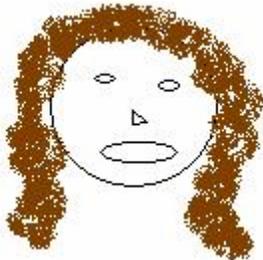


## User Interface for New-Age Thermostat

### Personas

#### Persona#1

#### Martha Lucre



Martha is a 34 year old stay-at-home mother. Having a 7 year old son and 5 year old daughter keeps her hands always full. Through a big part of the day, she keeps running across the house. She typically goes for grocery shopping every Thursday. And, when she enters her house her hands are full of heavy paper and plastic bags. The only thought in her mind being, eating those cookies in cool comfort of her room. She reaches thermostat, switches it on, her hands still full, sees the cool blue button on the thermostat, and pushes it in using her elbow. She smiles as she reads the LED displays her house would be cooled to 67F. She goes to kitchen to deposit her bags, so that she can go and relax.

#### Persona#2

#### Tom Stall



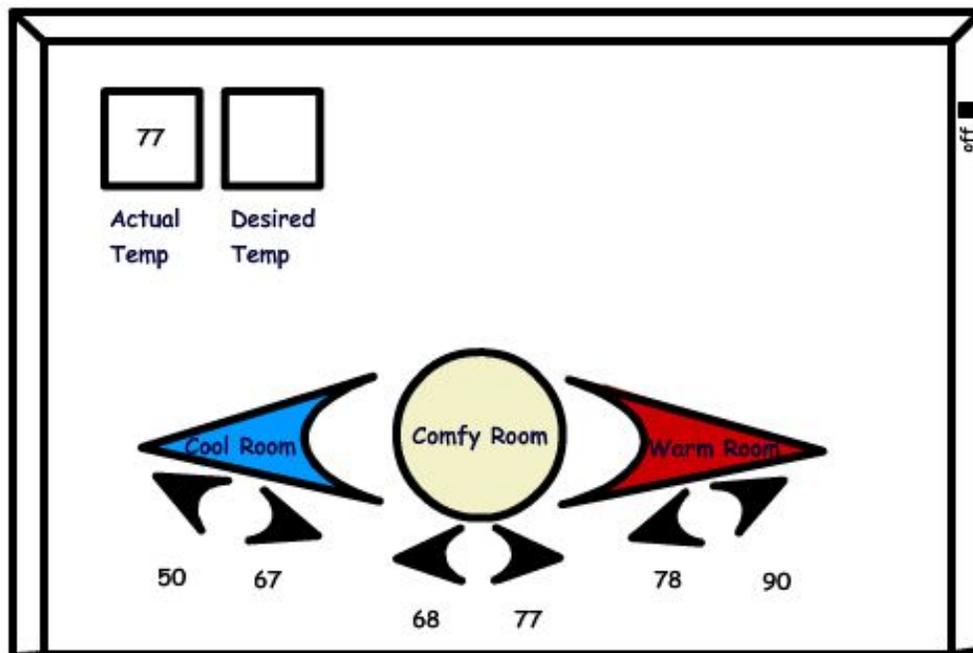
Tom is 21 year old college student. He lives in a place that is too close to his school and the gymnasium where he is found most of the time. His passions are for basketball and gadgets

that gives him sophistication. Last week, he bought a multi-purpose shoe which can be used for skating and running.

One day Tom comes home after a long practice for the next week basketball game. He finds his house so hot and the room temperature in the thermostat was 80F. in order, to cool his room he presses the ON button and then the COOL button in the thermostat. Now, the desired temperature was set to 68 f in the thermostat. Tom moved to his room to get a good sleep.

He wakes after few hours and found his place cool, the room temperature in the thermostat showed 69 f. Then he presses the COMFIY button and the desired temperature changed to 74 f to give a comfortable temperature.

### Initial Design Mockup



## Testing Procedures and Results

### Procedure:

- After consultation with the team, draw a list of questions/scenarios to be put up to the person who would be doing usability testing
- Draw the prototype on the board
- Assign one member to conduct the test  
(Our design involves a visual signal whenever it is “used” by the system, specifically it displays the “desired temperature” whenever user sets thermostat to a temperature. This is drawn every time on board to imitate the real design)
- Assign the other members to observe the response of the user
- The user is not given any information about the product. They have to figure it out themselves
- After the scenario questions are asked the team discusses the responses and applicable changes to the design

### List of scenarios

- 1) It's hot outside, and you've just played a game of basketball with your friends and are sweating heavily. When you get home you make a run for chilled water. Please change the temperature in the room using the thermostat to cool the room.
- 2) The house is too cool, please adjust the temperature so it is warmer than before.
- 3) It has been snowing all day long. You return from office almost frozen. What would you do to adjust the temperature?
- 4) It's a nice pleasant day and a cool breeze is blowing. You want to open the window to let the fresh air in. How would you adjust the thermostat?
- 5) The thermostat is switched off. You want to cool down your house. What will you do?

6) What temperature is most conformable for you?

## Testing Results

### **User 1:**

- 1) Hit little arrow (3<sup>rd</sup> black arrow from left) to get a desired temp of 68F
- 2) Hit warm zone button 4 times so that desired temp is 78F
- 3) Hit little arrow saying 77F (4<sup>th</sup> black arrow from left)
- 4) Can't decide between off button and comfort room button
- 5) Hit cool button 4 times
- 6) Comfortable Temperature = 70 - 72F

### Our Interpretation:

The user is not sure about the significance of the zone buttons  
The user thinks the little arrows represent presets and the big buttons represent a zone that must be selected before the temperature can be set.

