ECG DOCUMENTATION

Contents

0xDEADBEEF

Members are as follows:

- Huseyin Sert (HS)
- Jesse Batt (JB)
- Harrison James Marcks (HJM)
- Dan Steer (DS)

Purpose of document

This document aims to bring all documentation created for the ECG under one file.
The **requirements** for ECG component of the assignment were made collectively by **all members** of the 0xDEADBEEF.

However, **acceptance tests**, high level and low level designs were **created individually**. These documents will be identified by the creator's name on the contents page to make it easier to see the individual contribution of each member.

There is also the **WhoDidWhat_Documentation_Review_ECG.doc** document which gives a more concise and easy to follow version of individual progress. Along with a record of reviews comments throughout the project.

Requirements

Key: POST/Power on = P, **Ease Of Use = E,** Interfacing Between Devices = I, **Menu = M,** Data Handling, **Database = DB,** Human Interface = H, **ECG = EL,** Screen = S

Key: S = Show Stopper, **C = Critical,** M = Major, **N= Normal**, T = Trivial

ID	SUMMARY OF REQUIREMENT (I WANT TO)	RATIONALE (SO THAT I CAN)	PRIORITY	CREATED

POST/Power on

ID	SUMMARY OF REQUIREMENT	RATIONALE	PRIORITY	CREATED
P1	Be able to test the memory	Verify the board will work correctly	S	04/10/2018
P2	Be able to test the screen	Verify the screen will display correctly	S	04/10/2018
P3	Be able to test the CPU (Jump instructions)	Verify the board will work correctly	S	04/10/2018
P4	Be able to test the power	Verify the board will work correctly	S	04/10/2018
P5	Be able to test ROM	Verify the board will work correctly	S	04/10/2018
P6	Be able to perform POST/Power on the device	So the board can actually be used and boot up	S	04/10/2018
P7	Be able to check buttons	So that the buttons can be used	S	04/10/2018
P8	Check network interface	So that we can wired devices	N	04/10/2018
P9	Check Bluetooth module	So that we can connect devices	N	04/10/2018
P10	All tests run automatically on system start	Perform the tests automatically every time it is started	C	12/11/2018

Ease Of Use

ID	SUMMARY	RATIONALE	PRIORITY	CREATED
EU1	Be able to use the device within 2 minutes	So that the user can get a reading as soon as possible	C	04/10/2018
EU2	Not charge it very often	Not have to worry too often	B	04/10/2018
EU3	Power it via USB	A special cable is not needed	S	04/10/2018

EU4	Be able to take it with me	Take a reading whenever	T		04/10/2018
EU5	Be able to view results on a screen	Give the readings meaning in the moment	S		04/10/2018
EU6	Be able to adjust screen brightness	Have a more comfortable viewing experience	N		04/10/2018
EU7	Be able to adjust the text size	I can read the words incase they're too small	N		04/10/2018
EU8	Be able to improve accessibility for visually impaired	More people have access to the device	T		04/10/2018
EU9	Be able to charge device when its ON	Not depend on the limited charge capacity of the device	M		04/10/2018
EU10	Be able to charge device when its OFF	Make sure its ready to use when I need it	M		04/10/2018

Interfacing Between Devices

I1	Be able to interface with a computer via USB	I can download past results	S		04/10/2018
I2	Be able to interface with a computer via blue tooth	I can download past results if I don't have a cable	N		04/10/2018
I3	Be able to interface with the board via wifi	I can gather results without a cable	N		04/10/2018
I4	Be able to interface with the board via ethernet	I can gather results remotely	N		04/10/2018
I5	Be able to receive results via text	I can immediately alert a Dr. or family member	N		04/10/2018
I6	Be able to interface with a remote database	I can save results to something else	M		04/10/2018
I7	Be able to interface a local database	I can save results from previous tests	N		04/10/2018

Menu

M1	Navigate a menu	Select different options	S		04/10/2018

M2	Select a menu option	My navigation has meaning	M		04/10/2018
M3	Return to Menu	I can select something else	M		04/10/2018
M4	Select the ECG from the menu	I can take a reading	S		04/10/2018
M5	Select User options from the menu	I can configure user profiles	N		04/10/2018
M6	Select Historical ECG readings	I can view old readings	T		04/10/2018
M7	Reboot the board	I can perform more controlled maintenance and fixing	S		04/10/2018
M8	Have an Options option	I can edit options	N		04/10/2018

Data Handling

D1	Record readings to a file	I can export the file	N		04/10/2018
D2	Record readings to a human readable format	I can view the readings	C		04/10/2018
D3	Be able to store data	I can store data for later	N		04/10/2018

Database

DB1	Load data from a database	Store a data for querying	N		04/10/2018
DB2	Commit data to a database	Data can later be queried	N		04/10/2018
DB3	Store user data in database	Multiple users can be stored	N		04/10/2018
DB4	Load user data from the database	Different user data can be loaded	N		04/10/2018
DB5	Keep track of previous readings	Keep a record of previous readings	N		04/10/2018

Human Interface

H1	Perform a button press	I can interact with the device	S		04/10/2018
H2	Perform a button double click	I can interact with the device	C		04/10/2018
H3	Perform a long button press	I can interact with the device	C		04/10/2018
H4	Perform a multi-button press	I can interact with the device	C		04/10/2018

H5	Use the slider	I can interact with the device	C	04/10/2018
H6	View feedback on the screen	I can interact with the device	C	04/10/2018
H7	Enter user information	I can have multiple profiles	N	04/10/2018
H8	Change scale of ECG using slider	I can view more precise readings	C	17/10/2018
H9	Change the scale of the UI using the slider	I can enlarge the words on screen	N	17/10/2018

Screen

S1	Display heart rate	See the heart rate immediately	S	04/10/2018
S2	Show all available data on the screen	The screen real estate is used effectively	N	04/10/2018
S3	Display heart rate in real time	See readings are relevant	S	04/10/2018
S4	Display multiple ECG readings	Compare previous readings	N	04/10/2018
S5	Display a menu	Select different menu options	S	04/10/2018

ECG

EL1	Measure a user's heart rate	Measure a user's heart rate	S	04/10/2018
EL2	Send ECG readings to screen	View a user's heart rate	S	04/10/2018
EL3	Read data from all the electrodes	So that readings can be gathered	S	04/10/2018
EL4	Adjust sensitivity based on age	Readings can be more precise based on the type of user	N	04/10/2018
EL5	Filter out interference	The readings aren't skewed	S	04/10/2018
EL6	Measure heart rate in real time	Viewable readings are relevant	S	04/10/2018

Acceptance Tests

POST/Power On (Harrison James Marcks)

Test Name: PP_T1
Requirements Tested: P1
Outline: Ensure that the system tests the memory
Pre-requisites: System is turned off
Method:

STEP	*Action*	*Expected Observation*
1	Turn on the system	The system will start to display information to the screen
2	Wait	The system will eventually be started

Test Name: PP_T2
Requirements Tested: P2
Outline: Ensure that the system tests the screen
Pre-requisites: System is turned off
Method:

