Based on the stakeholder requirement mainly the needs of the users, the existing HVAC control panel, our team identified system requirements. We classify them into three level: “Must have” means the existing functions normally a HVAC control product has. “Nice to have” means the functions that are preferred to be added to make HVAC control more smart. “Desirable” means functions also are preferred, but our team don’t have enough capability and resource to implement. So we will focus on the “Must have” and “Nice to have” functions.

Base on system requirements, we made function analysis for our design. First level: system requirements. Second level: the function. Bottom level: the components that will implement their higher functions. The left part shows “Nice to have” functions, and they are designed as the new functions will make the control panel smarter. The right part illustrates “must have function”.

Our Function Block Diagram mainly focuses on the three new functions we mentioned before. Switch to economy mode when room is not occupied, Increase Humidity, Operation Schedule. The third level is the details to implement these functions.

Through the motion sensor the control panel get the room status- it means if there are people in the room or not? Through the user interface, it can get waiting time set by user. When the room is not occupied for a period of time, the HVAC system will enter economic mode, energy-cost components will be switch off.

For humidity change, it is similar, we use sensor measure relative humidity, we use user interface to get humidity setting, humidifier is in charge of changing humidity.

For the operation schedule, I will descript how it work later.

Here we designed two user interfaces for our system.

The first one is the default page. It can show time. Users can get information from this part, can also set threshold of temperature, humidity, co2 level. User can decide Fan is always working or just work when co2 control, heater, cooler need it to work.

Three HVAC mode: Cool, heat, operate following schedule.

Press SET SCHEDULE enter the schedule setting UI. Users can set one week’s setting, press any point of the black line to choose one time to set the configuration.

This is the interface to set operation schedule, choose one point and set the configuration. When you choose a schedule module it start to work.