Report

Background

In the given requirements, there are two distinct use cases involving two roles: Sally and her son, John.

For Sally's scenario, it can be divided into two main parts. The first pertains to her time at the office. Sally desires the boiler to be turned off when she leaves for work and to automatically turn on shortly before her return. This ensures that the house is comfortably warm upon her arrival. The second part relates to her sleeping hours. Sally prefers the boiler to remain on throughout the night, but only at a limited temperature, ensuring the environment is neither too cold nor excessively warm.

In John's scenario, the requirements are straightforward. When he returns from school and feels cold, he wants the ability to set a specific temperature on the boiler.

Problem space & Pact analysis

Simplifying the background, it is evident that there are two distinct requirements to be implemented. For Sally, the boiler should turn off or on at specific temperatures during designated time periods. In John's scenario, the focus is on setting a specific temperature and maintaining it for an extended duration.

From the background and requirements, the PACT analysis reveals the following insights:

People:

- Sally: A mother who desires varying temperatures in her home at different times.
- John: Sally's son, a student attending school.

Activities:

- house will be warm when she wake up
- the boiler will be turn off during Sally's office hours.
- the house will be warm when she come back

- Maintaining a cool yet comfortable temperature throughout the night.
- Promptly adjusting the home's temperature to a specific setting

Contexts:

- Sally's home experiences varied temperatures throughout the day.

Technologies:

- The boiler automatically turn on and off depending on the time of day to reach a specific temperature.
- The boiler will keep turn on unless the set temperature is reached.

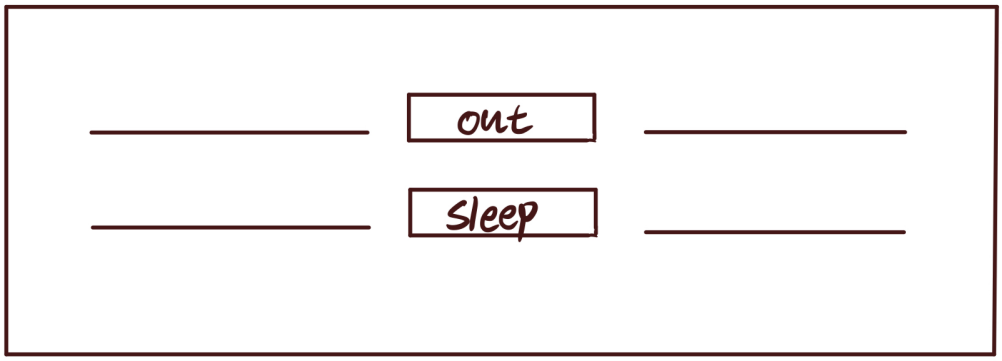
Prototype & UI theory & Heuristic evaluation

From the simplified background and the identified requirements, it's clear that two distinct functionalities are needed. Consequently, two separate widgets should be designed in the GUI to cater to these requirements.

1. Sally's Requirement Widget:

This widget will cater to Sally's specific needs. The design should allow users to:

- Set specific time intervals, possibly using a slider or a time input field. This will determine when the boiler turns on or off.
- Include buttons on either side of the time range to easily adjust the start and end times.
- For the sleeping hours, a similar interface design should be maintained to ensure consistency and ease of use.

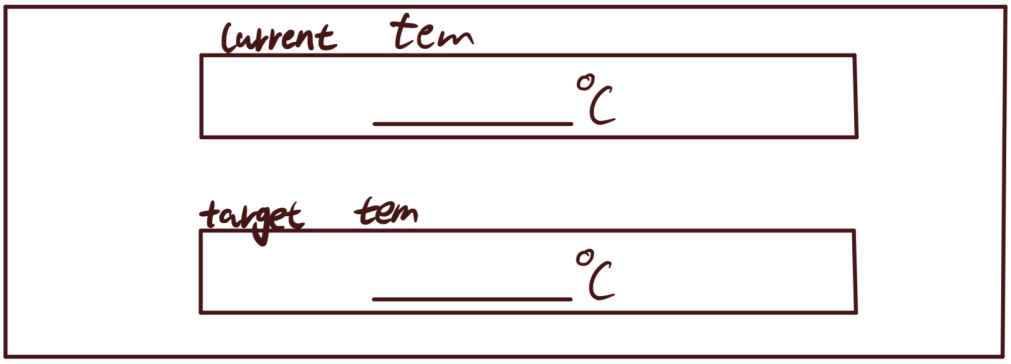


This widget has been keep the UI theory

2. John's Requirement Widget:

For John's simpler requirement, the widget can be more straightforward:

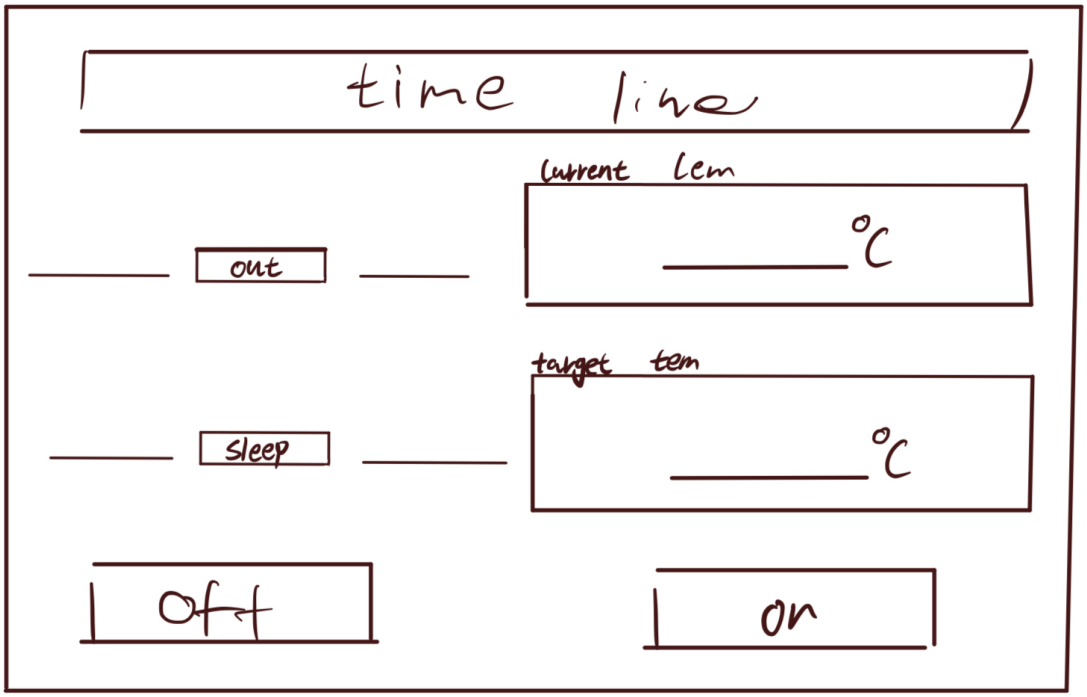
- A temperature setting interface, possibly a dial or a numeric input field, to set the desired temperature and show the current temperature
- A button to activate the boiler with the set temperature.



In the proposed GUI design, it has been maintained a consistent scale corresponding to its intended 20x10cm touch-screen dimensions to ensure seamless implementation. The envisioned application scenario involves the screen being positioned either on a coffee table or mounted on a wall. Given the environmental context, the primary user

task is to specify a desired boiler temperature, effectively directing the system's operation. Consequently, the user interface design should align with an instructive type .

The subsequent diagram presents an initial prototype, derived from the amalgamation of two distinct widgets with the original widgets include turn on and turn off button with the timeline. Upon examination, it is evident that the prototype adequately addresses the fundamental requirements of both use cases. However, certain issues persist. Such as the design's left and right orientations do not adhere to intuitive modular conventions. Additionally, there is a pronounced resemblance between the indicators for current temperature and set temperature, making rapid differentiation challenging. Drawing upon heuristic evaluations and the UI theories elucidated in this module—including the 'Eight Golden Rules', foundational design principles, and other pertinent theories, the final prototype was realized through two successive design iterations.

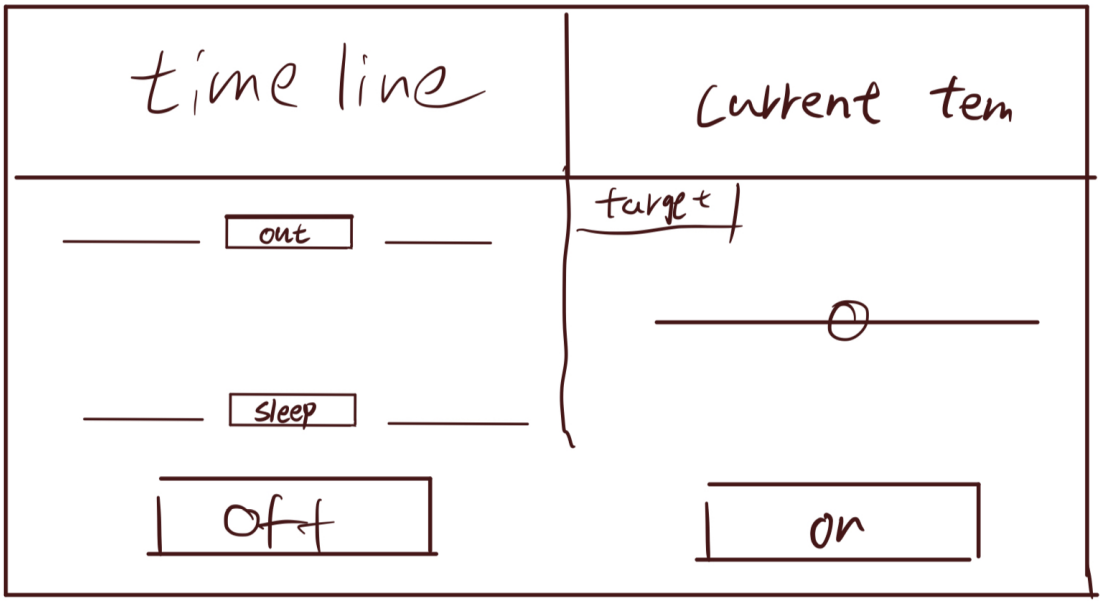


#	issue	Heuristics Violated	Severity
#1	lack of contextual help and documentation	#10	low
#2	Limited options for	#7 #6	medium

	quick temperature adjustments		
#3	inconsistent button labels and placement	#4	high
#4	Lack of real-time feedback for system status	#1	high

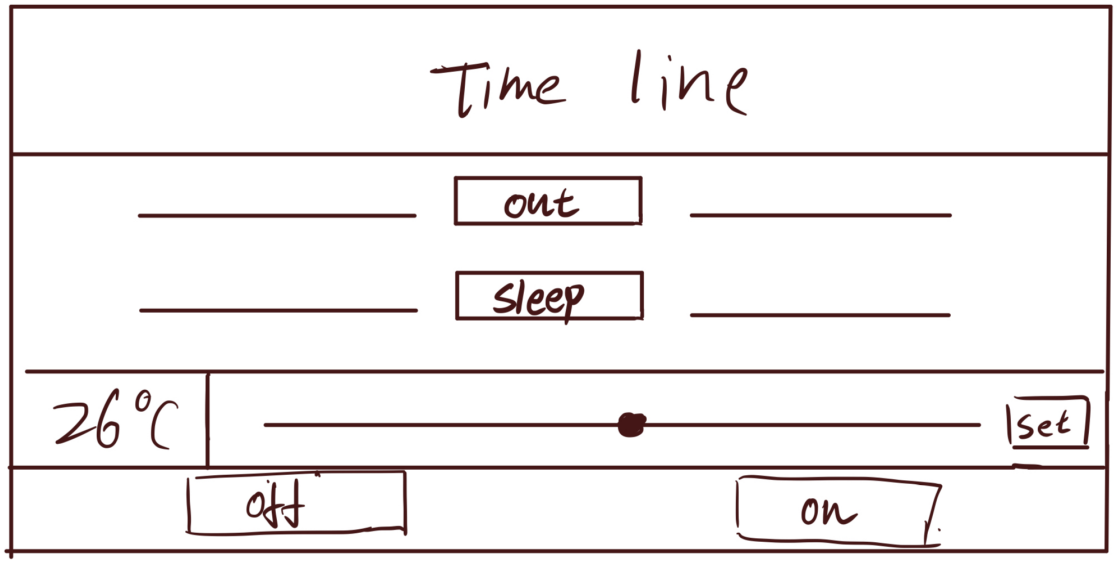
The refined design is now more apt for touch screen operations, underscoring the significance and perceptual considerations of UI theory. Rather than entering values into an input box, the advantage of setting the temperature is more intuitively conveyed to the user via a slider, enhancing the user's overall operational experience. This approach aligns with the 'Offer Informative Feedback' principle from the 'Eight Golden Rules'. Moreover, the modifications are informed by both the Keystroke Level Model and Fitts' Law. Given that human feedback on touch screens necessitates prompt responses, the design offers lucid feedback on temperature adjustments.

The design also introduces a rapid-access window. The foundational boiler functions, namely activation and deactivation, are facilitated by a switch positioned at the GUI's base, ensuring accessibility for both children and adults. This placement resonates with conventional touch screen device usage patterns. The 'Out' and 'Sleep' functions adhere to this convention, with the start time positioned to the left, the end time to the right, and confirmation centralized—a model prevalently employed in time-centric designs.



This prototype was predominantly sculpted under the influence of UI theories. Nonetheless, certain design limitations persisted, prompting a second iterative phase. Post this iteration, the final prototype emerged. The GUI's upper section retains the timeline, while the subsequent segment addresses time-related controls. Given the GUI's envisioned horizontal rectangular interface, the design transitioned to a vertical layout, optimizing screen utilization and aligning with intuitive human interactions. Concurrently, the display of the current boiler temperature was omitted, recognizing that tactile human perception supersedes the need for explicit temperature display—a notion inspired by air conditioning systems. Additionally, within the target temperature section, a QLcdNumber object is strategically positioned on the left, ensuring real-time temperature display.

In summation, this document provides a comprehensive overview of the prototype's design evolution and iterative processes."


Time line
out
sleep
26°C
set
off
on