Use Cases Final Project COMP 3004 B Team 11

USE CASE 1: TURN THE POWER ON

Primary Actors: Patient
Scope: Cranio-Electro Stimulation (CES) device
Level: User goal
Stakeholders and Interests:
Patient - wants to use the Cranial Electrical Stimulation device as a relaxation and meditation tool.
Health Care Providers – want to prescribe this device to patients for whom it is safe to use and want to supervise the use of the device by certain patients who have other complications.
Device manufacturing company – wants to manufacture a properly working Cranial Electrical Stimulation for its customers in order for the company to earn revenue and make profit.
Precondition: Patient is comfortable, has a 9V battery connected inside the battery compartment, and has both ear clips connected to the CES jack on the side of the device.
Minimal guarantee: The power LED of the device turns on and displays the battery level.
Success guarantee: The power LED of the device turns on, displays the battery level, and has sufficient battery to allow the user to select a session.
Main success scenario:
1. Patient holds down the power button until the power LED turns green.
2. The Cranio-Electro Stimulation (CES) graph displays the battery level for a few seconds. See use case *Detect Battery Level.*
3. The patient then selects one of the three selectable session groups. See use case *Select Session Group and Type.*
Extensions:
1a. Power button does not turn the CES device on:
    1a1. The patient contacts the service department of the manufacturing company for device repair.
1b. Power LED does not display:
    1b1. The patient contacts the service department of the manufacturing company for device repair.
2a. The battery level is not displayed:
    2a1. The patient replaces the battery in the device.
    2a2. The patient contacts the service department of the manufacturing company for device repair.
3a. A session is not selected within first 2 minutes of turning the device on:
    3a1. The Cranio-Electro Stimulation (CES) device turns off.

USE CASE 2: TURN THE POWER OFF

Primary Actors: Patient
Scope: Cranio-Electro Stimulation (CES) device
Level: User goal
Stakeholders and Interests:
Patient - wants to use the Cranial Electrical Stimulation device as a relaxation and meditation tool.

Health Care Providers – want to prescribe this device to patients for whom it is safe to use and want to supervise the use of the device by certain patients who have other complications.
Device manufacturing company – wants to manufacture a properly working Cranial Electrical Stimulation for its customers in order for the company to earn revenue and make profit.
Precondition: Device is currently powered on.
Minimal guarantee: Device shuts off after holding the power button.
Success guarantee: Device shuts off within a second after holding the power button.
Main success scenario:
1. The patient holds the power button down.
2. The device shuts down.
Extensions:
1a. A session is currently running while the patient holds the power button down:
    1a1. The Cranio-Electro Stimulation (CES) device takes up to a second to power off.
2a. The device does not shut down when the patient presses the power button:
    2a1. The patient contacts the service department of the manufacturing company for device repair.

USE CASE 3: END A SESSION

Primary Actors: Patient
Scope: Cranio-Electro Stimulation (CES) device
Level: User goal
Stakeholders and Interests:
Patient - wants to use the Cranial Electrical Stimulation device as a relaxation and meditation tool.
Health Care Providers – want to prescribe this device to patients for whom it is safe to use and want to supervise the use of the device by certain patients who have other complications.
Device manufacturing company – wants to manufacture a properly working Cranial Electrical Stimulation for its customers in order for the company to earn revenue and make profit.
Precondition: Current session is completed naturally (without the patient ending the session early or through battery depletion)
Minimal guarantee: The device ends with a Soft Off™.
Success guarantee: The device ends with a Soft Off™ and LED lights of the device scroll from 8 to 1.
Main success scenario:
1. The session ends with a Soft Off™: which is a gradual reduction of the CES stimulus.
2. After the Soft Off™ occurs, the unit will proceed to power off.
3. The CES device graph's LED lights scroll from 8 to 1 to confirm that a Soft Off™ is in progress.
4. The patient is presented with the option of whether they want to store their therapy and add it to the history of treatment. See use case *Record Therapy And Add To Treatment History*.
Extensions:
1a. The session does not end with a Soft Off™:
    1a1. The patient contacts the service department of the manufacturing company for device repair.
2a. The unit does not turn off after a Soft Off™:
    2a1. The patient contacts the service department of the manufacturing company for device repair.
    2b1. The patient forces the unit to turn off by using the power button. See use case *Turn the Power Off*.
3a. The LED lights of the device do not scroll from 8 to 1:

3a1. The patient contacts the service department of the manufacturing company for device repair.