### **User 2:**

- 1) Pushed the "Cool Room" button twice to cool the room to 65.
- 2) Push triangle#3 (3<sup>rd</sup> black arrow from left)
- 3) Push triangle#5 (5<sup>th</sup> black arrow from left)
- 4) Switch off using OFF button
- 5) Pushes "Comfort Room" button to switch it ON
- 6) Comfortable Temperature = 72-74F

### Our Interpretation:

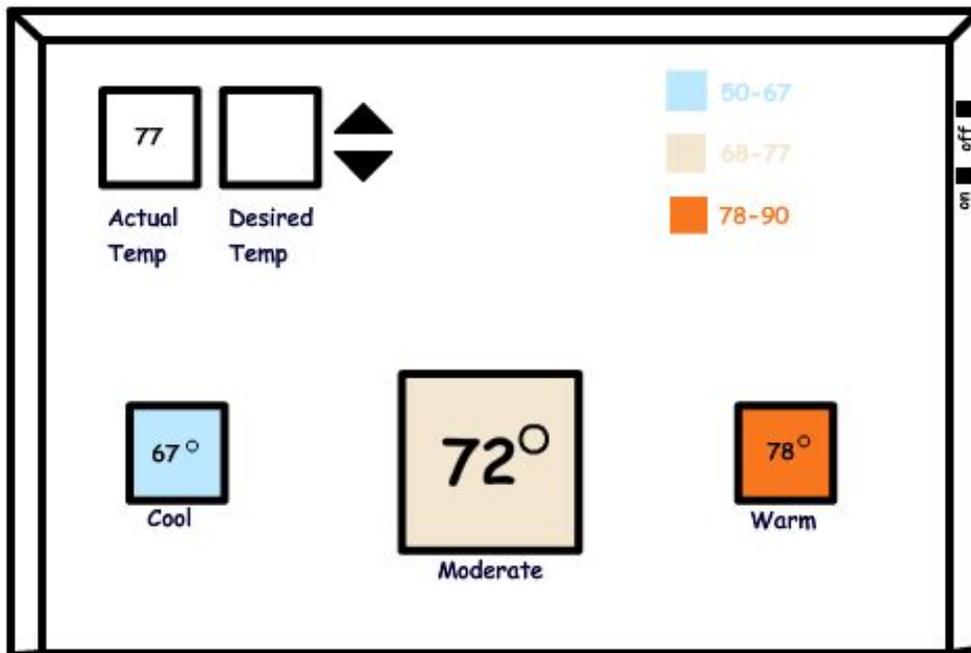
The user feels as though the "Comfy Room" button based on the Design 1 switches the thermostat on.  
The user also thought that the "Cool Room", "Warm Room" buttons actually lower/increase the temperature set by the "Comfy Room" button.  
Also uses the little black arrows as a means to lower/decrease temperature in any given scenario.

## Conclusions

- The little black arrows that represent increment and decrement buttons confuse the user. They seem to be a preset rather than depicting a range of temperature.

- The “Cool Room” and “Warm Room” buttons should not be shaped like arrows. They give wrong notion to the user
- There should be an “ON” button in parallel to the “OFF” button

## Final Design Mockup



## Design Rationale

(Arriving at the design)

The primary thought behind the design of interface of the thermostat is “ease of usability”. The big buttons, the soft backlight and LED displays have been used to relieve the user from the learning to operate procedure. There has been a strong focus on intuitive learning in this design of ours.

The problem statement is to prevent the user from setting a thermostat at too high or too low a temperature from what the user actually wants. We went to Lowe’s and observed interface designs of thermostats currently in the market. In these thermostats you just

need to pull a lever to set a temperature and pulling a lever to either of the extreme sides does not involve any extra work on the part of user. We analyzed this problem and decided to break the activity of setting the temperature in a 2-step procedure. This would make user to spend a fraction of second more while setting the temperature and he/she may decide not to unnecessarily set an unwanted temperature. To not frustrate the user, the design has to be kept very simple. Initially, we came up with several designs which we liked very much but towards the end we decided to make the design clutter-free and use as less buttons as possible. Also, we decided to keep grandparents and kids in mind while designing so that we do not stray from the path of "easy, simple and intuitive design".

### **Design Explanation**

(Using the design)

There are 2 LED displays on the thermostat board displaying current temperature and desired temperature. The current temperature LED would always be ON and keep displaying room temperature. The desired temperature would show the temperature to which thermostat is set.

We feel that viewing the temperature will make user less likely to set the temperature lower/higher than he/she needs.

There are 3 big buttons which are temperature presets, these buttons correspond to preferred comfortable, cool and warm temperature. The 2 black triangles are buttons which increment and decrement the temperature set by the big button.

There is legend printed on board which defines the temperature ranges. Eg. If you want a temperature of 80F, you need to press Orange (warm) button and then press increment (upper triangle) button to increase the temperature to 80F.

### **Design Argument**

- Simple design
- Quick and easy operation
- Less buttons
- Color coded buttons to make their function clear
- Presets set to popular and frequently used temperature settings
- Soft backlight for buttons
- Display of Room temperature
- Display of temperature set

- Biggest button for “Moderate Temperature” so that it is focal and the user mostly reaches for it
- ON and OFF button to prevent confusion
- Rounded edges of the thermostat for visual ease (not included in the design)
- Option for fan removed since no one uses it