Final Group Project
Group 46

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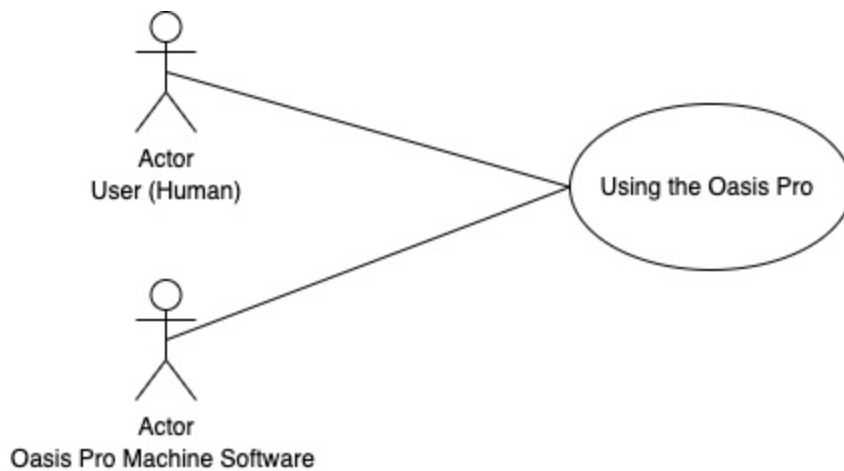
Object-Oriented Software Enginering
COMP 3004
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Use Cases

Using The Oasis Pro

Primary actor:
User (Human)
Secondary actor:
Oasis pro machine software
Level:
Summary
Stakeholders and Interests:
User - Want to use the machine to stimulate their brain
Raven Microcurrent Biofeedback Inc. - Want to make sure that their product is working properly and satisfies users
Precondition:
A 9V battery has been inserted into the machine and the user has the electrodes placed in their ear properly (removed interference eg. glasses, earring, other objects, etc.)
Success guarantees:
The user uses the machine and stimulates their brain
Main success scenario:
1. The user clicks on/off button to turn on the oasis pro
2. The user selects a session length from the available options by clicking on the indicated length buttons at the top of the machine (20 minutes, 45 minutes, user-designated)
3. The user clicks on the select button to confirm their session length choice
4. The user selects a session type from the available options by clicking on the type buttons at the top of the machine(MET, Sub-Delta, Delta, Theta)

5. The user selects a session intensity by clicking the intensity buttons (numbers 1-8)
6. The user clicks the select button to confirm their session type and intensity choice
7. The user clicks the connection button to test connection
8. The machine runs a connection test and blinks red, yellow, or green based on how good the connection is
9. The user clicks on the select button to confirm that the session should start
10. The user can now relax and enjoy
11. The session has ended, and the machine automatically shuts off
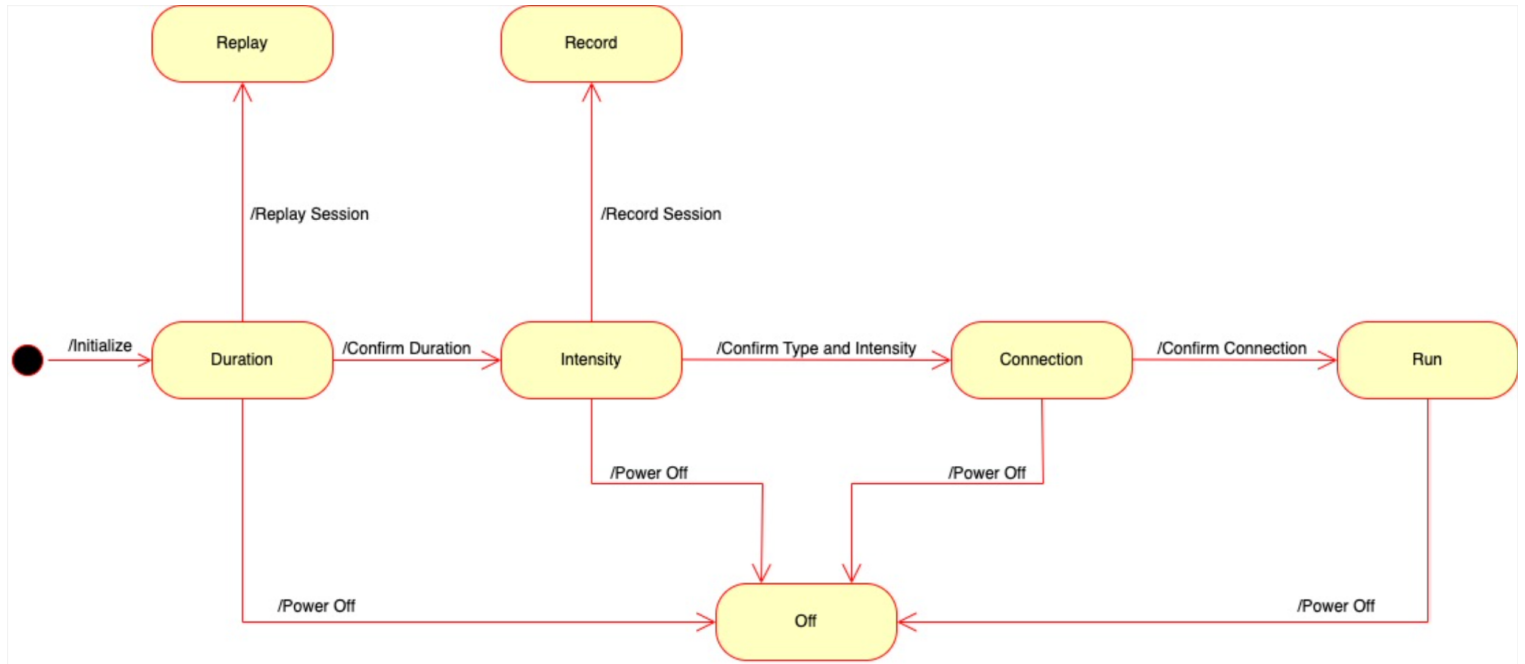
Extensions:

1a. No session is selected in the first 2 minutes, and the machine turns off

2a. The user decides to switch between groups

       2a1. The user clicks a different session length button to highlight a session number(20min, 45 min, and user-designated)

       2a3. The user presses the select button to confirm choice

2b. The user decides to replay a previous session

       2b1. The user clicks the replay a previous session button

       2b2. The user clicks the up or down arrow to move through the previous session

       2b3. The user clicks on the select button to select a previous session and start it

4a. The user decides to adjust the session type by clicking on a different session type (MET, Sub-Delta, Delta, Theta)

5a. The user decides to adjust the intensity level by clicking on the intensity numbers (1 through

8a. The connection is bad and the machine commences soft off

6a. The user decides to record session

       6a1. The user presses the record session button

7a. The connection test indicates the connection is not strong and the user readjusts the ear clips before proceeding

10a. The battery level is low, and the 2-bar battery level indicator is blinking

10b. The battery level is critically low, the 1 bar battery level indicator is blinking

       5b1. The session ends early and the machine will not turn on again until the battery is replaced

10c. The ear clips are disconnected mid-session, The session is paused and the connection indicator blinks red until the clips are reconnected.
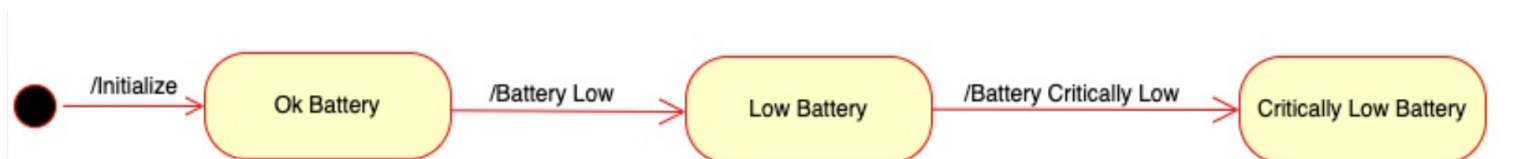
UML Class Diagram:

Machine

- recorded_sessions: int[]
- recorded: int
- curr_int: int
- state: int

+ session_string(Session s, int i):string
+ bool add_recorded_session(Session s)
+ bool start_session(s:Session);
+ bool ok_button(): bool
+ bool session_setup_button(): bool
+ bool record_session(): bool
+ bool unrecord_session() :bool
+bool record_button(bool): bool
+ bool replay_button(bool,s: string):bool
+ no_connection(): void
+ ok_connection(): void
+ ex_connection(): void
+ checkOffState(): bool
+ updateBattery(x: int):void
+ critically_low(): void
+ low_battery(): void
+ ok_battery(): void
+ battery_depletion(duration:int, intensity:int, connection: bool): bool
+ connectionButton(): int
+ turnOff(): void
+ turnOn(): void

Power

- id: int
- status: bool

+ turn_off(): void
+ turn_on(): void
+ soft_off(): void

Battery

- id : int
- life : int
- state : int

+ updateBattery(int): void
+ critically_low(): void
+ low_battery(): void
+ ok_battery(): void
+ battery_depletion(duration:int, intensity:int, connection: bool): int