USE CASE 4: DETECT BATTERY LEVEL

Primary Actor: Patient
Scope: Cranio-Electro Stimulation (CES) device
Level: User goal
Stakeholders and Interests:
Patient - wants to use the Cranial Electrical Stimulation device as a relaxation and meditation tool.
Health Care Providers – want to prescribe this device to patients for whom it is safe to use and want to supervise the use of the device by certain patients who have other complications.
Device manufacturing company – wants to manufacture a properly working Cranial Electrical Stimulation for its customers in order for the company to earn revenue and make profit.
Precondition: There is a 9V battery inserted in the CES device and it has been turned on.
Minimal guarantee: The battery level is displayed on the graph for a few seconds when the device is first turned on.
Success guarantee: The battery level is displayed on the graph for a few seconds when the device is first turned on and it is monitored and the correct level is displayed periodically while the session is running, where the level bars also blink as a warning when the battery is low.
Main success scenario:
1. The battery level is displayed on the graph for a few seconds when the device is first turned on.
2. As the therapy session starts, the battery starts to deplete according to the length of therapy and intensity selected by the patient as well as connection to skin. The higher the intensity and length of therapy selected, the faster the battery depletes. The battery does not deplete when there is no connection.
3. The battery level is monitored and displayed periodically as the session runs.
4. When the battery gets low, the graph displays two bars and blinks as a warning.
5. When the battery becomes critically low, the graph displays a single blinking bar as a warning. If this happens when the unit is turned on, then the patient replaces the battery immediately. If this occurs during a therapy session, then the session ends early, and the battery indicator continues to blink for a short period of time.
6. If the session ended early due to the battery becoming critically low, then the patient changes the battery before the next session begins.
7. The battery level stays the same after the device turns off and until it is turned back on again.
Extensions:
1a. The battery level is not displayed on the graph for a few seconds when the device is first turned on:
    1a1.The patient replaces the battery in the device.
2a. The battery depletes quicker than usual, even for shorter durations of therapy and lower intensities.
    2a1. The patient replaces the battery in the device.
    2a2. The patient contacts the service department of the manufacturing company for device repair.
2b. The battery depletes even when there is no connection:
    2b1. The patient contacts the service department of the manufacturing company for device repair.

3a. The battery levels are not displayed periodically as the session runs:
    3a1. The patient contacts the service department of the manufacturing company for device repair.
3b. The battery levels are not correctly monitored, and wrong values are displayed:
    3b1. The patient contacts the service department of the manufacturing company for device repair.
4a. The graph does not display two blinking bars when battery is low:
    4a1. The patient replaces the battery in the device.
    4a2. The patient contacts the service department of the manufacturing company for device repair.
5a. The graph does not display one blinking bar when battery is critically low:
    5a1. The patient replaces the battery in the device.
    5a2. The patient contacts the service department of the manufacturing company for device repair.
5b. The patient does not replace the battery immediately even when the battery is critically low when the unit is turned on:
    5b1. The session ends early, and the battery indicator continues to blink for a short period of time.
6a. The patient does not change the battery before the next session when the current session ended early due to battery being critically low:
    6a1. The device does not turn on during the time of the next session.
    6a2. The device turns on, the graph displays a single blinking bar and the device immediately turns off.
7a. The battery does not retain its value when the device is normally switched off:
    7a1. The patient replaces the battery in the device.
    7a2. The device does not turn on during the time of the next session.
    7a3. The patient contacts the service department of the manufacturing company for device repair.

