Indian Institute of Information Technology, Allahabad
Object Oriented Methodology (OOM)
Mini Project-8
Group-10
Topic: - Heating, ventilation and air conditioning (HVAC) system

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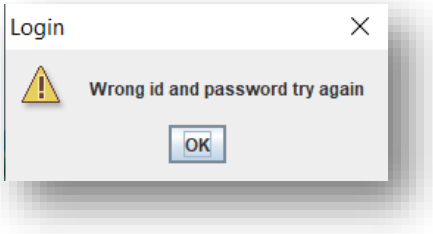
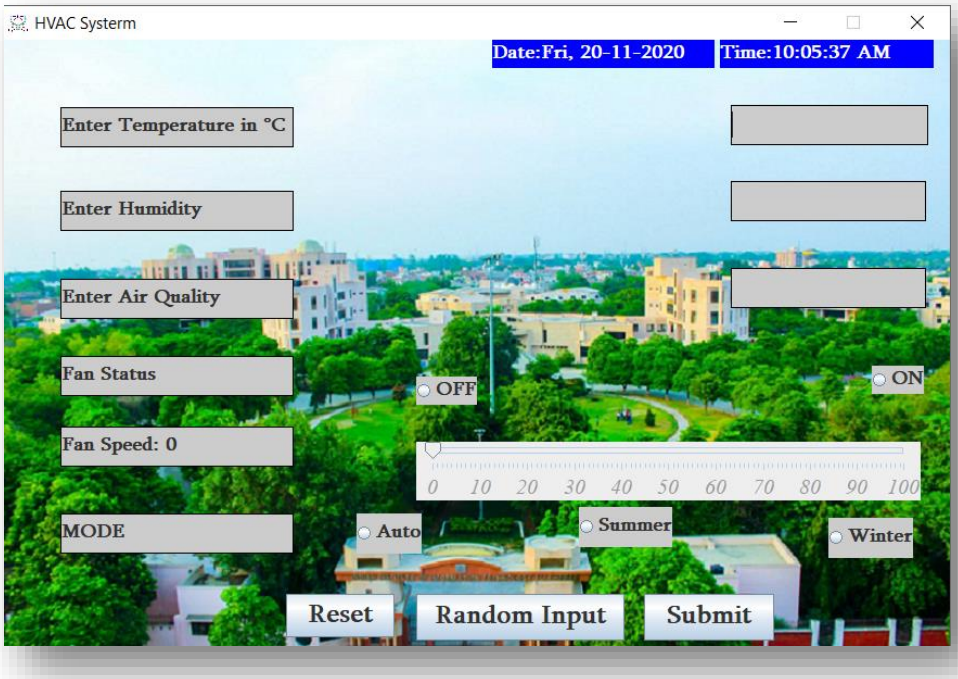
Project overview:-

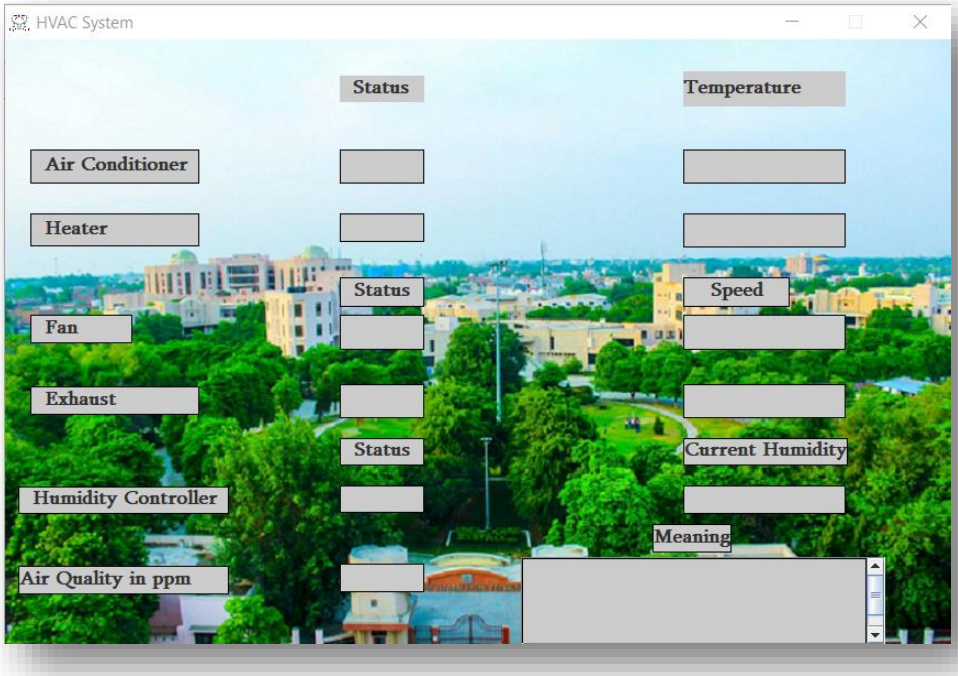
When the user pressed the jar file or run the code in net beans. Initially Login screen appears on the screen that contains two input textfield one for the username and the other for the password. The username is **Admin** and the password is **Admin@123**. We also put the reset button which clears all the input fields and in eye icon through which we can see our password.