MainWindow

- ui: MainWindow

- on_selectButton_clicked(): void
- on_replayButton_clicked(): void
- on_recordButton_clicked(): void
- on_powerButton_clicked(): void
- on_intensity1_clicked(): void
- on_intensity2_clicked(): void
- on_intensity3_clicked(): void
- on_intensity4_clicked(): void
- on_intensity5_clicked(): void
- on_intensity6_clicked(): void
- on_intensity7_clicked(): void
- on_intensity8_clicked(): void
- on_type1Button_clicked(): void
- on_type2Button_clicked(): void
- on_type3Button_clicked(): void
- on_type4Button_clicked(): void
- on_replayButton_clicked(): void
- on_twentyTimeButton_clicked(): void
- on_fortyFiveTimeButton_clicked(): void
- on_userDesTimeButton_clicked(): void
- on_upButton_clicked(): void
- on_downButton_clicked(): void
- on_connectionButton_clicked(): void
- enableType(): void
- enableIntensity(): void
- timer(): void
- enableRecord(): void

Session

- id : int
- duration : int
- date : QDate
- time : QTime
- intensity : int
- st : int

+ print() :void

Connection

-connection_number: int
- id: int

+ no_connection(): bool
+ ok_connection(): bool
+ ex_connection(): bool
+ testmode(): int

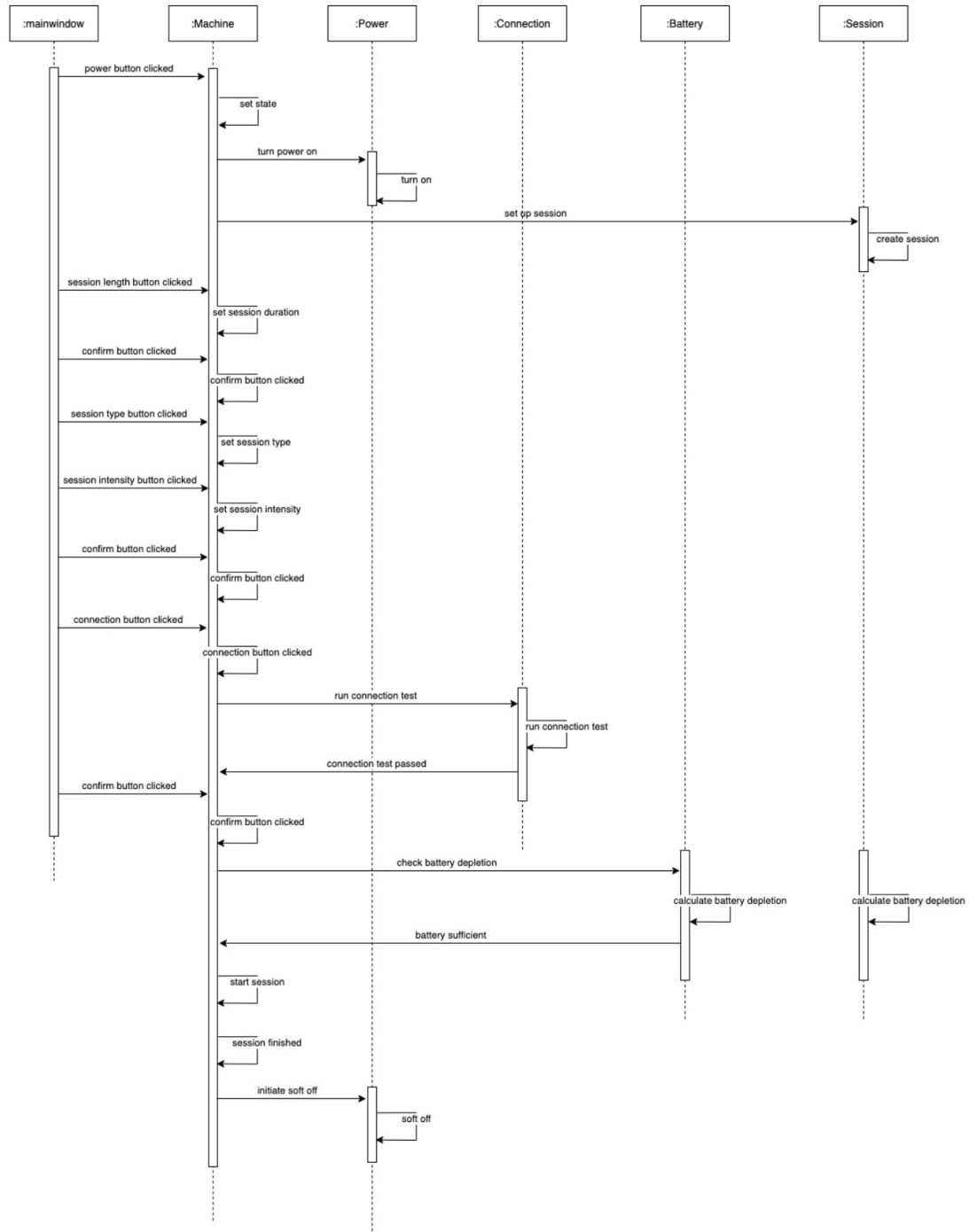UML State Diagrams:
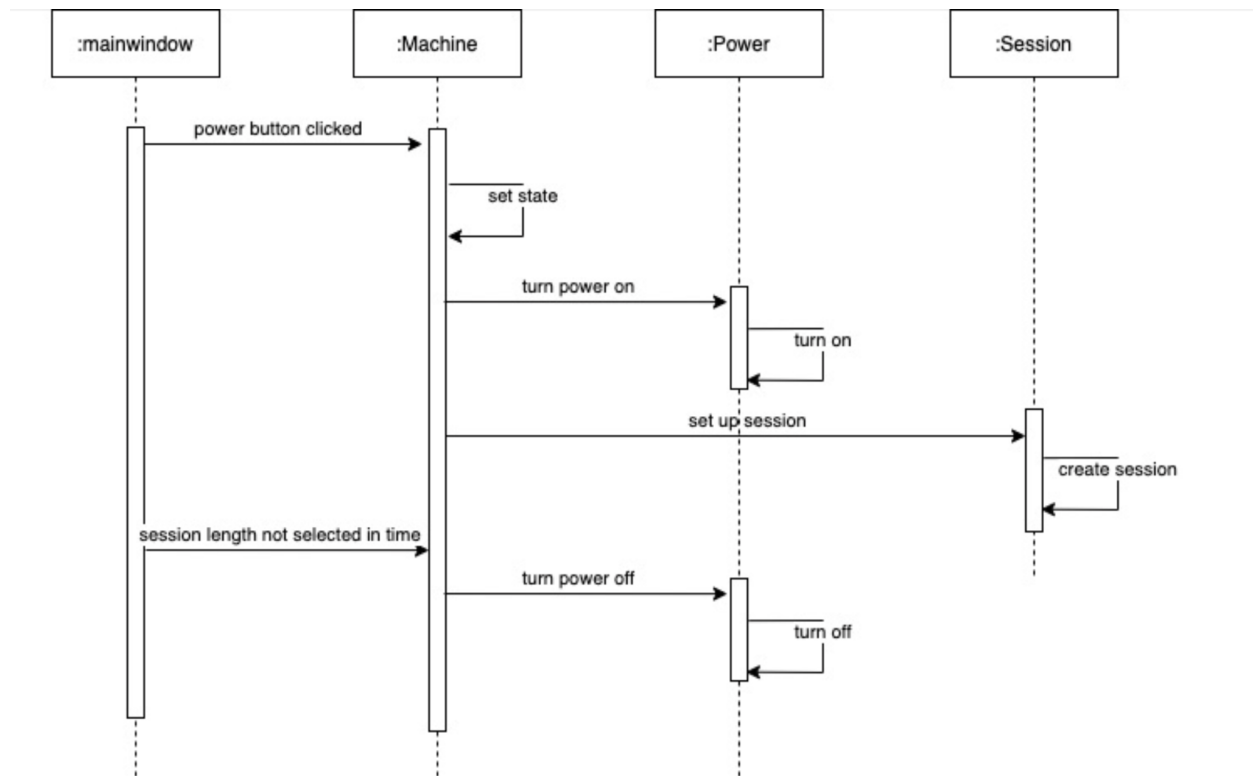
Machine State Diagram
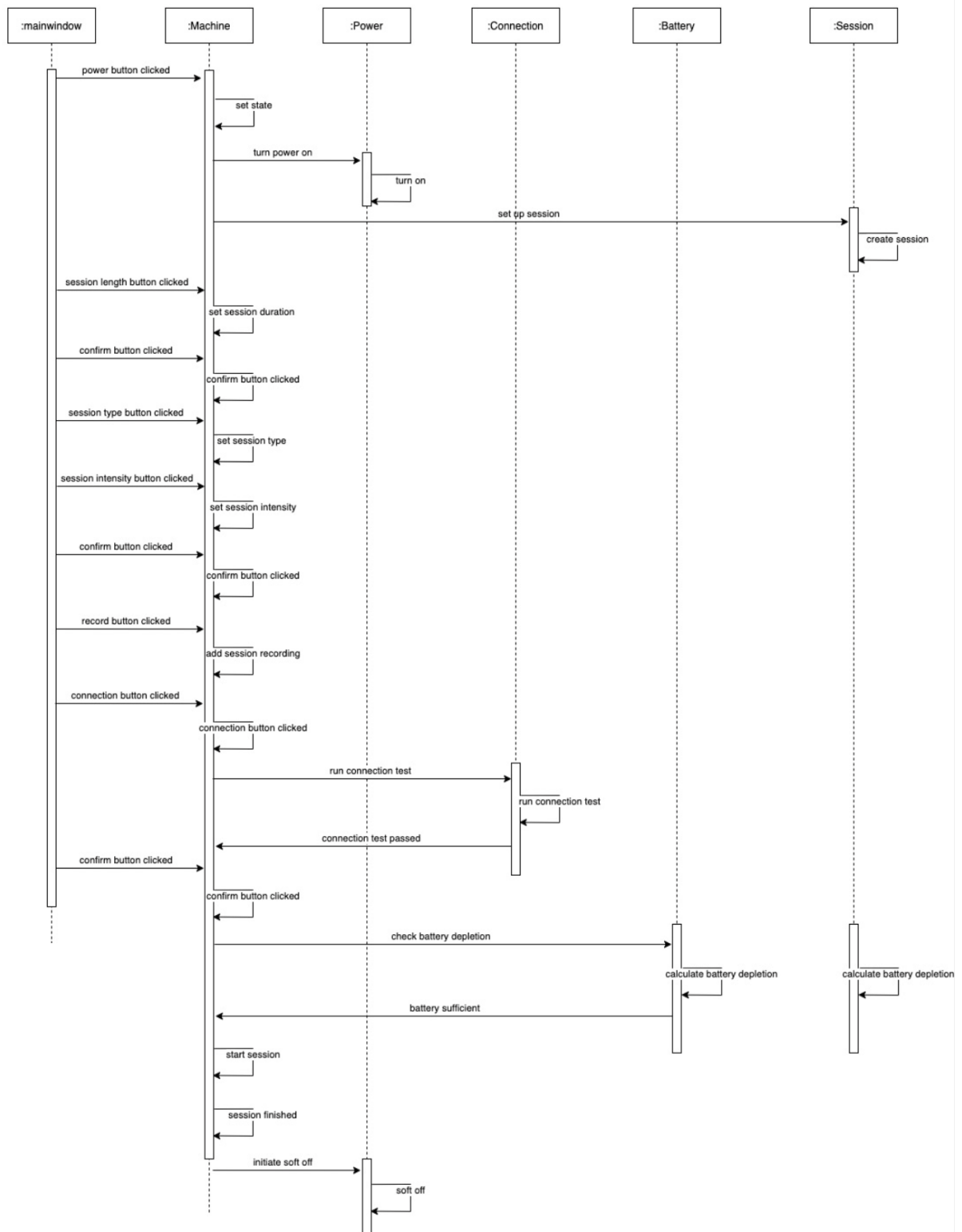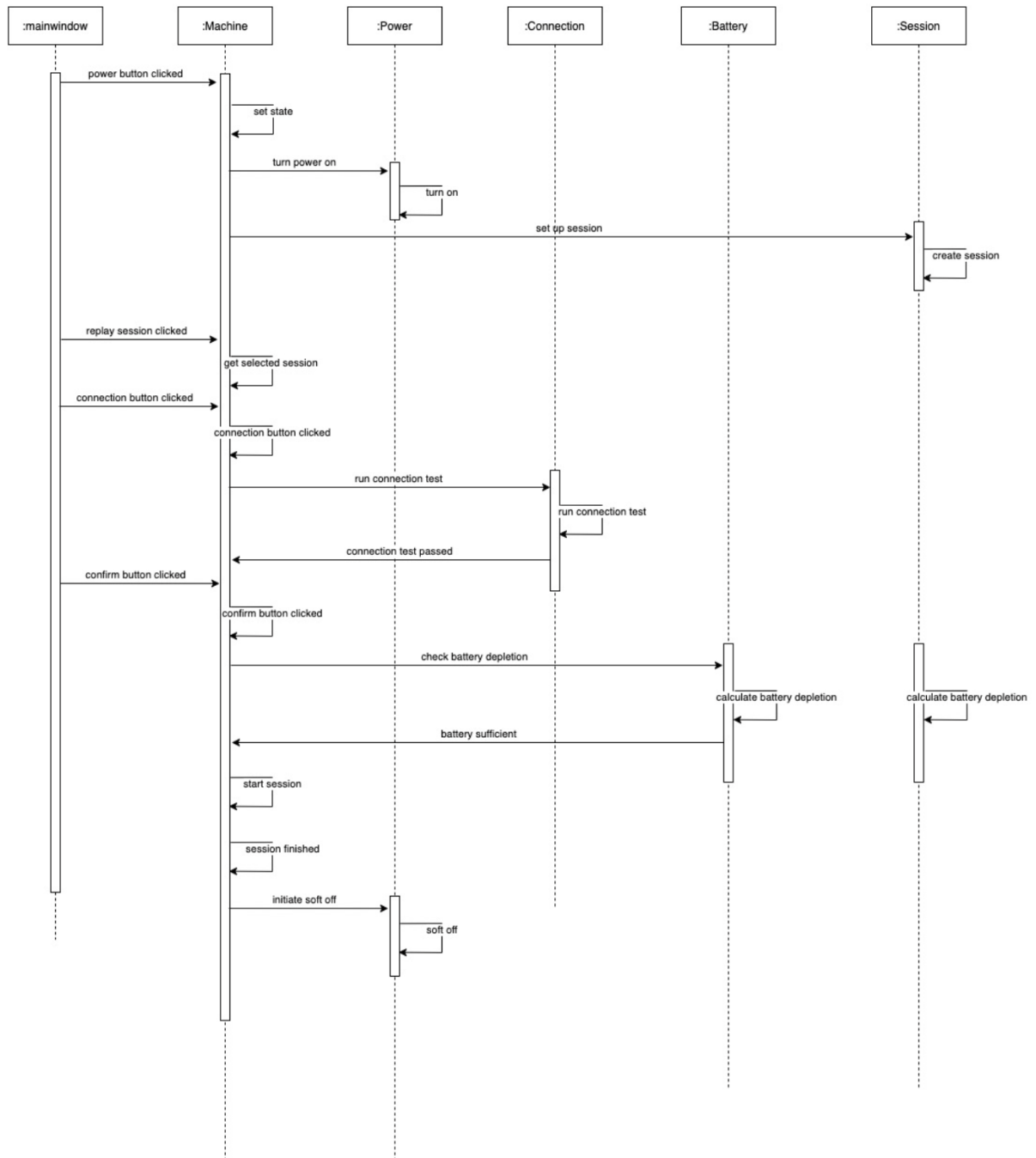

Battery State Diagram

UML Sequence Diagram:

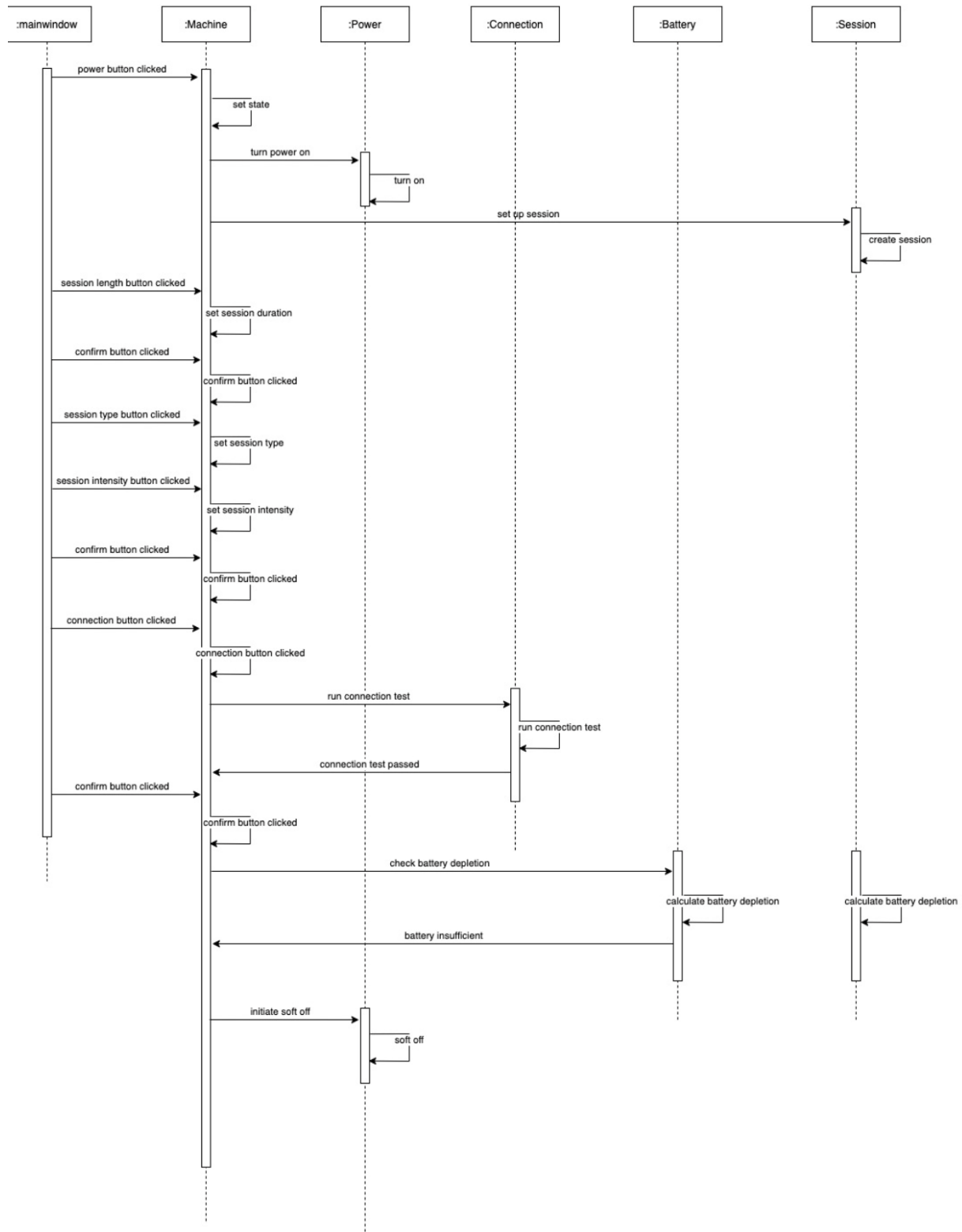Main Case

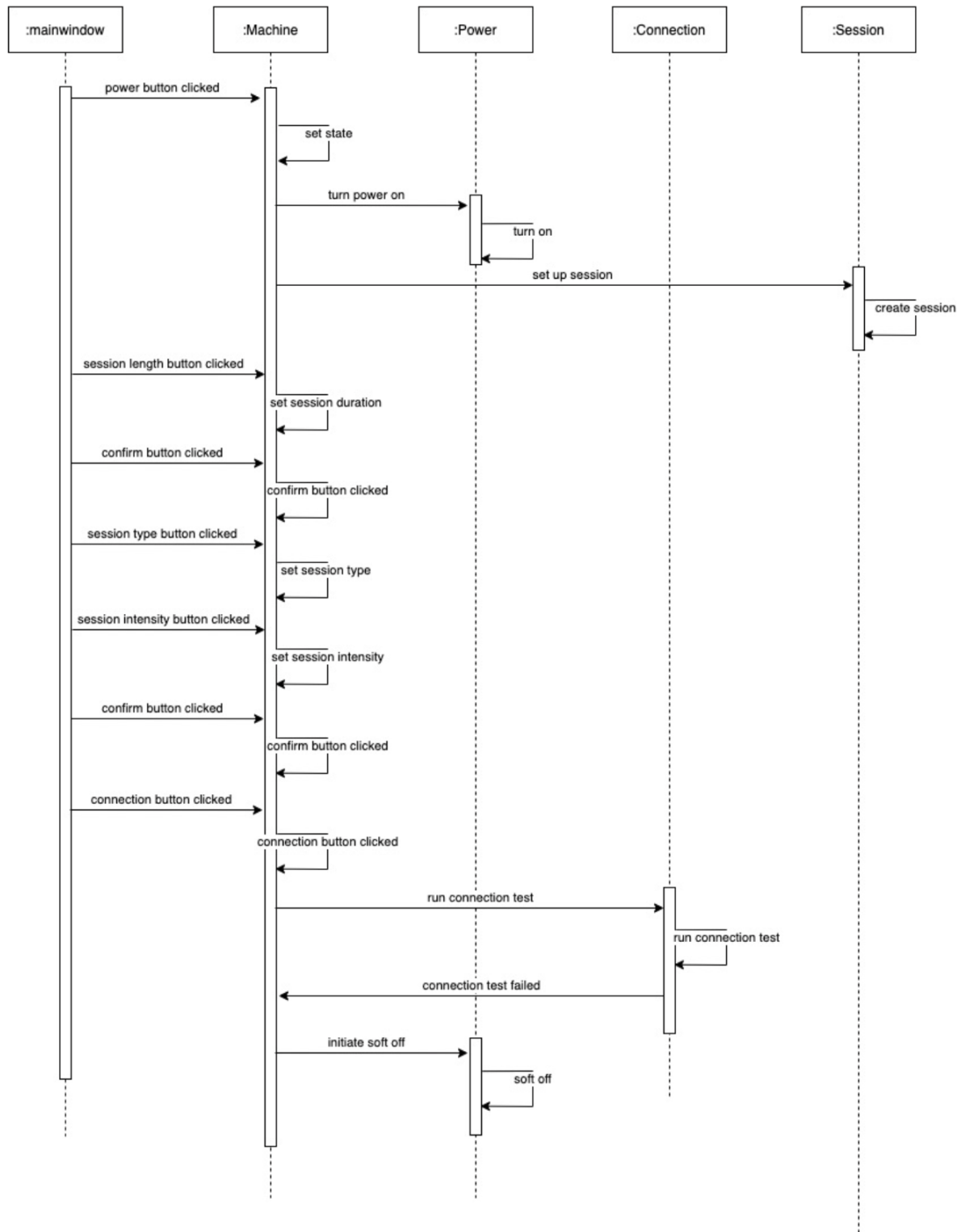## No Session Selected in the First Two Minutes Case

Recording Session Case

Sequence diagram participants: :mainwindow, :Machine, :Power, :Connection, :Battery, :Session

