Use Case: Breath Pacer
Primary Actor: User
Precondition: User has initiated a session and device is turned on.
Success guarantee: Breath Pacer will indicate when the user should inhale and exhale during the HRV session.
Main success scenario:
1. The breath pacer will start by filling up the indicator bar to indicate to the user that they should fill up their lungs with air at the rate of indicator bar going from left to right.
2. Once the indicator bar is filled the breath pacer will wait out the duration set by the user (default 10 seconds) indicating how long the user should hold their breath.
3. Once the timer is complete the indicator bar will gradually start to decrease to indicate the user should begin to exhale at the rate of the indicator bar.
Related Information:

- The user has the ability to change the default base timer in the settings of the device (this can be from 1-30 seconds).

Use Case: Turn Device On
Primary Actor: User
Precondition: User has device.
Success guarantee: Device turns on and displays menu.
Main success scenario:
1. Device receives power on signal.
2. Device runs through startup procedures.
3. Device displays main menu.
Extensions:
1a. Signal can either be from the power button or from the device itself.
1b. If the device battery is at 0% the device does not get past step 1 and therefore does not initialize and does not display anything effectively leaving it in an off state until the battery is charged.
2a. Startup procedure:
    2a1. Set power status to on.
    2a2. Set summary UI and session UI to not visible.
    2a3. Turn the screen on.
    2a3. Enable Buttons

Use Case: Active Pulse Reading Indicator
Primary Actor: User
Precondition: Device is receiving heart rate pulses and is turned on.
Success guarantee: Device will indicate with an LED that it is receiving an active heart pulse rate.
Main success scenario:
1. Device will illuminate the LED to indicate that it is receiving an active heart reading.

Use Case: Turn Device Off
Primary Actor: User
Precondition: User has device.
Success guarantee: Device turns off.
Main success scenario:
1. Device receives a power off signal while the device is already on.
2. Device runs through shutdown procedures.
2. Device turns the display off.
Extensions:
1a. Signal can either be from the power button or from the device itself.
2a. Startup procedure:
    2a1. Set power status to off.
    2a2. Save the current session if not already.
    2a3. Set summary UI and session UI to not visible.
    2a4. Turn the screen off.
    2a5. Disable Buttons

Use Case: Reset Device
Primary Actor: User
Includes: Use Case: Turn Device Off
Precondition: User has previous sessions stored and/or has turned on the device at least once.
Success guarantee: Device is cleared of all logs and any related variables are reset to their initial values.
Main success scenario:
1. User presses the reset button.
2. Device clears log database.
3. Device has all related variables reset to initial values.
4. Device turns off.
Extensions:
4a. Refer to Use Case: Turn Device Off

Use Case: Coherence Level Indicator
Primary Actor: User
Precondition: Device is turned on and the user has started a session.
Success guarantee: Lights on the display will indicate the current coherence level of the user.
Main success scenario:
1. Device gets Challenge level.
2. Device gets current Coherence Score.
3. Coherence Level indicators display either the colour red, blue, or green depending on the Coherence Score and Challenge Level.
4. Play a beep noise if the user reaches a new colour.

Use Case: Coherence Level Indicator Related Information:

- Coherence Score can range from 0.0-16.0.
- User has the ability to change the Challenge level in settings before starting a session. Can range from levels 1-4. Level 1 is default.
- Light colour to display is determined with Coherence score and Challenge level as follows:

	Red	Blue	Green
Level 1	0.0-0.5	0.6-0.9	1.0-16.0
Level 2	0.0-0.6	0.7-2.1	2.2-16.0
Level 3	0.0-1.8	1.9-4.0	4.1-16.0
Level 4	0.0-4.0	4.1-6.0	6.1-16.0

Use Case: View Log(s)

Primary Actor: User

Precondition: Device is turned on and at the menu screen.

Success guarantee: User will be able to see a list of their previous sessions and revisit the summaries of each session.

Main success scenario:

1. User selects “HISTORY" in the menu.
2. Device gets logs/previous sessions from the database.
3. Device displays logs/previous sessions to users in a listable format.
4. User selects a log from the list view.
5. Device displays summary of selected log.

Extensions:

3a. If there are no logs/previous sessions found in the database the screen will display “No previous sessions.”

Related Information:

- For the list view each session should be assigned a number such as “Session X” where X is the session number provided by a total sessions counted variable as well as the date at which the session took place.
- Device will display an expanded view of the selected log showing the summary view of the session. Here the user will also have an option to delete the log/previous session from the database.

Use Case: User Starts a Session

Primary Actor: User

Includes: Use Case: Coherence Level Indicator, Use Case: Breath Pacer

Precondition: Device is turned on and the user is at the menu screen.

Success guarantee: Device will start and record a session.

Main success scenario:

1. User selects “Session”
2. Device makes the session view visible to the user.
3. Device sets appropriate variables to the desired values.
4. If sensor is connected, Device starts the timer.
5. Device creates a new session object to store appropriate data collected during the session.
6. Timer calls for an update.
7. Device drains battery.
8. Session duration is increased and displayed to the user.
9. New heart rate is obtained.
10. If conditions are met, the x-axis of the session graph is updated.
11. Device adds the new heart rate to the graph.
12. If conditions are met, a new coherence score is calculated.
13. If conditions are met, the Device will turn on the appropriate coherence light.
14. Device repeats steps 6-13 until the user presses “Back”, “Menu”, or “Ok” selector buttons or if the sensor is removed by the user.
15. Once the session has ended the device will stop the timer.
16. Device will display the session summary
17. Device records summary data to database entry.

Extensions:

4a. Session will wait for the user to connect the sensor before starting.

9a. If the new heart rate is higher or lower than the current set min and high heart rate the device will update the y-axis of the graph to match this new heart rate appropriately.

10a. The x-axis is only updated after the session duration has passed 5 seconds.

12a. Device should only update the achievement score and Coherence level indicator if 5 seconds have passed since the last update.

13a. Coherence Light is only updated when a new coherence score has been calculated.

13b. For updating the Coherence level indicator refer to Use Case: Coherence Level Indicator.

Related Information:

- Session summary includes the challenge level, percentage of time in different coherence levels (low medium and high), average coherence, length of session, achievement score, entire HRV graph
- Coherence score is calculated by comparing the current heart rate to the pattern of a sine wave with a frequency between 0.04-0.24 Hz (3-15 cycles per minute). The further away the heart rate is from the sine wave at that current time position then the worse the score (worst is 0, best is 16).
- Achievement score is calculated by adding the current Coherence score to a total sum of all previous scores since the start of the session.