STEP	*Action*	*Expected Observation*
1	Turn on the system	The system will start to display characters on the screen
2	Wait	Eventually, it'll move on to the next test

Test Name: PP_T3
Requirements Tested: P3
Outline: Ensure that the CPU instructions work correctly
Pre-requisites: System is turned off
Method:

STEP	*Action*	*Expected Observation*
1	Turn on the system	Diagnostic information will be displayed on the screen relating to the jump instructions being tested
2	Wait	Eventually the system will move onto the next test

Test Name: PP_T4
Requirements Tested: P4
Outline: Make sure the power is stable
Pre-requisites: System is turned off
Method:

STEP	*Action*	*Expected Observation*
1	Turn on the system	System shows it is starting
2	Wait	Information relating to the power supply is displayed

Test Name: PP_T5
Requirements Tested: P5
Outline: Test the ROM to make sure everything is okay
Pre-requisites: System is turned off
Method:

STEP	Action	Expected Observation
1	Turn on the system	System shows it is starting
2	Wait	System shows ROM diagnostic information on the screen

Test Name: PP_T6
Requirements Tested: P6
Outline: The POST/Power On tests should be able to run
Pre-requisites: System is turned off
Method:

STEP	Action	Expected Observation
1	Turn the system on	The first test is run
2	Wait	Each subsequent test is run one after another
3	Wait	All tests have been run and the system is in a sane state OR some diagnostic information is being displayed

Test Name: PP_T7
Requirements Tested: P7
Outline: Check to make sure the buttons can be read from
Pre-requisites: System is turned off
Method:

STEP	Action	Expected Observation
1	Turn on the system	The system shows it is starting
2	Ask for user input on both buttons	The system confirms each button press and carries on

Test Name: PP_T8
Requirements Tested: P8
Outline: Check network interface
Pre-requisites: System is turned off
Method:

STEP	Action	Expected Observation
1	Turn the system on	System shows it is starting
2	Wait	The system performs a Hardware check to see if there is an Ethernet or Wi-Fi Module

Test Name: PP_T9
Requirements Tested: P9

Outline: Check blue-tooth module
Pre-requisites: System is turned off
Method:

STEP	Action	Expected Observation
1	Turn on the system	System shows it is starting
2	Wait	The system performs a Hardware check to see if there is a blue-tooth module installed

Test Name: PP_T10
Requirements Tested: P10, P1, P2, P3, P4, P5, P6, P7, P8, P9
Outline: Perform all tests in sequence at system boot
Pre-requisites: System is turned off
Method:

STEP	Action	Expected Observation
1	Turn on the system.	The system shows it has begun booting using the LEDs
2	Wait	Eventually the screen will begin to show POST diagnostic information
3	Wait	More tests will appear on the screen and completed one after another
4	Wait	Eventually a splash screen will be displayed, and the user will be informed of any tests that may have failed.

Ease of Use (Huseyin Sert)
Test Name: EU_T1
Requirements Tested: EU1
Outline: Ensure that the device boots up under 2 minutes
Pre-requisites: Make sure the device is turned off and healthy
Method:

STEP	ACTION	EXPECTED OBSERVATION
1.	Power on the device	Observe booting process
2.	Run a timer to record the time it took boot up	Device fully booted

Test Name: EU_T2
Requirements Tested: EU2, EU3, EU4
Outline: Ensure that the device does not need to be charged very often
Pre-requisites: Device is fully charged
Method:

STEP	Action	Expected Observation

STEP	Action	Expected Observation
1.	Connect the device to a power source and make sure the battery is charging	Battery should be charging
2.	Stop charging the battery at 100%	Battery percentage should be 100%
3.	Run a timer until the device turns off itself and then take the reading from the timer	Device should be turned off and you should have a reading that tells you how long the device can run on battery

Test Name: EU_T3
Requirements Tested: EU3, EU9, EU10
Outline: Ensure that the device can be powered by USB
Pre-requisites: Device can be turned off or turned on
Method:

STEP	Action	Expected Observation
1.	Connect the device to power source via a USB connection	Device is connected to the power source
2.	Ensure that the battery is being charged	LEDs on the device should indicate that the power is being transmitted from the power source to the device
3.	Check the battery percentage	Battery percentage should be going up

Test Name: EU_T4
Requirements Tested: EU5, S1, S2, S3, S4
Outline: Ensure that the results can be viewed on the screen
Pre-requisites: Device is turned on and healthy
Method:

STEP	Action	Expected Observation
1.	Navigate to where the results are being displayed	You are on the expected menu section
2.	Check the screen	Results are being displayed

Test Name: EU_T5
Requirements Tested: EU6, EU8
Outline: Ensure that users can adjust the screen brightness
Pre-requisites: Device is turned on and healthy
Method:

STEP	Action	Expected Observation
1.	Navigate to where the screen brightness settings are	See the brightness setting options
2.	Select the brightness options and click on the button to **decrease** the brightness	Screen brightness is dimming down
3.	Select the brightness options and click on the button to **increase** the brightness	Screen brightness is increasing

Test Name: EU_T6
Requirements Tested: EU7, EU8
Outline: Ensure that text size is adjustable
Pre-requisites: Device is turned on and healthy
Method:

STEP	Action	Expected Observation
1.	Navigate to where the screen font settings are	See the font settings options
2.	Select the font options and click on the button to **decrease** the size of font	Font size is decreasing
3.	Select the font options and click on the button to **increase** the size of font	Font size is increasing

Interfacing Between Devices (Dan Steer)

Test Name: IBD_T1
Requirements Tested: I1, D3, DB5
Outline: A PC can read files from the ECG
Prerequisites: The PC and ECG are powered and healthy, the ECG is connected to the PC via USB.
Method:

Step	Action	Expected Observance
1	View USB devices on the PC.	The PC should list the ECG as a device.
2	Mount the ECG to the OS.	The ECG should successfully mount to the OS.
3	Navigate to the ESG and list files.	The ECG should successfully mount to the OS.

Test Name: IBD_T2
Requirements Tested: I2, P9, M1, D3, DB5, S5
Outline: The ECG can send files via Bluetooth to a PC.
Prerequisites: The PC and ECG are powered on and healthy, Bluetooth is turned on and discoverable on the PC and ECG.
Method:

Step	Action	Expected Observance
1	Search for Bluetooth devices on the PC.	The PC can find the ECG as a Bluetooth device.
2	Connect the ECG on via the PC.	The ECG should receive a prompt to connect to the PC.

Step	Action	Expected Observance
		The ECG should accept the request, and the PC should show a healthy connection status to the ECG.
3	On the ECG, navigate the menu to find files. Use the buttons to send via Bluetooth.	The PC should get a notification of an incoming file from the ECG.

Test Name: IBD_T3
Requirements Tested: I3, I4, P8, D3, DB5,
Outline: View files on the ECG from a PC.
Prerequisites: The PC and ECG are powered on and healthy, is connected to the network via Wi-Fi or Ethernet, the ECG and PC are on the same network, ECG credentials are known.
Method:

Step	Action	Expected Observance
1	List connected device on the router.	The ECG should be visible and should have an IP address.
2	Using the PC, SSH into the ECG using its IP.	SSH connection should be successful.
3	Using the correct terminal commands; navigate to the folder containing ECG save files, and list.	A list of files in the current directory should be listed.

Test Name: IBD_T4
Requirements Tested: I6, P8, M1, D3, S4, S5
Outline: Send data from ECG to a server.
Prerequisites: The ECG is powered on and healthy, is connected to a network via Ethernet or Wi-Fi and the PC is connected to the network via Ethernet or Wi-Fi, The server is connected to the same network as the ECG.
Method:

Step	Action	Expected Observance
1	Check ECG has a successful connection with the server.	ECG is connected to the server.
2	Navigate menu to find the list of records on the ECG and select the option to upload a singular file to the server.	A prompt should appear on ESG to confirm server upload.
3	Confirm upload from prompt.	An uploading prompt appears. An upload complete prompt proceeds.
4	Check the file has successfully been uploaded to server.	An uploading prompt appears. An upload complete prompt proceeds.

Test Name: IBD_T5
Requirements Tested: I7, E5, M1, D3, DB5, S5
Outline: View previous results from database.
Prerequisites: The ECG is powered on and healthy, results have already been saved to the local database.
Method:

Step	Action	Expected Observance
1	Navigate menu to results page.	Results are shown in chronological order (latest first)

Test Name: IBD_T6
Requirements Tested: I5, E5, M1, D1, D3, H7, S3, S5, E1, E3, E6
Outline: Results are sent via SMS to client.
Prerequisites: The ECG is powered on and healthy.
Method:

Step	Action	Expected Observance
1	Navigate menu and select record new readings.	Recording screen is shown.
2	After the results have been recorded, select option to send results via SMS.	A prompt should appear to enter a phone number.
3	Confirm phone number and press send.	The results are received in plain text to the specified phone number.

Menu (Jesse Batt)

Test Name: MENU_T1
Requirements Tested: M1, M2, M3, M4, M5, M6, S2, S5, H1, H5
Outline: Ensure that the Menu can navigate between Sub-Menus and return to the Main Menu
Pre-requisites: System turned on, display functional
Method:

STEP	Action	Expected Observation
1	Use device input such as buttons/sliders to cycle through possible menu options	Display shows cycling of possible menu options through a possible "hover over" state
2	Use button to select menu option, for example "Start ECG Reading" or "Settings"	Device correctly navigates to the chosen sub menu and the display reflects this
3	Use button to return to the main menu	Device returns correctly to the main menu and display reflects this

Test Name: MENU_T2
Requirements Tested: M2, M3, M4, H5, ECG(All), S2, S5, DB1, DB5, H6
Outline: Ensure the user can prompt the start of an ECG reading via Menu navigation on the device
Pre-requisites: Device is on, Menu navigation working correctly, ECG sensors connected
Method:

STEP	Action	Expected Observation
1	Use buttons to navigate to "Start Reading"	Device and display correctly reflect the selection
2	After the reading is complete, use buttons to navigate menu to view results of reading	Displays the correct reading on the screen
3	Select "View previous readings", pull from database	Displays correctly
4	Return to menu using buttons	Display and device reach main menu

Test Name: MENU_T3
Requirements Tested: M1, M2, M7, H1, S5, P6
Outline: Ensure the board can be rebooted as prompted by the user
Pre-requisites: Device is on, Menu navigation working correctly, I/O functional
Method:

STEP	Action	Expected Observation
1	Use buttons to cycle to reboot option	Display reflects this
2	Use button to select reboot option	Device shuts down safely, then reboots automatically, fully functional and ready to go

Data Handling (Jesse Batt)

Test Name: DH_T1
Requirements Tested: D3
Outline: Ensure that the device can store ECG readings on the device/database
Pre-requisites: Device is on and functional, sensors connected and working correctly
Method:

STEP	Action	Expected Observation
1	Begin an ECG reading on the device	Device starts reading, following the reading, option for saving data results appears
2	Select option to save data to device	successfully saves
3	Load results data from device	Data loads and displays on the screen

Test Name: DH_T2
Requirements Tested: D1, D2
Outline: Ensure that the data can be saved as a file that can be readable by a computer
Pre-requisites: Device is on, reading has taken place
Method:

STEP	Action	Expected Observation
1	Following ECG reading, select "save as file"	Successful

	Step	Action	Expected Observance
	2	Connect ECG to PC	PC can detect and view data results file
	3	Open file in a text editor	Data file is human readable and formatted

Database (Dan Steer)

Test Name: DB_T1
Requirements Tested: DB1, DB4, DB5, EU5, M1, M2
Outline: Data is being loaded from the database.
Prerequisites: The ECG is powered and healthy.

Method:

Step	Action	Expected Observance
1	Navigate menu to find the list of past readings.	A list of previous readings should be listed.

Test Name: DB_T2
Requirements Tested: DB2, DB3, DB4, I7, M1, M2, M5, M8, H7
Outline: Edit user data.
Prerequisites: The ECG is powered and healthy.
Method:

Step	Action	Expected Observance
1	Navigate menu to find the user profile information.	The user information fields (age, gender etc.) should appear either blank or prefilled.
2	Edit the information.	Fields should be editable.
3	Save changes.	● A save success prompt should appear. ● Information fields should appear again, but with the alterations.

Human Interface (Harrison James Marcks)

Test Name: HI_T1
Requirements Tested: H1. H2, H3, H4
Outline: Ensure that a single button click is registered as only a click
Pre-requisites: System is turned on, healthy, and ready to receive input
Method:

STEP	Action	Expected Observation
1	Click the button for an option	No other type of button press is registered

Test Name: HI_T2
Requirements Tested: H1. H2, H3, H4
Outline: Ensure that a double button click is registered as only a double click
Pre-requisites: System is turned on, healthy, and ready to receive input
Method:

STEP	Action	Expected Observation

STEP	Action	Expected Observation
1	Double click an option	No other type of button press is registered

Test Name: HI_T3
Requirements Tested: H1. H2, H3, H4
Outline: Ensure that a single long press is registered as only a long a press
Pre-requisites: System is turned on, healthy, and ready to receive input
Method:

STEP	Action	Expected Observation
1	Hold button down to select an option	No other type of button press is registered

Test Name: HI_T4
Requirements Tested: H1. H2, H3, H4
Outline: Ensure that pressing multiple buttons at once is registered as nothing else
Pre-requisites: System is turned on, healthy, and ready to receive input
Method:

STEP	Action	Expected Observation
1	Push multiple buttons	No other type of button press is registered

Test Name: HI_T5
Requirements Tested: H5
Outline: Use the slider to change an option
Pre-requisites: System is turned on, healthy, and ready to receive input
Method:

STEP	Action	Expected Observation
1	Adjust the slider such that an option is changed	The slider input is correctly handled

Test Name: HI_T6
Requirements Tested: H6
Outline: View feedback on the screen
Pre-requisites: System is turned on, healthy, and ready to send output
Method:

STEP	Action	Expected Observation
1	Make changes to the system such that what is displayed to the user will change	Any changes or actions carried out by the user are communicated to them