USE CASE 5: SELECT SESSION GROUP AND TYPE

Primary Actor: Patient
Scope: Cranio-Electro Stimulation (CES) device
Level: User goal
Stakeholders and Interests:
Patient - wants to use the Cranial Electrical Stimulation device as a relaxation and meditation tool.
Health Care Providers – want to prescribe this device to patients for whom it is safe to use and want to supervise the use of the device by certain patients who have other complications.
Device manufacturing company – wants to manufacture a properly working Cranial Electrical Stimulation for its customers in order for the company to earn revenue and make profit.
Precondition: The CES device is powered on and has sessions programmed into it.
Minimal guarantee: The power button can be used to switch between session groups.
Success guarantee: Lit group icon changes as power button is used to switch between groups and a session number is highlighted as INT up or down is pressed.

Main success scenario:
1. The patient presses and releases the power button to switch between the three standard session groups (20 minutes, 45 minutes, user designated length of time).
2. As the patient switches between the standard session groups, the lit group icon changes.
3. The patient then presses the INT up or down buttons to highlight a session number (4 session types per group).
4. The selected session's frequency icons light up to indicate the frequency range and CES pulse type that will be used.
5. Patient presses the select button to start the highlighted session.
6. The session number flashes and begins after five seconds.
Extensions:
1a. The power button does not work to switch between the session groups:
    1a1. The patient contacts the service department of the manufacturing company for device repair.
2a. The lit group icon does not change:
    2a1. The patient contacts the service department of the manufacturing company for device repair.
3a. The INT up or down buttons do not work:
    3a1. The patient contacts the service department of the manufacturing company for device repair.
4a. The selected session's frequency icon does not light up:
    4a1. The patient contacts the service department of the manufacturing company for device repair.
5a. The select button does not work:
    5a1. The patient contacts the service department of the manufacturing company for device repair.
6a. The session number does not flash:
    6a1. The patient contacts the service department of the manufacturing company for device repair.
6b. The session does not begin after five seconds:
    6b1. The patient replaces the battery in the device.
    6b2. The patient contacts the service department of the manufacturing company for device Repair.
6c. The session is interrupted if connection is lost (this can happen anytime during the session):
    6c1. The patient tries to fix the connection to resume the treatment. See use case *Perform Connection Tes*t.

USE CASE 6: PERFORM CONNECTION TEST

Primary Actor: Patient
Scope: Cranio-Electro Stimulation (CES) device
Level: User goal
Stakeholders and Interests:
Patient - wants to use the Cranial Electrical Stimulation device as a relaxation and meditation tool.

Health Care Providers – want to prescribe this device to patients for whom it is safe to use and want to supervise the use of the device by certain patients who have other complications.
Device manufacturing company – wants to manufacture a properly working Cranial Electrical Stimulation for its customers in order for the company to earn revenue and make profit
Precondition: Session is currently running.
Minimal guarantee: Device performs a connection test.
Success guarantee: Device performs a connection test and displays the connection status.
Main success scenario:
1. Device enters a test mode to check for an electrical connection at the start of the session.
2. The graph displays the current status of the connection ('No Connection'- red, 'Okay'- yellow Connection, or 'Excellent Connection'- green).
3. Once a connection has been confirmed, the display will go blank.
4. The device runs with either an 'Okay' or 'Excellent' connection.
5. If the connection is 'Okay' or 'Excellent' then both the 'L' 'R' icons are lit green, otherwise they are lit red.
6. Connection test ends, allowing for intensity to be adjusted. See use case *Adjust Intensity.*
Extensions
2a. The ear clips are disconnected:
    2a1. The device pauses the session and waits for the ear clips to be reconnected. No connection will display for a few seconds. The graph scrolls up and down indicating that the unit is returning the voltage to a safe testing level (this may take up to 20 seconds).The 'L' and 'R' lights may turn red as well.
2b . The device does not display the current connection status:
    2b1. The patient contacts the service department of the manufacturing company for device repair.
4a. "No connection" is displayed:
    4a1. To get a better connection, the patient wets their earlobes with tap water or a tiny amount of conductive gel.

