

USABILITYREPORT

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Introduction

Thermostats or microwaves

After reviewing all the pros and cons of every product we suggested to use for the seminar, we came to choose between a microwave and the thermostat from hell. We obviously picked the thermostat, and not just because the microwave was a little cliché.

This particular thermostat was designed so poorly that even the experienced Interaction Designers in the group couldn't figure out how to use the thing. Mapping the functions of the device was a tough task, considering

that its features weren't obvious at all, and in the end we weren't even sure we mapped all the

It became clear that it was going to be quite a challenge to redesign this device into something more user friendly.



functions of the device.

Who needs to set a different temperature for every day of the week? Not any regular end-user.

Mapping the device

Landis & Gyr Chronogyr Rev 20

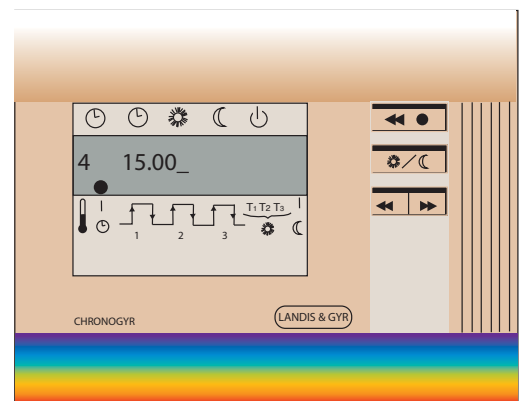
Functions of the device:

- View current time
- View current temperature
- Set schedule using T1, T2, T3: T= Time
- Night feature, allows you to set the night temperature
- Days (1-7) to set temperature to a schedule according to the days (and times listed above)
- Unsure how to use copy function, unsure how to turn off, unsure what day/night key is, unsure what one other key is.
- In order to set current temperature you have to first go through the week schedule (1-7) to find the day that it is, than go through the menu, change the T1, T2, T3 that corresponds to the current time, and than change that temperature. You can not just simply change the temperature as you please, you are on a consistent schedule.

The problems we encounter with the design included:

- The T functions have two separate places in which you enter the time.
- T1= Time 1, example 6:00 to 10:00
- T2= Time 2, example 10:00-18:00
- T3=Time 3, example 18:00-24:00
- For each of these time periods you have to enter the temperature that you would like to have your house at.

“In order to set current temperature you have to first go through the week schedule (1-7) to find the day that it is, than go through the menu, change the T1, T2, T3 that corresponds to the current time, and than change that temperature. You can not just simply change the temperature as you please, you are on a consistent schedule.”



- Buttons are difficult to press, they are placed with plastic around them and they are hard to reach.
- There are icons, such as a sun, a cluck, a moon, etc. These are not clear, it is difficult to tell what they stand for.

Stat from hell

The Landis & Gyr Chronogyr thermostat is probably the worst consumer thermostat that ever hit the market.



Testing the device

Target audience: College students

The testing was based on questions we had developed for each individual. We wanted to find out whether they could understand the symbols and process only by observation; this would help determine whether the thermostat is simple and effective usability or not. Our target audience was college students between the ages of 18 and 23, four people in total; two men and two women.

These were the questions we asked:

1. What do you think each symbol means?
2. How do you view the current temperature? Time?
3. How do you switch from day to day, and view the times and temperatures?
4. (After using the product): Did you think the product was easy or difficult to use? Why?
5. What would you like to see added to/ subtracted from this product? How would you redesign it?



Fun facts

- Many households (perhaps 30% or higher) with programmable thermostats may be unable, unwilling, afraid, uninterested, or otherwise reluctant to deploy default programs or to create or deploy custom programs.
- Many households (about 50%) set back or set up their thermostats manually, thus leaving less savings possibilities to be garnered by a programmable thermostat.
- The automatic program used with the thermostat may not be any more conservative than use of manual thermostats setback or setup by hand.
- Many consumers have mental models of heating and cooling that lead them to believe they will not save energy from setting up or setting back other than long periods of time.

Source: energystar.gov



“He thought it was very difficult to use. He became frustrated and gave up easily on the product.”

TEST RESULTS

Celine Baskal

Age: 22

Sex: F

Major: Law

1. Top row: Knew all the symbols, except couldn't identify the rocking chair beneath the second clock. Bottom row: Knew all the symbols, except the meaning behind the symbol of lines & arrows.
2. Determined the dot on the screen should be placed over the thermostat and clock symbols. To move the dot, the button with arrows should be pressed.
3. Knew that the DAY button had to be used, but didn't know what to do after pressing it.
4. She thought it was very difficult to use. She became frustrated and was unsure how to use the product.
5. She suggested to leave the thermostat at its same size; making it smaller would be difficult to use. The symbols should be more understandable and to reduce the number of them. Also, no buttons should be covered, like how they were on the thermostat with the flap/hood.

Brecht Hermans

Age: 20

Sex: M

Major: Theater Sciences

1. Top row: Knew all the symbols, except couldn't identify the 17 beneath the first clock and the rocking chair beneath the second clock. Bottom row: Knew the thermostat and clock symbols. He thought the symbol of lines & arrows measured the temperatures strength. He couldn't identify the T1, T2, T3 and the crescent shape.

2. Knew the thermostat and clock symbols on the bottom row represented the current temperature and time, but didn't know how to view them.

3. Knew that the DAY button had to be used, but didn't know what to do after pressing it.

4. He thought it was very difficult to use. He became frustrated and gave up easily on the product.

5. He suggested to remove the lines & arrows symbol and therefore the whole T1, T2, T3 system because it was impractical. The current temperature and time should be placed separately from the other symbols and on its own screen so they can be easily viewed. The redesign should be more minimal; all that is needed is the temperature and time, no planning ahead.

Maria Teresa Machado

Age: 23

Sex: F

Major: Law

1. Top row: Knew all the symbols, except couldn't identify the meaning of the rocking chair beneath the second clock. Bottom row: Knew all the symbols, except thought the symbol of lines & arrows represented the different temperature/parts of the day.

2. Knew that the dot should be moved by pressing the button with the arrows, but didn't know that the dot should go over the thermostat and clock.

3. Knew that the DAY button had to be used, but didn't know what to do after pressing it.

4. She thought it was very difficult to use. Slowly she became annoyed because she thought the thermostat system was impractical and required a basic pre-knowledge (ex. instruction manual) in order to use it.

5. She suggested the thermostat shouldn't be as thick and bulky-looking, and should have smooth rounded corners. The buttons heights should be at surface level (not jut out). The symbols should be designed more clearly. Also, the external flap should be removed.

Aashish Dutt

Age: 18

Sex: M

Major: Economics

1. Top row: Knew all the symbols, except couldn't identify the meaning of the rocking chair. Bottom row: Knew all the symbols, except thought the symbol of lines & arrows represented an electrical circuit.

2. Knew the thermostat and clock symbols on the bottom row represented the current temperature and time, but didn't know how to view them.

3. Knew that the DAY button had to be used, but thought the day/night and -/+ buttons had to be used as well.

4. He thought it was very difficult to use. He became frustrated and annoyed, and thought the product was complicated and vague.

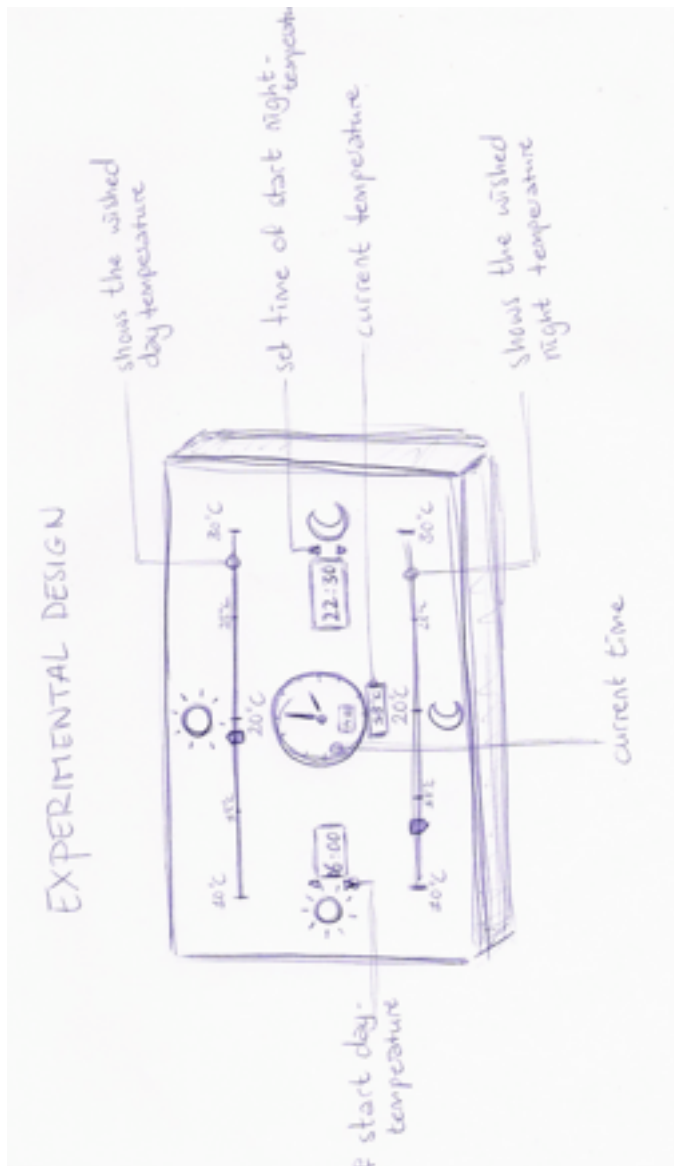
5. He suggested the rocking chair symbol be removed. A different symbol should be used for the clock with the 17 underneath it to represent the 7 days/week. Also, the electrical circuit symbol should be removed because its meaning is unclear and stupid.

Test conclusion

Change is inevitable

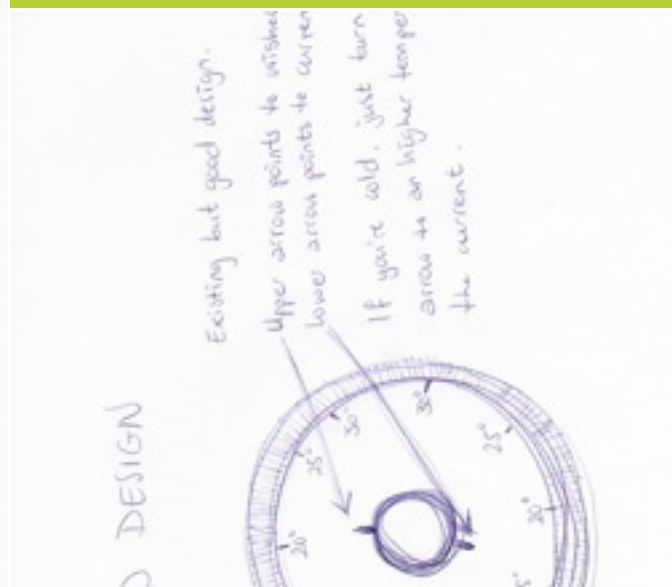
After conducting our tests, we set up a list of the things that *had* to be changed in the first run:

1. Removing certain symbols:
 - Rocking chair
 - 17
 - Lines and arrows
2. Simplifying the system:
 - Removing the pre-planning concept of setting a temperature for a particular day and time
 - Make temperature adjustments simple (hotter or colder, that's it)
 - Allow only the current time to be shown
3. Simplify the symbols.
4. Redesign the product's physical appearance (industrial design).



“Designing useful and attractive products requires skill and creativity. As products evolve from initial ideas through conceptual design and prototypes, iterative cycles of design and evaluation help to ensure that they meet users’ needs.”

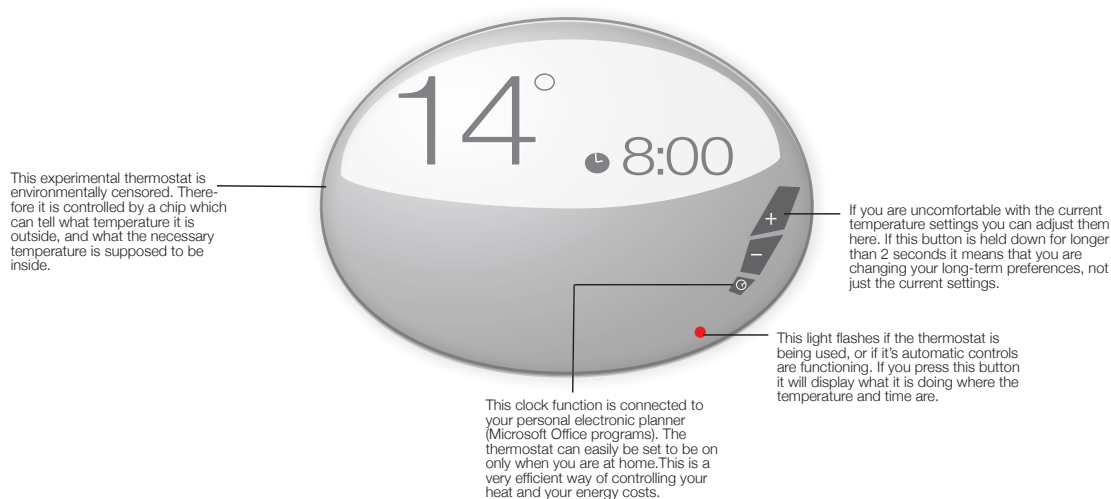
Preece, Rogers & Sharp

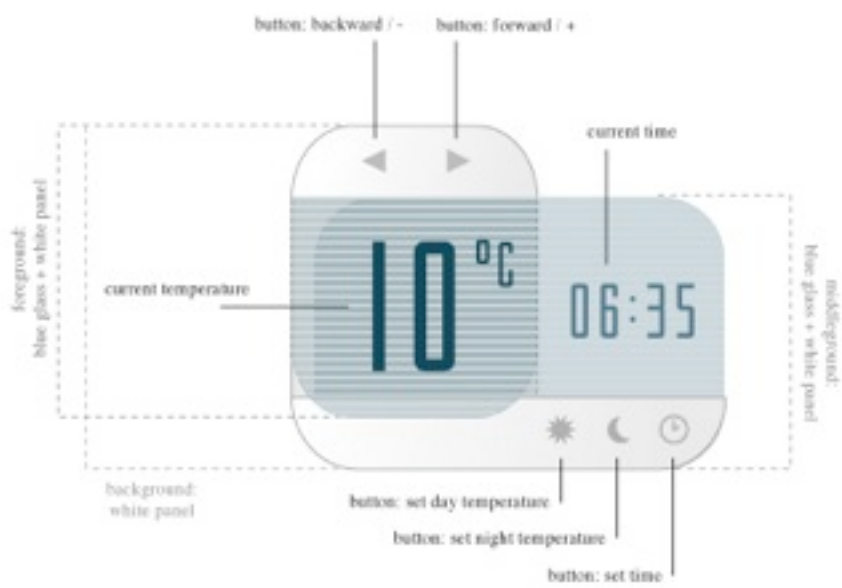
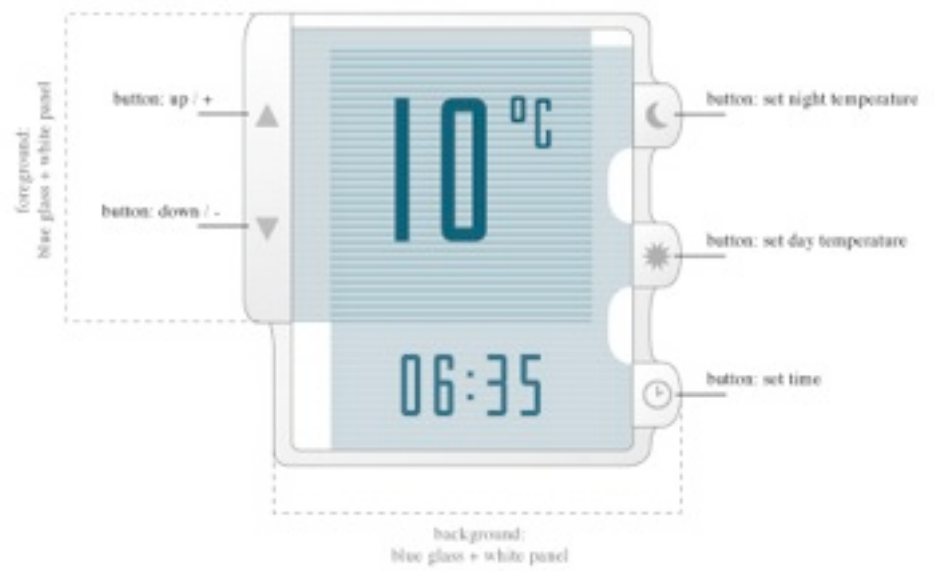


Redesigning the thermostat

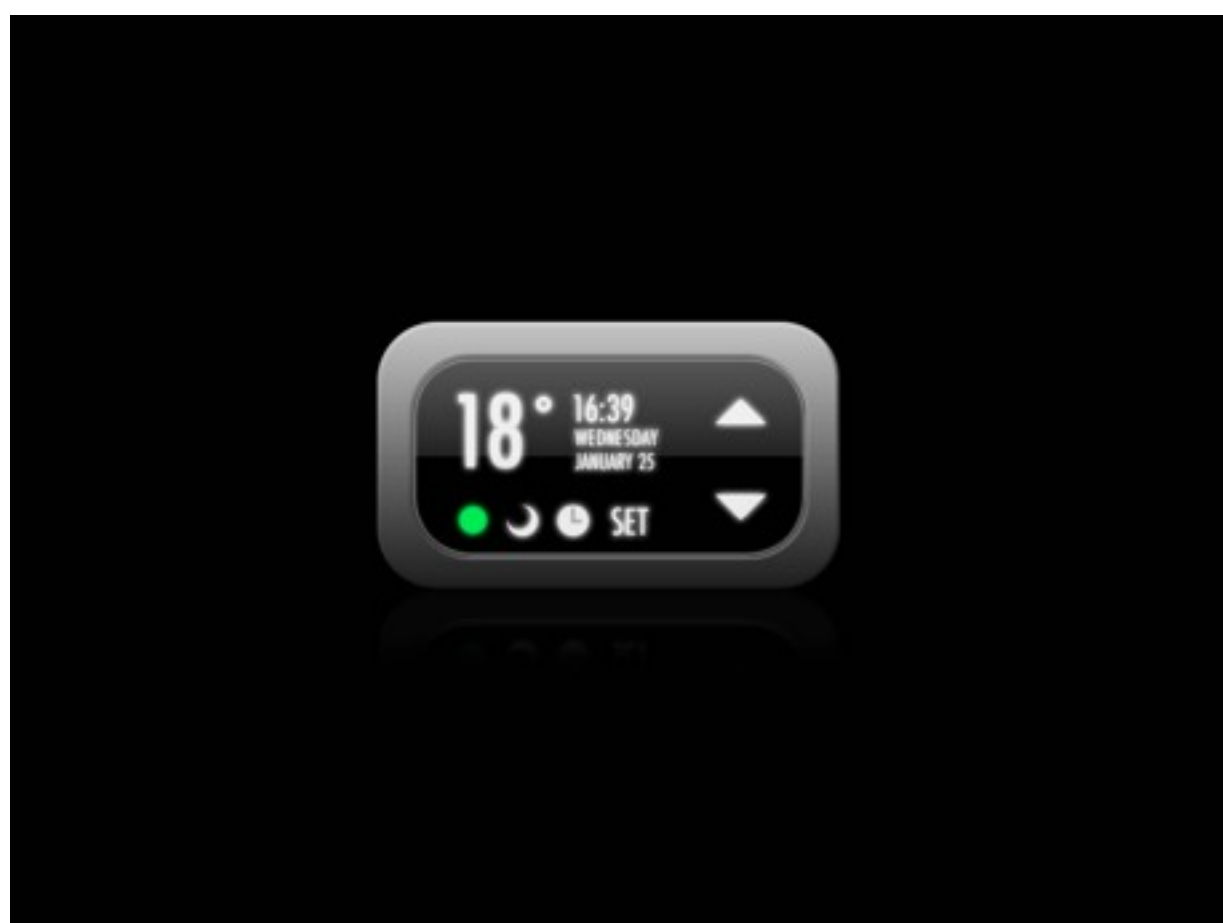
Changes, changes

These are the experimental and functional designs that we came up with:











“Next step was mapping the functions, creating a flowchart of how the device operates.”



Selecting a design Modifying and testing

After selecting the design we were going to work on, we mapped the functions of the device, and made flowcharts of how the device should work. This helped us setting up use cases and scenarios that were later used to test our target audience once again, but this time with our own design.

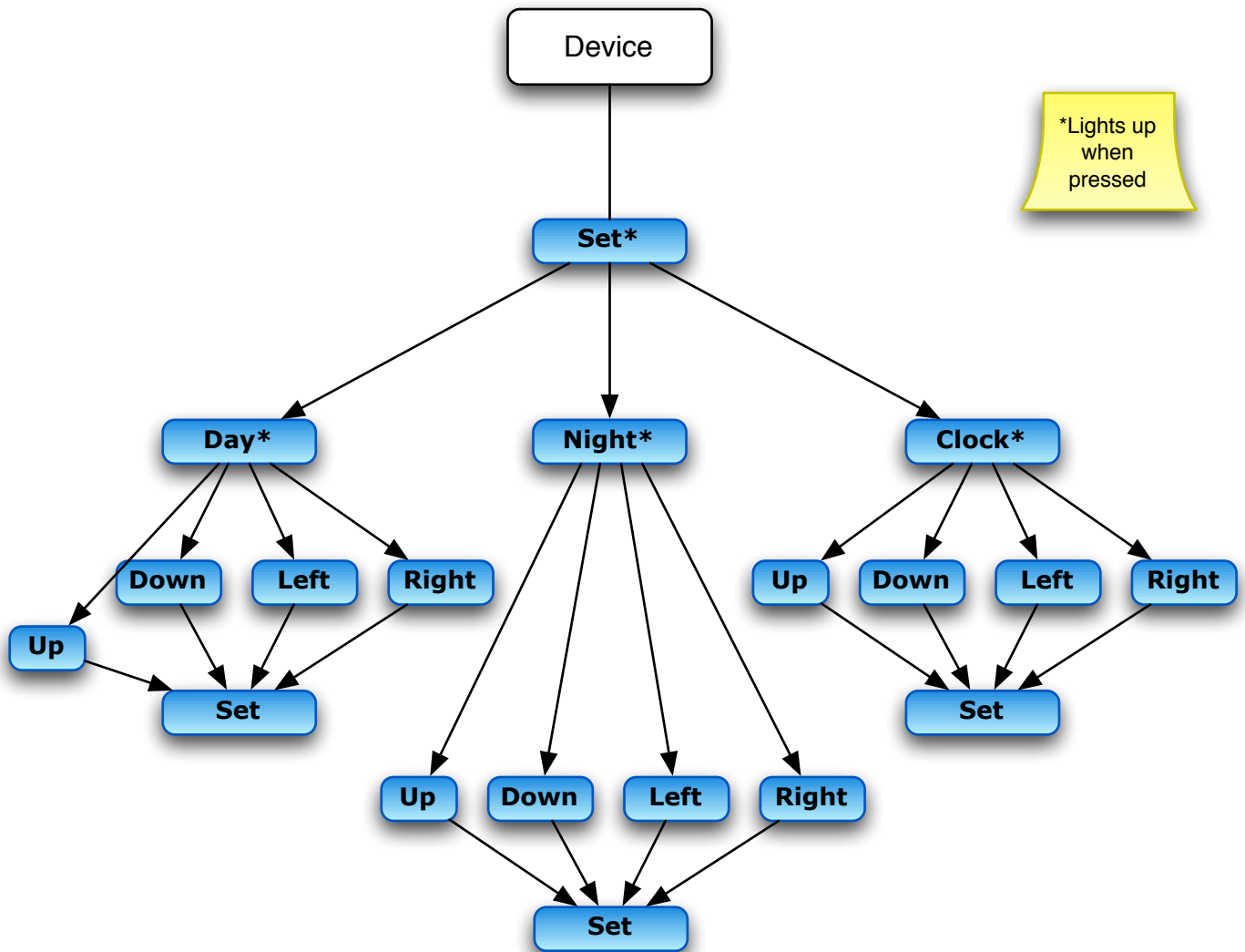
The changes we were making on our design included:

- Button spacing: the buttons in the first design had too little spacing between them. This would make it very hard for the user to operate the device.
- It seems that in order to set the time you have to use the up and down arrows. The only problem is that there is no evident way to set the hour and minutes separately; so it is assumed that the time must be set minute by minute. In order to make this ordeal easier, it would be best to provide a button to set the hour and another to set the minute. If a user wanted to change the hour, he/she

would first press the clock, then the hour button, then the arrows to adjust the numbers.

- Product's color: Use white instead of grey/metallic; if placed on a wall (which a lot of them appear to be white/cream), it would be best to make the thermostat white too so it can blend in well with the wall and not drastically appear to stand out.
- Adding a remote control for usage around the house.

Next step was mapping the functions, creating a flowchart of how the device operates.



Testing target audience, part deux

The tests we conducted were based on scenarios derived from the flowcharts. We recorded the tests and based our analysis on the testing itself and our footage. The testing of our design came up with some interesting results:

- The Set button confuses the users. They do not know whether or not to press it before or after they set the schedule. Some users didn't even think about using it. I believe eliminating this button altogether would be the most productive way of improving this process.
- The clock symbol confused 1/2 of those who were tested. One didn't know it was a clock; the other didn't know what to do with it.
- One user mentioned the black background color of the screen should be a different color. Another user said the green color of the pressed button should be different.
- The other problems with the testing came from the fact that the prototype was not completely functioning. Examples of these problems are the fact that things didn't light up when they would if the product was real, and you couldn't scroll through the options. I'm not sure how to word this, but I feel like the difficulties that the test sub-

jects had were from the fact that the product wasn't fully functioning.

- A suggestion from two of the testers was to make the sun symbol look more like a sun (make the rays bigger).

Conclusion

What we've learned

We ditched the remote, and instead, made our thermostat portable: It can be connected to a wall mount (several wall mounts could be placed around the house), but can also be taken off its docking station and be placed upon a desk or on a night cabinet thanks to its supporting leg.

Testing the target audience with every iteration of your product is essential for a good user experience, obviously. Modification of the design, returning to the drawing table, and testing again will improve products drastically. If we'd have the time to do another series of tests we would've come up with an (even) better product than we did now.

We decided to go for a functional design, instead of an experimental design, which might be less interesting because there are numerous similar products available on the market, but we feel like we did a good job on testing our design, listening to feedback in the class hours and coming up with a final product.



Wall mount

The wall mount makes it possible to hang the device on whichever wall the user would like to put it on. It can also be taken off and set up elsewhere, just as a picture frame.

STAT°

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