Test Name: HI_T7
Requirements Tested: H7
Outline: Enter information on a user
Pre-requisites: System is turned on, healthy, and ready to receive input
Method:

STEP	Action	Expected Observation
1	Goto user profiles	
2	Create or edit a new user	
3	Enter user information using various combinations of the button presses	The data being entered can be entered by the user using the buttons

Test Name: HI_T8
Requirements Tested: H8

Outline: Use the slider to change the ECG scale
Pre-requisites: System is turned on, healthy, and ready to receive input
Method:

STEP	Action	Expected Observation
1	Navigate to ECG screen	
2	Use the slider to zoom in/out	The readings are enlarged

Test Name: HI_T9
Requirements Tested: H9
Outline: Change the scale of the UI using the slider
Pre-requisites: System is turned on, healthy, and ready to receive input
Method:

STEP	Action	Expected Observation
1	While on any screen use the slider to change the scale of the text and other things	The text is enlarged/shrank

Screen (Huseyin Sert)

Test Name: S_T1
Requirements Tested: S1, S3, E1, E6
Outline: Ensure that the screen displays the heart rate
Pre-requisites: Device is turned on and healthy
Method:

STEP	Action	Expected Observation
1.	Connect the sensors	Sensors are connected
2.	Look at the screen	See the heart rate
3.	Take off the sensors	See the heart rate value either disappear or display 0

Test Name: S_T2
Requirements Tested: S2, DB1, DB4
Outline: Ensure that the screen displays all the available / useful data
Pre-requisites: Device is turned on and healthy
Method:

STEP	Action	Expected Observation
1.	Connect all the sensors and peripherals that can be connected	All sensors and peripherals are fully connected
2.	Make sure that all the data is formatted perfectly on the screen so that every useful and available data can displayed on one screen	View all the available / useful data in one screen without any data missing or protruding out of the screen

Test Name: S_T3
Requirements Tested: S1, S3, E1, E6
Outline: Ensure that the screen displays heart rate in real time
Pre-requisites: Device is turned on, healthy and sensors are connected
Method:

STEP	Action	Expected Observation

STEP	Action	Expected Observation
1.	Attach sensors to a person	Sensors are connected to a person
2.	Look at the heart rate reading on the screen	See the heart rate reading on the screen that should be changing according to persons physical activity
3.	Attach the sensors to a different person	Sensors are connected to another person
4.	Look at the heart rate reading on the screen	See that the heart rate reading on the screen is potentially different and still changing which proves that the readings are done in real time

Test Name: S_T4
Requirements Tested: S4, DB1, DB3, DB4, DB5
Outline: Ensure that the screen can show multiple ECG readings at once
Pre-requisites: Device is turned on and healthy
Method:

STEP	Action	Expected Observation
1.	Navigate to where the user profiles are on the menu	See a list of users
2.	Select a user from the list	See a list of previous readings on one screen

Test Name: S_T5
Requirements Tested: S5, P2, H6, M1, M2, M3, M4, M5, M6
Outline: Ensure that the screen can display a menu
Pre-requisites: Device is turned on and healthy
Method:

STEP	Action	Expected Observation
1.	Look at the screen	See a list of options available to pick for different tasks

ECG (Harrison James Marcks)

Test Name: EL_T1
Requirements Tested: EL1, EL2, EL3, EL5, EL6
Outline: Take the measurements for a user's heart rate
Pre-requisites: System is on, healthy, ready to receive electrode input, ready to display heart rate
Method:

STEP	Action	Expected Observation
1	Navigate to ECG reading screen	
2	Attach electrodes to user	
3	View Screen	The user's heart rate is displayed with very little erroneous or odd readings and is shown to be operating in real time

Test Name: EL_T2
Requirements Tested: EL1, EL2, EL3, EL4, EL5, EL6
Outline: The sensitivity of the device needs to be changed based on a user's age
Pre-requisites: System is on, healthy, ready to receive electrode input, ready to display heart rate
Method:

STEP	Action	Expected Observation
1	Navigate to ECG Screen	
2	Attach electrodes to user	
3	View Screen and record readings	
4	Attach electrodes to a different, older user	
5	Adjust sensitivity	The readings on the screen should show similar/as clean results as compared to the first readings

Designs
Software Hierarchy (Huseyin Sert)
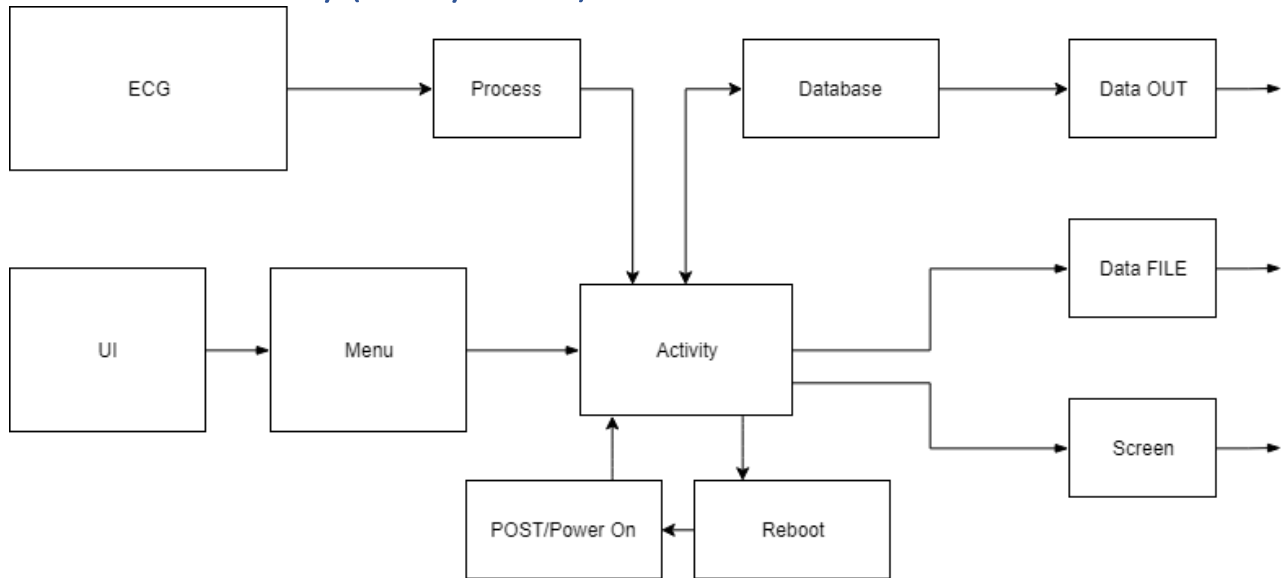
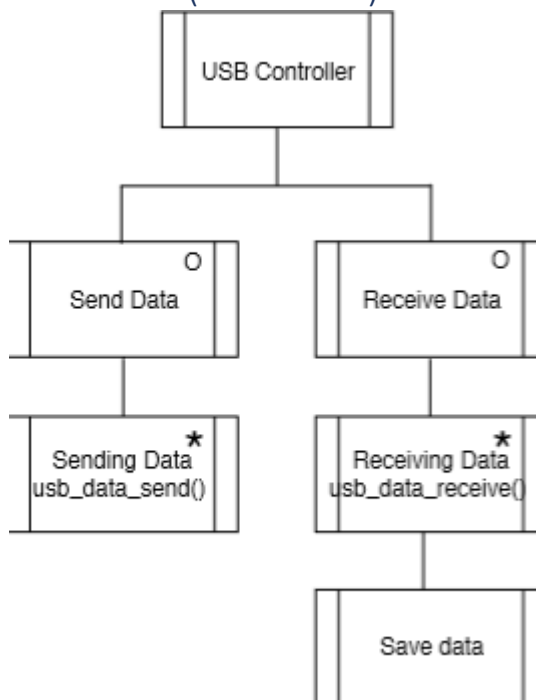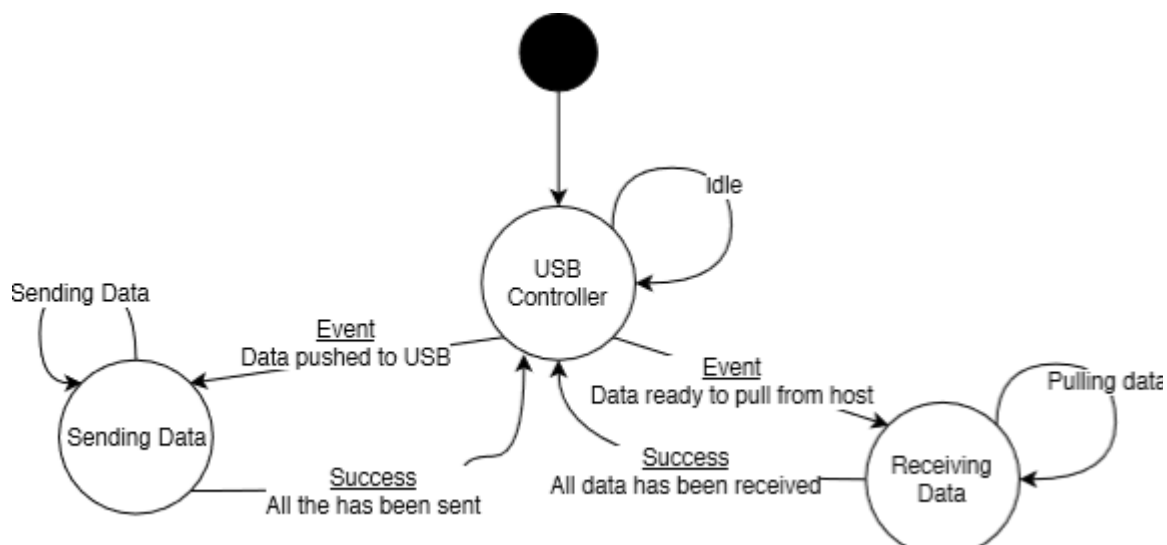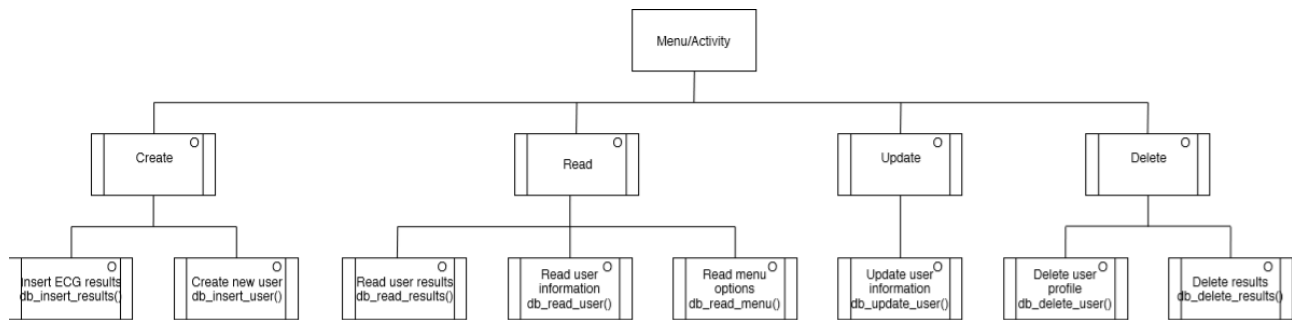# Interfacing between Devices

Low Level (Dan Steer)
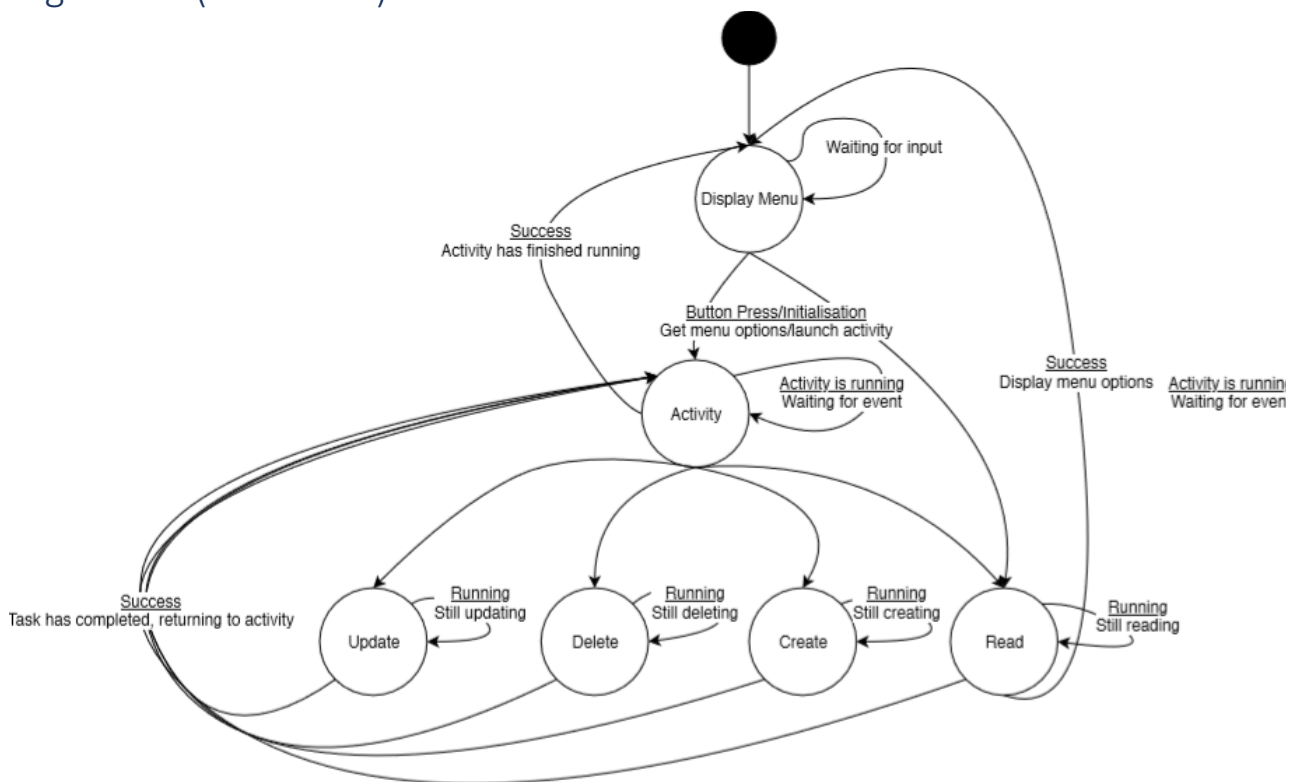

High Level (Huseyin Sert)

Database
Low Level (Dan Steer)

High Level (Dan Steer)

Screen
Low Level (Huseyin Sert)

```
                          ┌─────────────────┐
                          │     Screen      │
                          └─────────────────┘
                   ┌───────────────┴───────────────┐
          ┌──────────────────┐          ┌──────────────────┐
          │ Initialise Screen│          │ Initialise Screen│
          │  init_display()  │          │      Buffer      │
          └──────────────────┘          │init_display_buff()│
                   │                     └──────────────────┘
          ┌──────────────────┐
          │        *         │
          │ Decode characters│
          │   and display    │
          └──────────────────┘
                   ┌──────────────┴──────────────┐
          ┌──────────────────┐         ┌──────────────────┐
          │  Display Menu    │         │  Display user    │
          │     Options      │         │     input        │
          │  display_menu()  │         │ display_input()  │
          └──────────────────┘         └──────────────────┘
          ┌────────┬─────────┴──────────┬────────┐
   ┌──────────────────┐ ┌──────────────────┐ ┌──────────────────┐
   │        O         │ │        O         │ │        O         │
   │ Display ECG Menu │ │  Display user    │ │ Display options  │
   │ display_ecg_menu()│ │     profile      │ │  options_menu()  │
   │                  │ │   user_menu()    │ │                  │
   └──────────────────┘ └──────────────────┘ └──────────────────┘
```

High Level (Huseyin Sert)

Waiting for input

Display Menu

Button Press
Go to sub menu

Button Press
Go back to main menu

Display Sub Menu

Waiting for input

Button Press
Select a task within sub menu

Button Press
Go back to sub menu

Display Task Running

Task running

Main Menu

Low Level (Jesse Batt)

```
                    ┌─────────────────┐
                    │                 │
                    │   Main Menu     │
                    │                 │
                    └────────┬────────┘
              ┌──────────────┴──────────────┐
        ┌─────┴───────────O┐         ┌───────┴──────────O┐
        │ Get Slider Input │         │ Get Button Input  │
        │   get_slider()   │         │   get_button()    │
        └──────────────────┘         └───────────────────┘
              └──────────────┬──────────────┐
     ┌──────────┐      ┌──────────┐      ┌──────────┐
     │ Start ECG O│    │Return to Main O│ │Launch UserO│
     │  Reading  │     │   Menu        │  │Profile Menu│
     │begin_ECG()│     │go_main_menu() │  │go_user_profile()│
     └──────────┘      └──────────┘      └──────────┘
```
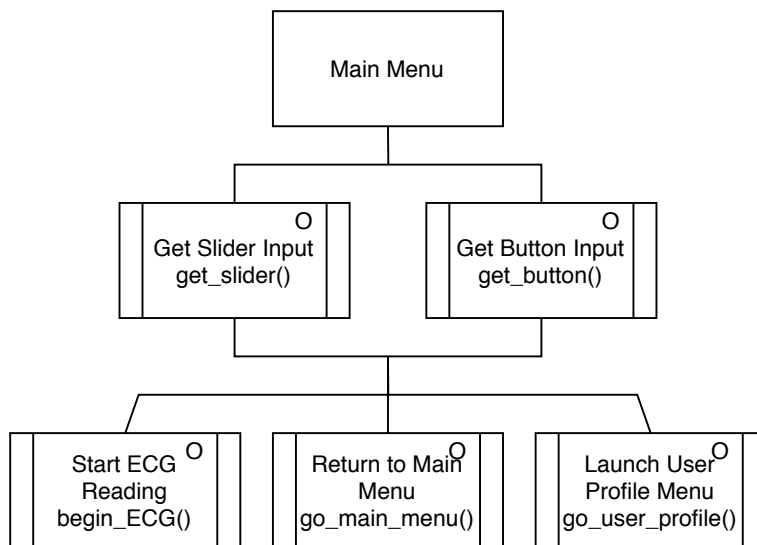
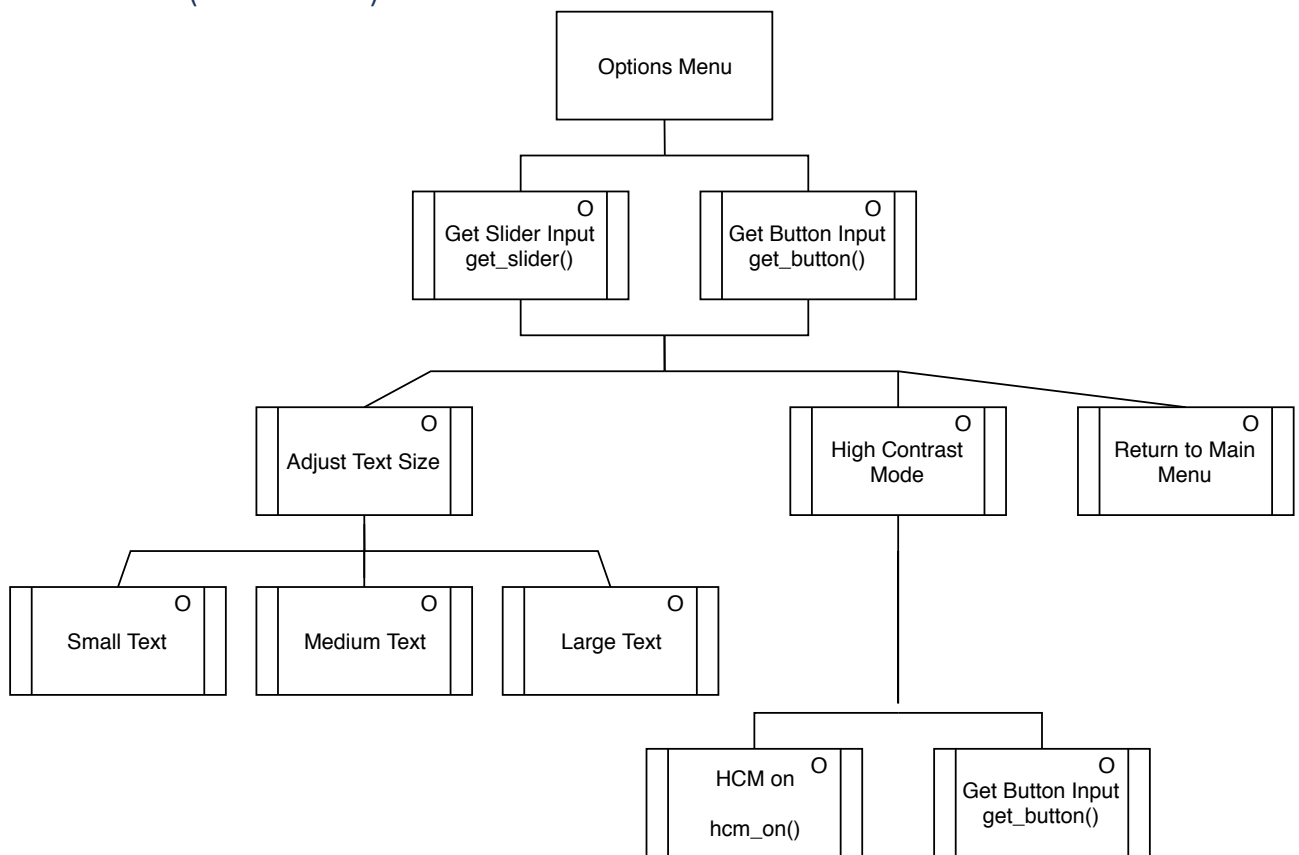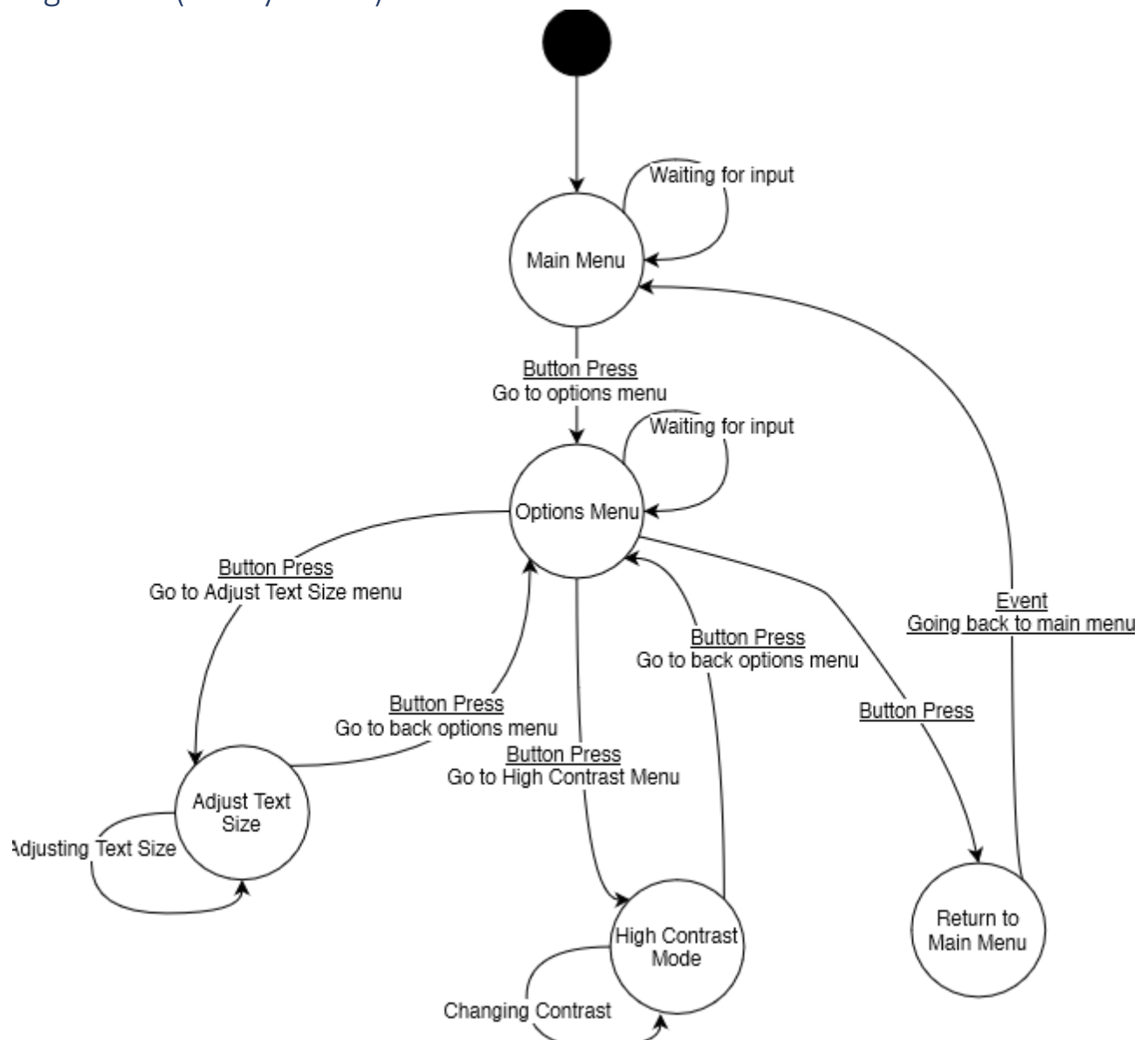# High Level (Huseyin Sert)