- power button clicked (mainwindow → Machine)
- set state (Machine → Machine)
- turn power on (Machine → Power)
- turn on (Power → Power)
- set up session (Machine → Session)
- create session (Session → Session)
- session length button clicked (mainwindow → Machine)
- set session duration (Machine → Machine)
- confirm button clicked (mainwindow → Machine)
- confirm button clicked (Machine → Machine)
- session type button clicked (mainwindow → Machine)
- set session type (Machine → Machine)
- session intensity button clicked (mainwindow → Machine)
- set session intensity (Machine → Machine)
- confirm button clicked (mainwindow → Machine)
- confirm button clicked (Machine → Machine)
- record button clicked (mainwindow → Machine)
- add session recording (Machine → Machine)
- connection button clicked (mainwindow → Machine)
- connection button clicked (Machine → Machine)
- run connection test (Machine → Connection)
- run connection test (Connection → Connection)
- connection test passed (Connection → Machine)
- confirm button clicked (mainwindow → Machine)
- confirm button clicked (Machine → Machine)
- check battery depletion (Machine → Battery)
- calculate battery depletion (Battery → Battery)
- calculate battery depletion (Session → Session)
- battery sufficient (Battery → Machine)
- start session (Machine → Machine)
- session finished (Machine → Machine)
- initiate soft off (Machine → Power)
- soft off (Power → Power)

Replaying a Session Case

Battery Insufficient To Run Session Case

:mainwindow	:Machine	:Power	:Connection	:Battery	:Session

power button clicked →

set state

turn power on →

turn on

set up session →

create session

session length button clicked →

set session duration

confirm button clicked →

confirm button clicked

session type button clicked →

set session type

session intensity button clicked →

set session intensity

confirm button clicked →

confirm button clicked

connection button clicked →

connection button clicked

run connection test →

run connection test

connection test passed ←

confirm button clicked →

confirm button clicked

check battery depletion →

calculate battery depletion

calculate battery depletion

battery insufficient ←

initiate soft off →

soft off

Bad Connection Case

:mainwindow	:Machine	:Power	:Connection	:Session

power button clicked

set state

turn power on

turn on

set up session

create session

session length button clicked

set session duration

confirm button clicked

confirm button clicked

session type button clicked

set session type

session intensity button clicked

set session intensity

confirm button clicked

confirm button clicked

connection button clicked

connection button clicked

run connection test

run connection test

connection test failed

initiate soft off

soft off

Traceability Matrix:

Id	Requirement	Related Use Case	Implemented By	Test
1	The interface has a power button that turns on and turns off the machine	Using the Oasis Pro	Power, mainwindow	Run the program on qt creator and click the power button
2	The interface has a battery that displays the battery level and low battery warnings	Using the Oasis Pro	Battery, mainwindow	Run the program on qt creator and click the power button
3	The interface has session length selection	Using the Oasis Pro	Session, mainwindow	Run the program on qt creator, click on the power button then choose a length
4	The interface has session type selection	Using the Oasis Pro	Session, window	Run the program on qt creator, click on the power button then choose a type
5	The interface has session intensity selection	Using the Oasis Pro	Session, mainwindow	Run the program on qt creator, click on the power button then choose an intensity
6	The interface has a connection button that performs a connection test that blinks the appropriate colors	Using the Oasis Pro	Connection, mainwindow	Run the program on qt creator, click on the power button then choose a a length, type, and intensity. Then click the

				connection button to run the connection test
7	The interface has a record button that can record a session	Using the Oasis Pro	Machine, mainwindow	Run the program on qt creator, click on the power button then choose a a length, type, and intensity. Before running the connection button, click the record button. Then run the connection text and confirm the selection
8	The interface has a reply button that allows the user to replay a previously recorded session	Using the Oasis Pro	Machine, mainwindow	Run the program on qt creator, click the on button, use the arros to navigate through recorded sessions, and once one is selected click the replay button, then run the connection test and start session
9	The interface has a select button that confirms user selections	Using the Oasis Pro	Machine, mainwindow	Run the program on qt creator
10	The interface has buttons that perform their specified functions		mainwindow	Run the program on qt creator

11	The interface has a screen that displays previously recorded sessions	Using the Oasis Pro	mainwindow	Run the program on qt creator
12	The battery is dependent on intensity, duration, and a connection	Using the Oasis Pro	Battery, Machine	Run the program on qt creator, and run different kinda of sessions, they will deplete the battery with different variabilities
13	Session only runs if the battery is sufficient enough to handle the intensity	Using the Oasis Pro	Battery, Machine	Run the program on qt creator, click the power on button and go through the steps of running a session
14	Session will only run if the connection is good or excellent	Using the Oasis Pro	Connection, Machine	Run the program on qt creator, click on the power on button and go through the steps of running a session
15	Session will stop running is the connection becomes bad	Using the Oasis Pro	Connection, Machine	Run the program on qt creator, change the connection bvaribale to bad connection and go through the steps of running a session
16	The machine will turn off if a session length is not selected	Using the Oasis Pro	Machine	Run the program on qt creator, click the power on button

	within the first two minutes			
17	The user can change the selected session length, type, and intensity before confirming the selection	Using the Oasis Pro	Session, Machine	Run the program on qt creator, click the power button, click on a duration, then switch the chosen to duration by clicking on another duration button