Project Update 1:

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Github link:

https://github.com/samu7988/ECEN5823_Project_Health_tracker

1. Status description, with updates/changes present:

Work done:

Hardware:

1) Procurement of hardware (sensors, breadboard, resistors, blue gecko board), and assembling all of them.
2) Needed to solder the accelerometer as well as some pins of the blue gecko board so soldering of the accelerometer is done.

Firmware:

Interfacing of the heart rate sensor (pulse sensor):

1) Basically, pulse sensors is used to determine the person's heart beat in BPM. The ideal range of the BPM for human heart is (40-120).
2) Pulse sensor generates output in analog form. To interface with our microcontroller we require digital values, to achieve that we have programmed the ADC peripheral to sense the analog voltage that is generated by our pulse sensor. The ADC is programmed in 12 bit resolution with internal reference voltage of 5V.

Interfacing of Accelerometer:

1) Implemented setup accelerometer in which following API's are called and tested:
    a. **read_accelerometer_register** : Read DEVID registor by this API.
    b. **write_accelerometer_register** : Enable measurement mode by writing value 0x08 into power control register
    c. **clear_setting** : To clear setting of certain accelerometer registers.
    d. **set_free_fall_threshold** : Programmed the user value threshold
    e. **set_free_fall_duration** : function to set the free fall duration.
    f. **Set_interrupt** : Function to setup interrupt for free fall detection.

Work in progress:

1) Free fall detection of accelerometer which has been interfaced with I2C protocol.
2) Development of accelerometer and heartbeat state machine

Work Needs to be done:

1) Sending services and characteristics such as Accelerometer free fall and heartbeat values to the client from blue gecko.
2) Connection and bonding of server and client
3) Assign UUID to all the characteristics to be sent to the clients
4) Testing whether the values sent successfully or not to the client.
5) Integrating the complete system.

2. Updated schedule table present

Proposed schedule

Task	Target Completion Date	Expected Date
Procurement of hardware and assembly	**11/11/2021**	**11/11/2021**
LETIMER Implementation and testing	**11/12/2021**	**11/12/2021**
Accelerometer I2C read write	**11/15/2021**	**11/15/2021**
Verified functionality of ADC	**11/17/2021**	**11/17/2021**
Free Fall detection	**11/19/2021**	**11/19/2021**
Heart pulse sensor implementation and testing	**11/16/2021**	**11/16/2021**
Heart pulse sensor testing the range	**11/17/2021**	**11/17/2021**
LCD Display	**11/19/2021**	**11/19/2021**
Radio Transmission	**11/25/2021**	**11/25/2021**
Bluetooth functionality enable (services and characteristics)	**11/21/2021**	**11/21/2021**
Final Integration and testing	**11/30/2021**	**11/30/2021**

3.Progress on test plan, % completed listed:

According to the test plan proposed the 40% of the project work has been done which includes following:

1)LETIMER fires at 1 sec

2)Heart pulse sensor interfacing and testing

3) Accelerometer interfacing with the blue gecko board using I2C protocol.

4.Test plan spreadsheet (.xlsx file) present :

I have included the test verification excel file in the github url

5.Github URL:

https://github.com/samu7988/ECEN5823_Project_Health_tracker

6.Github repository with Wiki page kept up to date

I have updated the wiki page on github. Link provided above.

7. Incorporated feedback from Project Proposal :

As per feedback from professors and discussion with TA's during standup, following questions were asked to be included in the next update:

a) *What if the person being monitored should fall when the MCU is asleep (i.e. the letter hasn't gone off), should the accelerometer generate an interrupt to the MCU on a GPIO pin and wake up the MCU?*

Ans: Yes, the accelerometer (ADXL 345) which is interfaced to the blue gecko board has a dedicated interrupt pin. The interrupt pin is connected to GPIO pin of MCU. So, when free fall is detected when the MCU is asleep, the interrupt would cause the MCU to wakeup due to GPIO_IRQ_handler.

b) Rate and valid ranges for data types?

Ans:
Valid range for Pulse sensor reading is between 40 – 120, so a uint8_t data type would be sufficient. Pulse sensor values would be transmitted at fixed rate determined by timer period.

Valid range for accelerometer free fall characteristics is either 0 or 1, so a Boolean or uint8_t is sufficient. Free fall values would be 0 when no fall is detected and would be 1 when fall is detected.

8. Attendance at stand ups :

For the week (15th November to 19th November), I have attended two standups, one with Rajat and another one with Jake.

Standup attendance:
Rajat: On 16th November (Tuesday)

Jake: On 18th November (Thursday)

Total standup attended for this week: 2