Options Menu
Low Level (Jesse Batt)
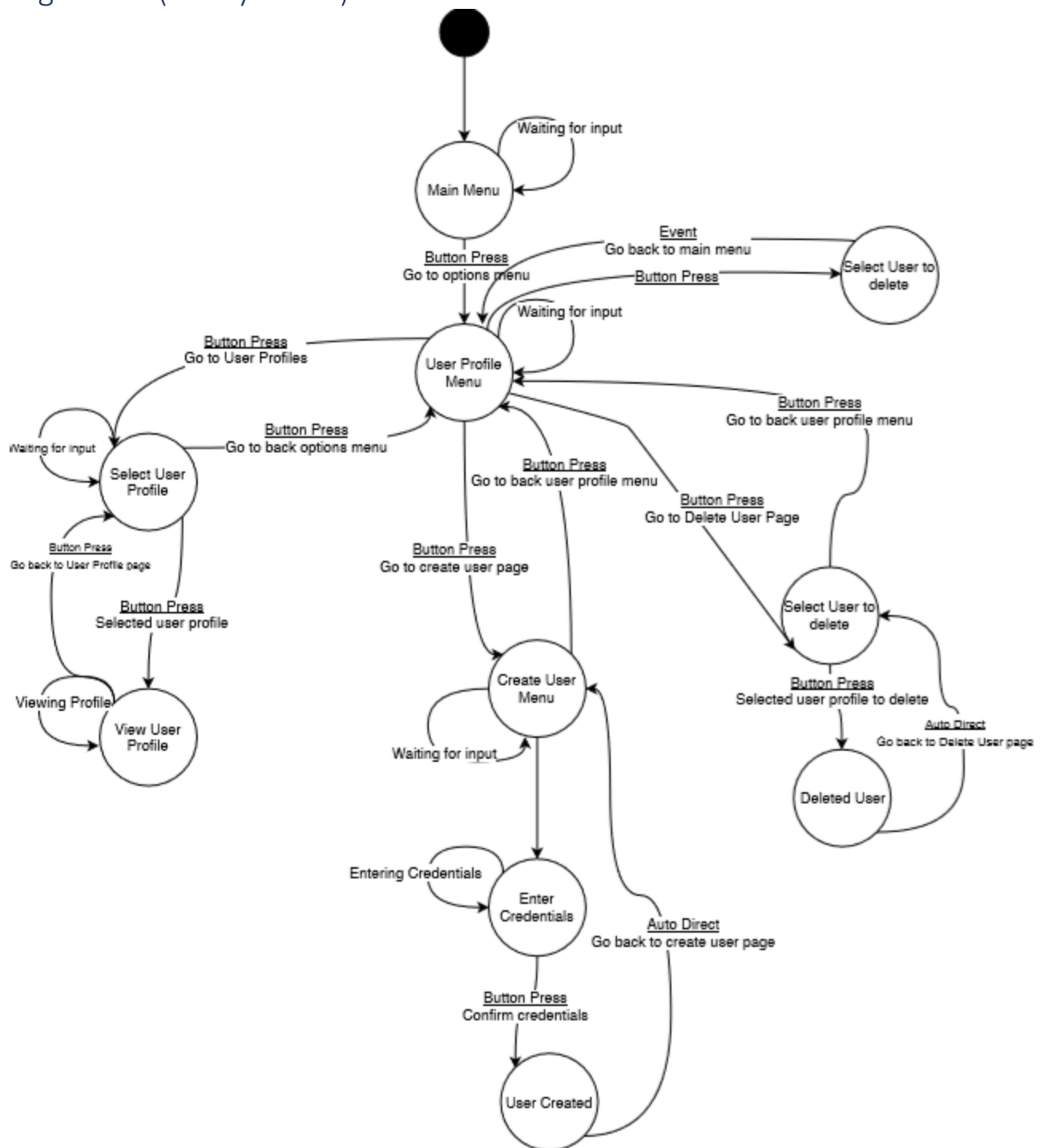
High Level (Huseyin Sert)

User Profile Menu
Low Level (Jesse Batt)

```
                        ┌─────────────────────┐
                        │  User Profile Menu  │
                        └─────────────────────┘
                 ┌─────────────┴─────────────┐
          ┌─────────────────┐         ┌─────────────────┐
          │       O         │         │       O         │
          │ Get Slider Input│         │ Get Button Input│
          │   get_slider()  │         │   get_button()  │
          └─────────────────┘         └─────────────────┘
```

O	O	O	O
View User Profiles	Create New User	Delete User	Return to Main Menu

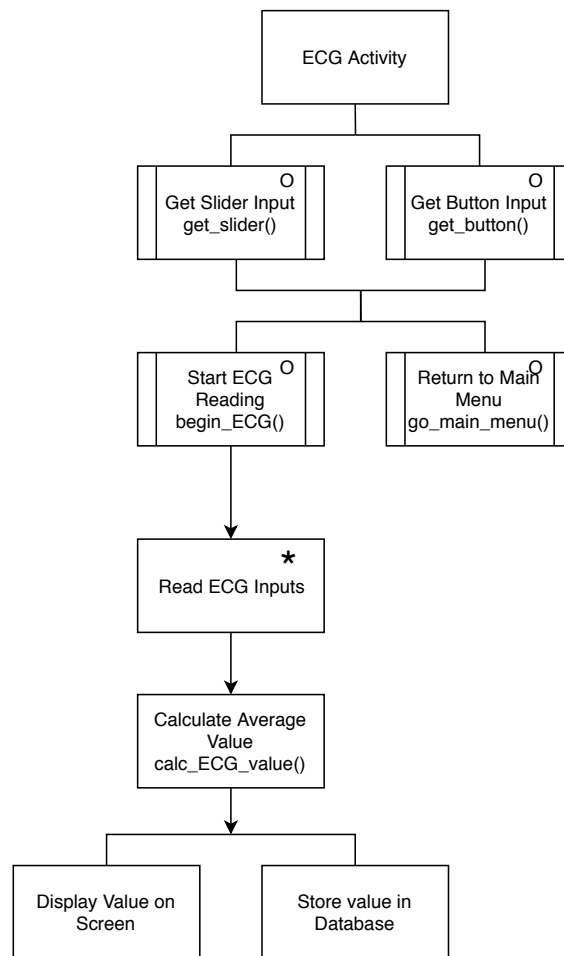|		
Enter Name	Enter Age Range	Save To Database
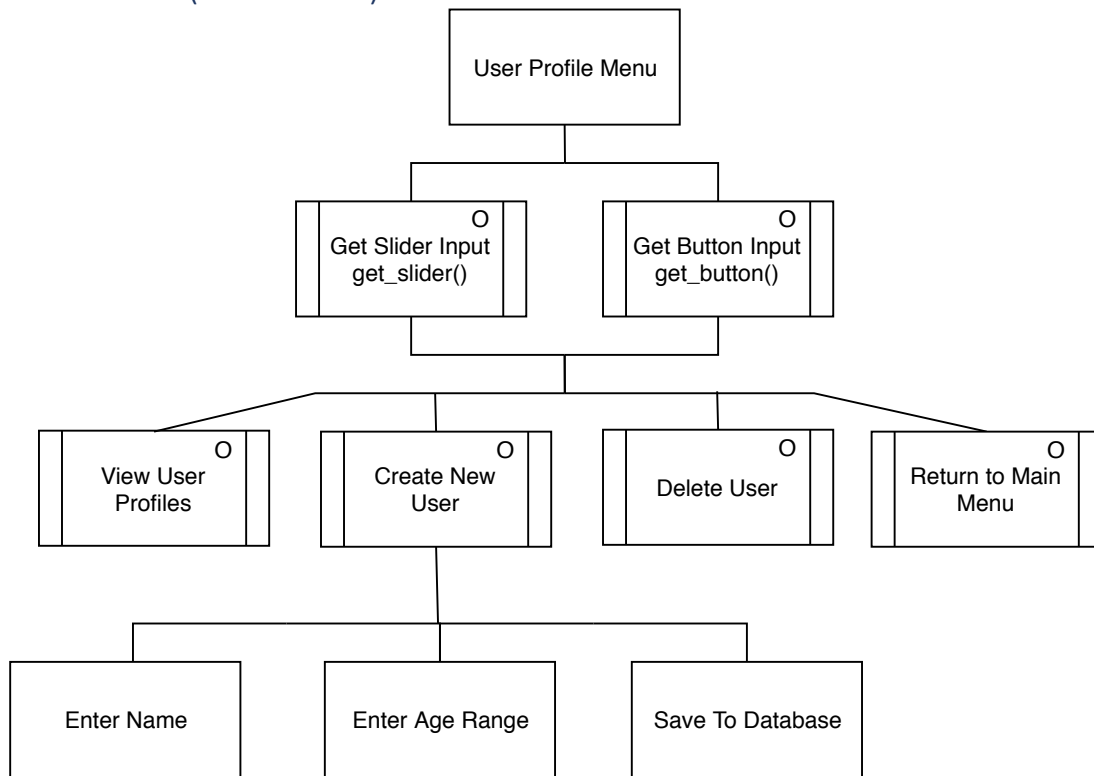
High Level (Huseyin Sert)

ECG Activity
Low Level (Jesse Batt)

High Level (Huseyin Sert)