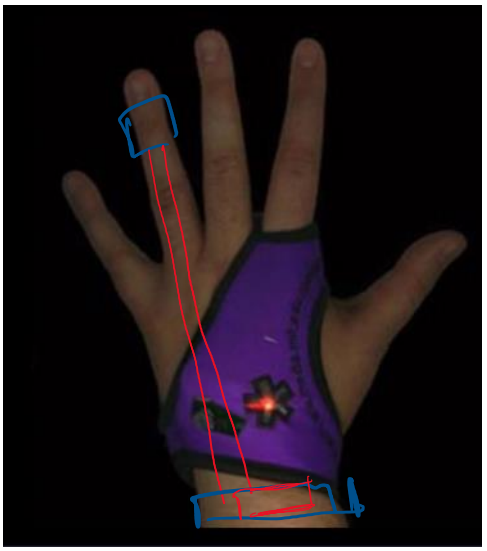
Possible Idea:
- Light dimming/optimal alarms times based on personal Circadian Rhythms (EEG? + Blood pressure + Temperature + Pulse + Light Sensor)
  - https://datadryad.org/stash/dataset/doi:10.5061/dryad.73f69
  - https://osf.io/j5cfs/
  - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6520649/#:~:text=A%20circadian%20rhythm%20is%20an,demonstrate%20a%20robust%20circadian%20rhythm.
  - https://www.ahajournals.org/doi/full/10.1161/HYPERTENSIONAHA.121.14519
  - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7065627/#:~:text=Blue%20light%20is%20currently%20considered,with%20severe%20general%20health%20implications.

Current Ideas:
**Stress Level Measuring throughout the day**
- **Heart rate**
- ~~**Galvanic Skin Response**~~

Sun exposure: -> Glasses
- UV exposure

+ Heat Stroke Prevention
- Temp + Humidity
- Skin conductance (Sweat)
- Pulse

Physical Device!



**Stress Level Measuring throughout the day**
- **Measurement: Heart rate**
- **Target: College Students**
- **Device: ….**

Components:
Pulse: https://www.amazon.com/PulseSensor-com-Original-Pulse-Sensor-project/dp/B01CPP4QM0/ref=sr_1_3?keywords=arduino+heart+rate+sensor&qid=1689012927&sr=8-3 ($25)

Arduino nano BLE: https://store-usa.arduino.cc/products/arduino-nano-33-ble ($27)
or
Regular Nano : https://store-usa.arduino.cc/products/arduino-nano?selectedStore=us ($25)

For App (prospective):
React: https://blog.logrocket.com/using-react-native-ble-manager-mobile-app/
Flutter: [FLUTTER] control Arduino with Bluetooth module
MIT App Inventor: https://howtomechatronics.com/tutorials/arduino/how-to-build-custom-android-app-for-your-arduino-project-using-mit-app-inventor/

Data:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5900369/

# Day 2 Project Planning

Tuesday, July 11, 2023 8:46 AM

Goals:

- Fully setup Microsoft Project
- Figure out important metrics to consider for thresholds in biometric measurements
- Establish the first list of materials to purchase
- Start thinking about arduino and app coding

Important Doc for HRV: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5900369/