USE CASE 7: ADJUST INTENSITY

Primary Actor: Patient
Scope: Cranio-Electro Stimulation (CES) device
Level: User Goal
Stakeholders and Interests:
Patient - wants to use the Cranial Electrical Stimulation device as a relaxation and meditation tool.
Health Care Providers – want to prescribe this device to patients for whom it is safe to use and want to supervise the use of the device by certain patients who have other complications.
Device manufacturing company – wants to manufacture a properly working Cranial Electrical Stimulation for its customers in order for the company to earn revenue and make profit.
Precondition: Connection test completed with an 'excellent' or 'okay' connection.
Minimal guarantee: Intensity is adjusted as the INT up or down buttons are pressed.
Success guarantee: Intensity is adjusted as the INT up or down is pressed with the graph lights 1 to 8 showing an approximate intensity level and when adjusting the intensity, the topmost lit number blinks.

Main success scenario:
1. The patient presses the INT up button to increase the intensity and INT down button to decrease the intensity.
2. As the patient adjusts the intensity, the topmost lit number blinks.
3. The patient sets the intensity so that it can just barely be felt.
4. The graph lights 1 to 8 show an approximate intensity level and the correct number lights up based on the intensity the patient adjusts to.
Extensions:
1a. The INT up or down button does not work to switch between the intensity levels:
    1a1. The patient contacts the service department of the manufacturing company for device repair.
2a. The topmost lit number does not blink.
    2a1. The patient contacts the service department of the manufacturing company for device repair.
3a. The patient sets the intensity too high:
    3a1. This may result in skin irritation for the patient.
4a. The graph lights do not work to show the correct intensity level:
    4a1. The patient contacts the service department of the manufacturing company for device repair.

USE CASE 8: RECORD THERAPY AND ADD TO TREATMENT HISTORY

Primary Actor: Patient
Scope: Cranio-Electro Stimulation (CES) device
Level: User Goal
Stakeholders and Interests:
Patient - wants to use the Cranial Electrical Stimulation device as a relaxation and meditation tool.
Health Care Providers – want to prescribe this device to patients for whom it is safe to use and want to supervise the use of the device by certain patients who have other complications.
Device manufacturing company – wants to manufacture a properly working Cranial Electrical Stimulation for its customers in order for the company to earn revenue and make profit.
Precondition: The previous session is completed naturally (not through battery depletion or through the user ending a session earlier than the session's designated time duration)
Minimal guarantee: The patient is able to add their previous session information as a record to the treatment history to be viewed later on.
Success guarantee: The patient is able to add their previous session information as a record to the treatment history to be viewed later on, and takes any intensity adjustments during sessions into consideration.
Main success scenario:
1. The patient is prompted as to whether or not they want their previous session to be recorded upon its completion.
2. The patient chooses to record information related to the previous therapy session.

3. The previous session's type, duration, and intensity level is stored and saved as an individual record. If intensity level was adjusted multiple times while the previous session was running, then the device instead uses the final adjusted intensity for the session's record.
4. The new session's record is added to the device's treatment history.
5. The device displays all previously recorded therapy sessions if the patient chooses to view them .

Extensions:

1a. The patient is never prompted to have the session recorded after their session ends:
    1a1. The patient contacts the service department of the manufacturing company for device repair.
2a. The patient is not being able to use device interface to choose the session to be recorded:
    2a1. The patient contacts the service department of the manufacturing company for device repair.
3a. The history does not record all the necessary information:
    3a1. The patient contacts the service department of the manufacturing company for device repair
4a. The record was not properly added to the device's treatment history:
    4a1. The patient contacts the service department of the manufacturing company for device repair.
5a. The device does not output it's previously recorded therapy session records to the record history interface:
    5a1. The patient contacts the service department of the manufacturing company for device repair.

**** Use case diagram on next page**

Use case diagram: