

Assignment 5 - Rapid Prototyping

Overview

Regular thermostats let you adjust the temperature in your home, it's just a control panel for your heating and air conditioning system. Programmable thermostats let you set the temperature and have the thermostat change it based on the time of day. What makes most smart thermostats so "smart" is that they learn from your behaviors, allow you to control the climate in your home remotely, show you energy consumption in real-time, and can even adjust themselves based on ambient conditions like humidity.

The main features include:

1. Easily programmable
2. Change temperature from anywhere
3. Monitor the HVAC system
4. Keep tabs on furnace system while travelling
5. Adapts to your schedule

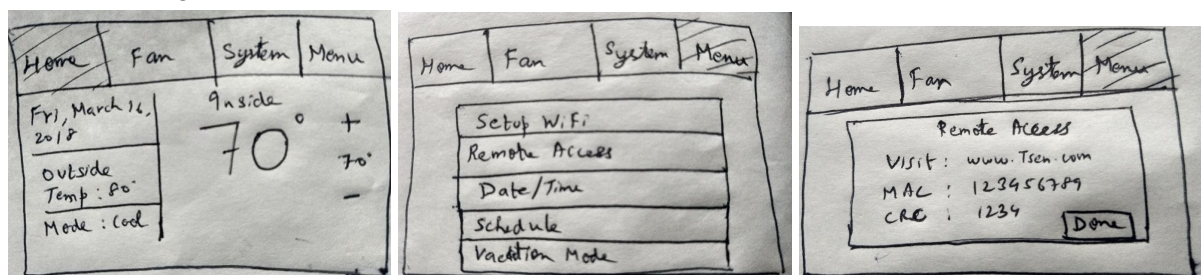
Major competitors are:

1. Nest
2. Ecobee
3. Honeywell Lyric

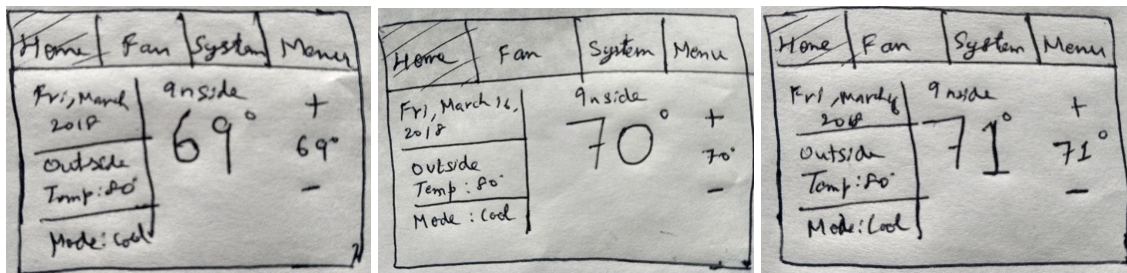
The Nest thermostat learns the schedule based on whether there is someone present in the house, if the oven is on, humidity etc and automatically adjusts itself. The Honeywell and Ecobee smart thermostats also has the WiFi connectivity feature and supports remote control through mobile apps. They too learn features and auto-program themselves based on habits of the user.

Initial Sketches

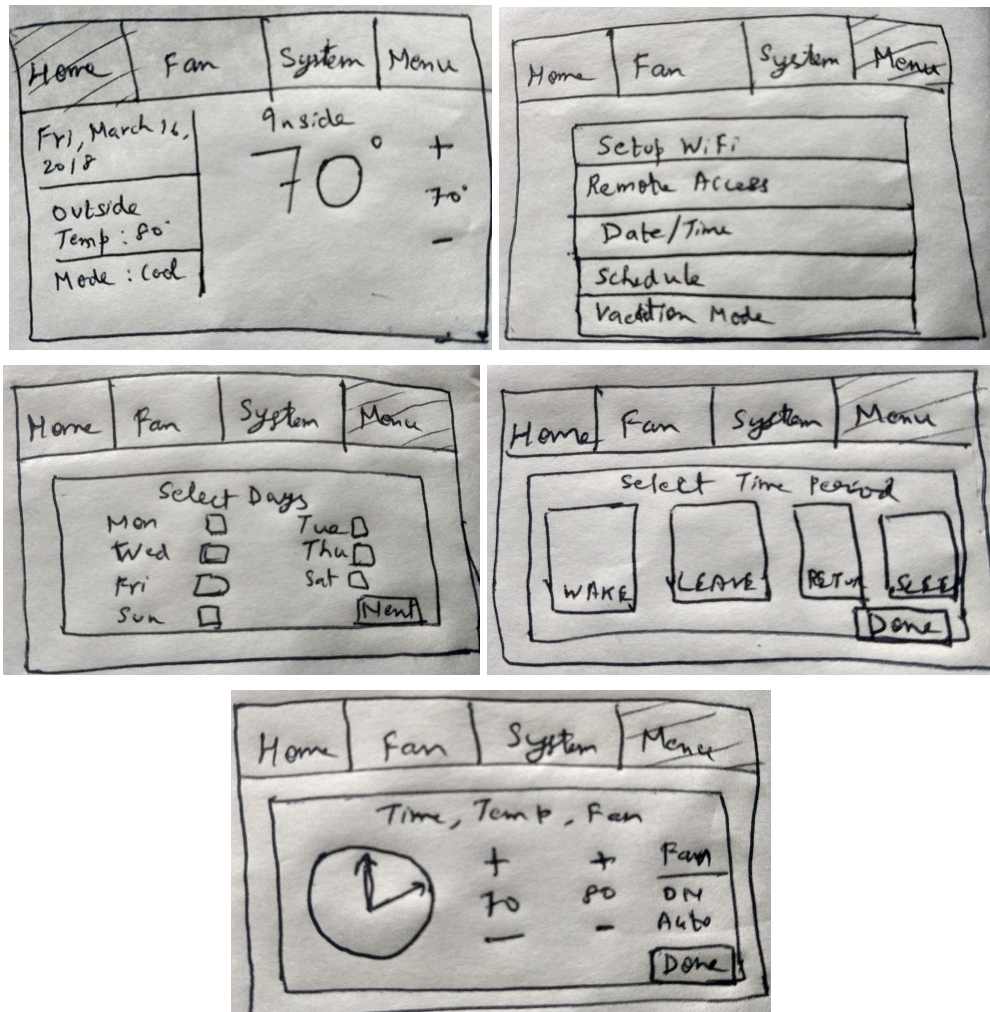
1. Pairing



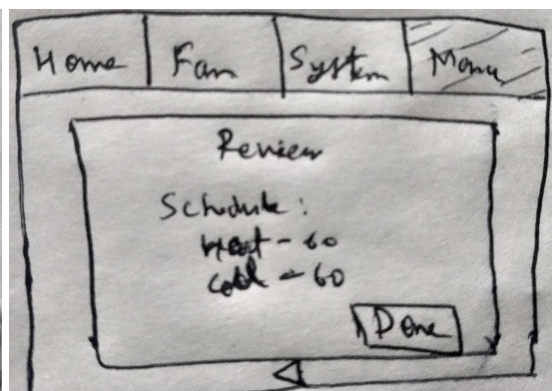
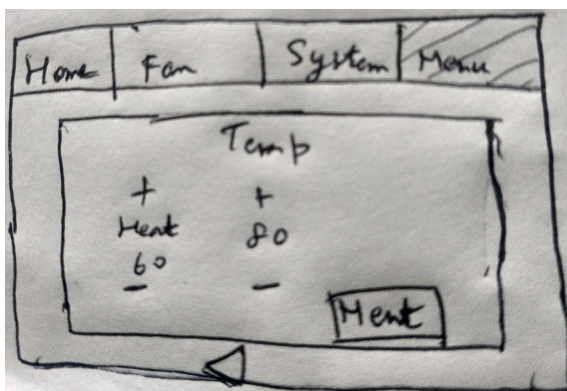
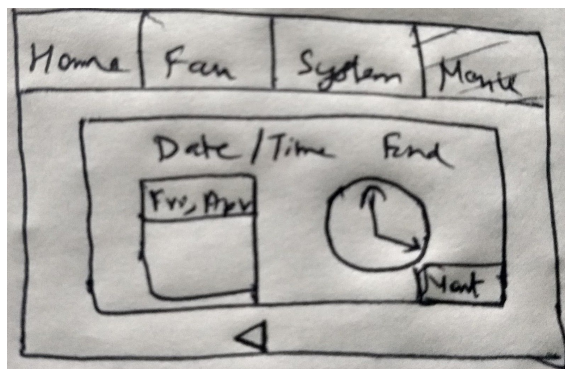
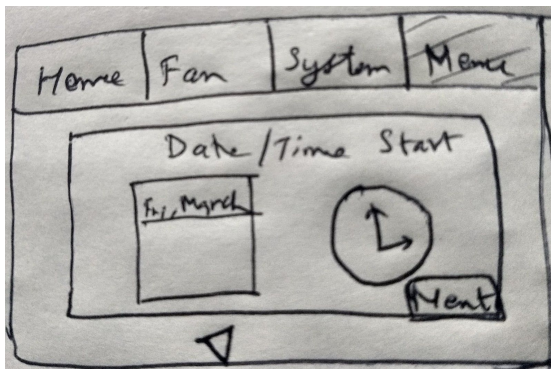
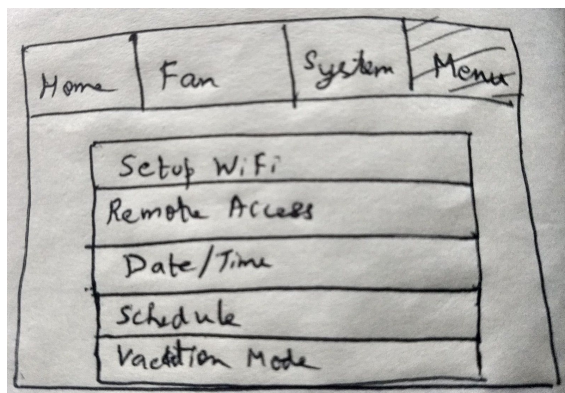
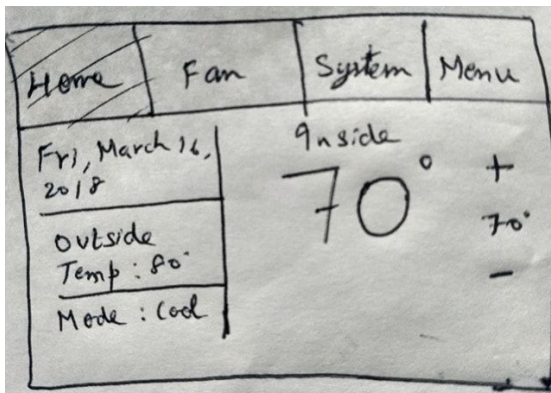
2. Ability to change temperature



3. Ability to set temperature schedule

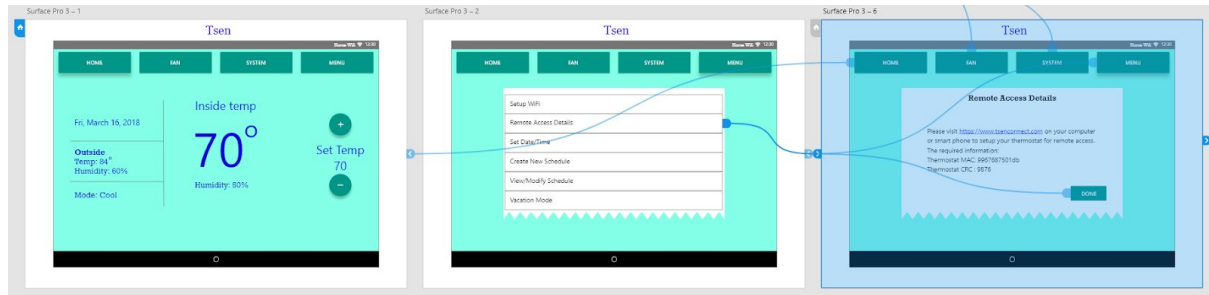


4. Vacation Mode



Feature Flows

1. Pairing



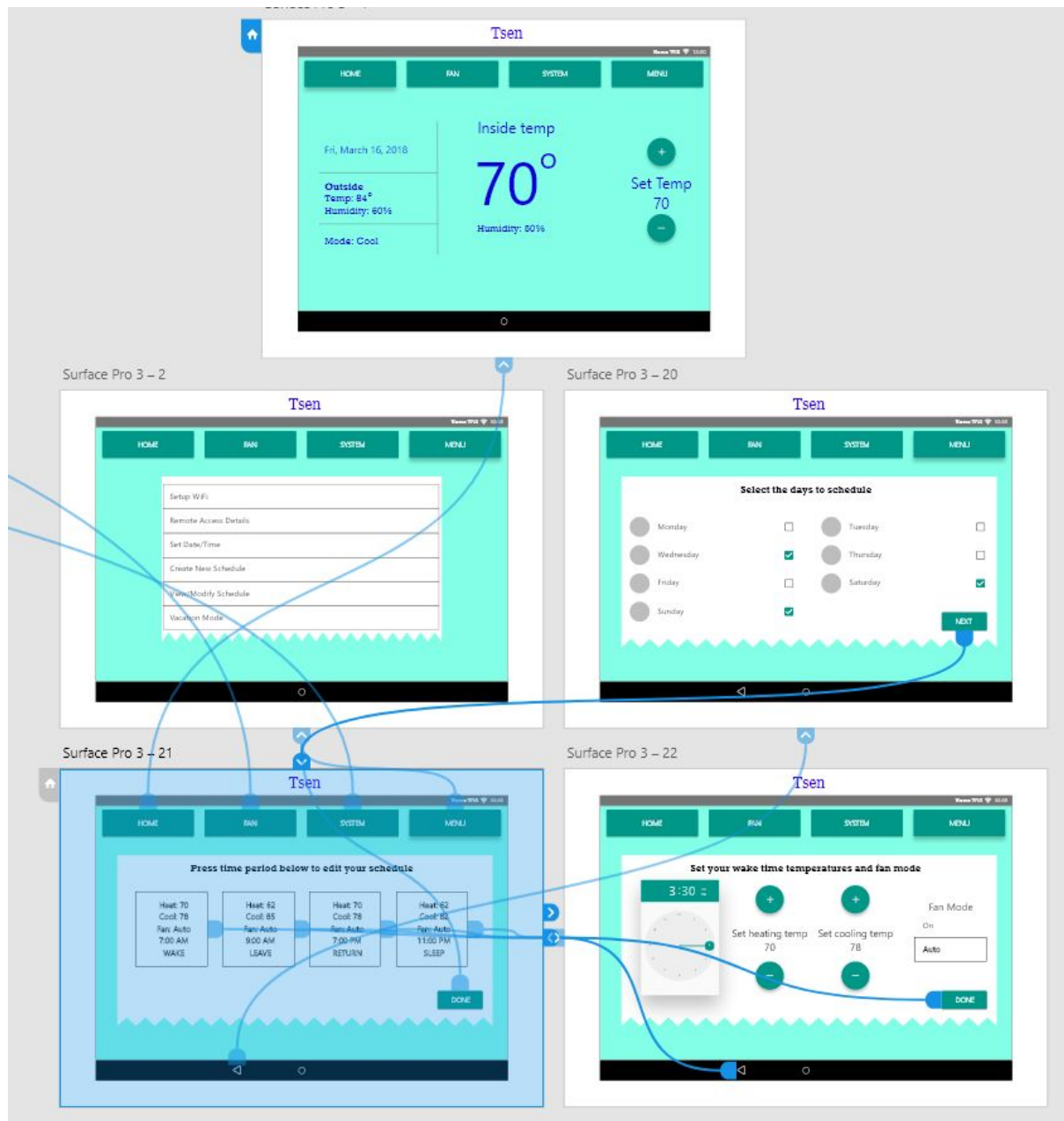
To do pairing with web account, the user needs to click on “Menu” then select the option “Remote Access Details”. It shows the link to the website where the user needs to create an account and fill the thermostat details (MAC and CRC) which are unique. Now the user can change the temperature and create schedules through the web interface.

2. Ability to change temperature



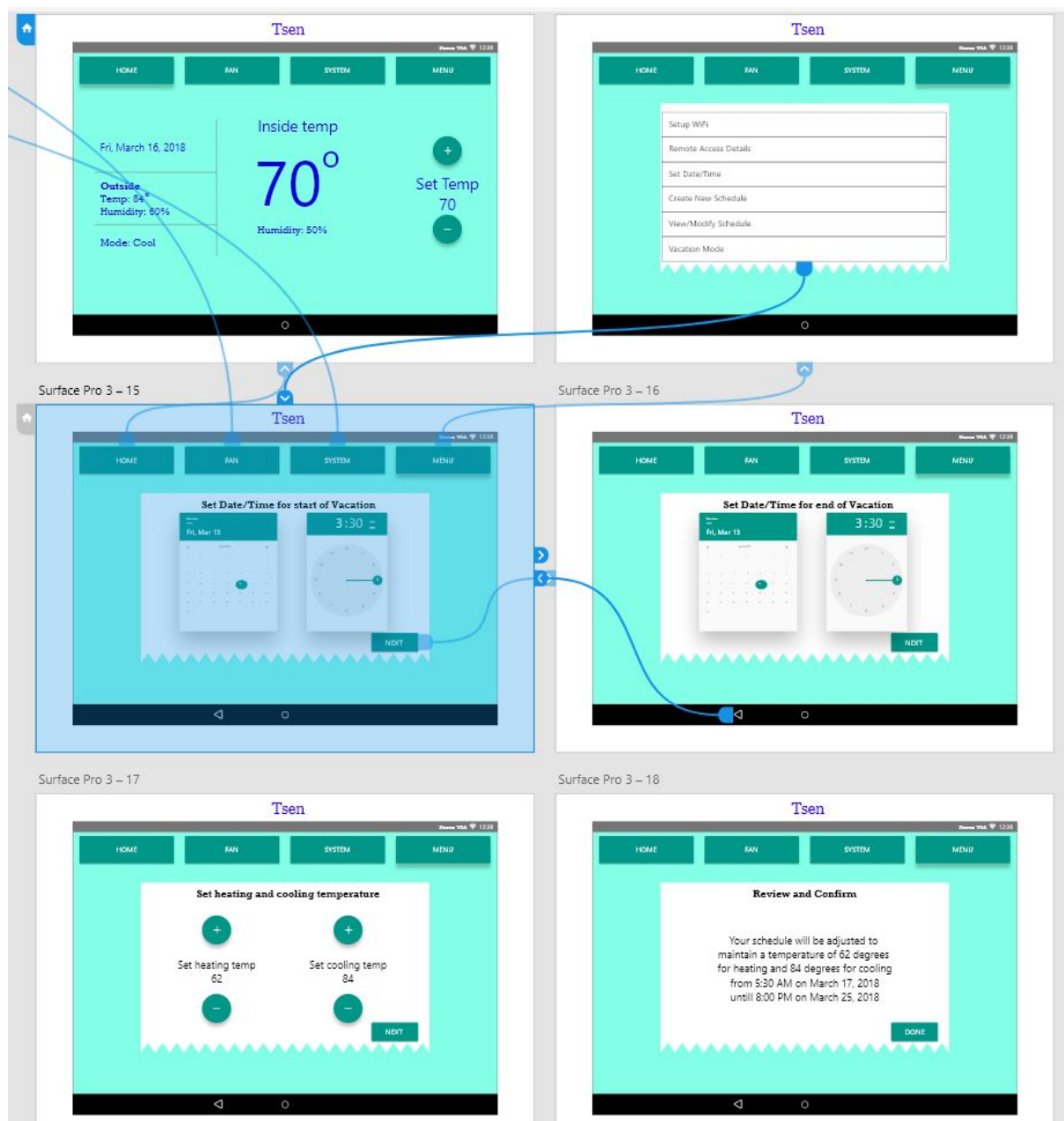
When the user presses the ‘+’ button in the Home screen, the temperature increases by 1 and when (s)he presses the ‘-’ button it decreases by 1. The temperature only varies in the range [68,72] both inclusive.

3. Ability to set temperature schedule



To create a schedule, the user needs to click on “Menu” button and then select the “Create New Schedule” option. Now the user needs to select the days for this schedule and click on “Next”. Next, the user selects the period (Wake/Leave/Return/Sleep) and in the next screen selects the time and Heat and Cool temperature and the Fan mode and clicks on “Done”. The user needs to do this for all the periods and finally clicks on “Done”.

4. Vacation Mode



For this, the user needs to click on the “Menu” button and select the “Vacation Mode” option. In the next screen, (s)he needs to select the start date and time of the vacation and click “Next”. In the next screen, (s)he needs to do the same for end of the vacation and click “Next”. In the next screen, they need to select the heating and cooling temperature and click on “Next”. The final screen shows the details of the settings to confirm and the user can either click on “Done” to confirm the settings or click the back button “<|” (the android triangle button) to go back and change the settings.

References

1. Honeywell WiFi thermostat manual,
<https://customer.honeywell.com/resources/techlit/TechLitDocuments/33-00000s/33-00132ES.pdf>