If the password or username is wrong then one alert box appears on the screen saying that something is wrong.



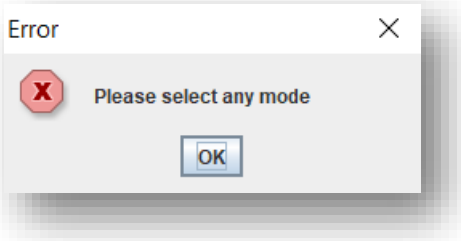
And if the password and username is correct. Then the login window disappears and the navigation and controller window appears on the screen.





The controller window is for taking the input from the user .If the user wants to give the random input then we set one button for random input which give random inputs to the temperature humidity and aqi (air quality index) but the mode needs to be filled by the user

If mode not selected



and it depends on the user that whether there user wants to put the fan on or off. If the user put the fan on then user needs to give the fan speed using the jSlider .

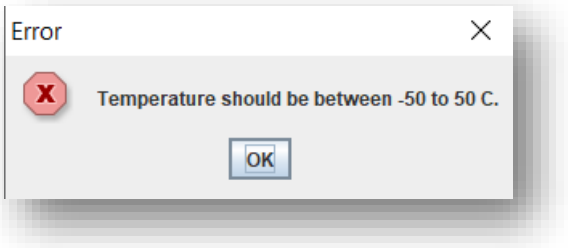
The jSlider only enables when the user puts the fan mode on. If the user feels that the input is wrong then there is also one Reset button to reset all the input data. To submit the data there is submit button. We also put ranges on the temperature, aqi value and humidity.

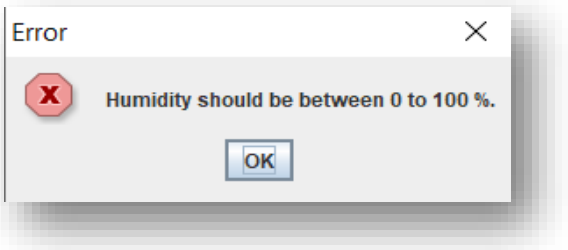
Range for temperature is -50 °C to 50 °C

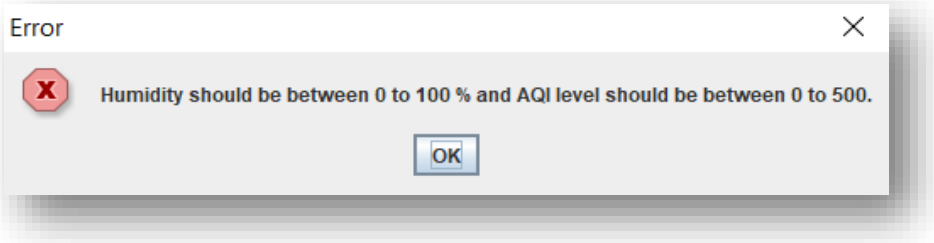
Range for humidity is 0 to 100 %

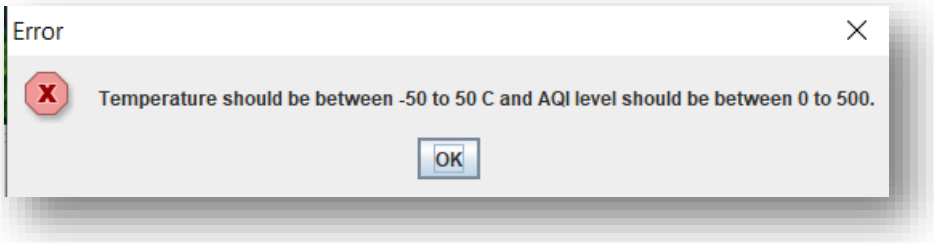
Range for aqi is 0 to 500 (ppm)

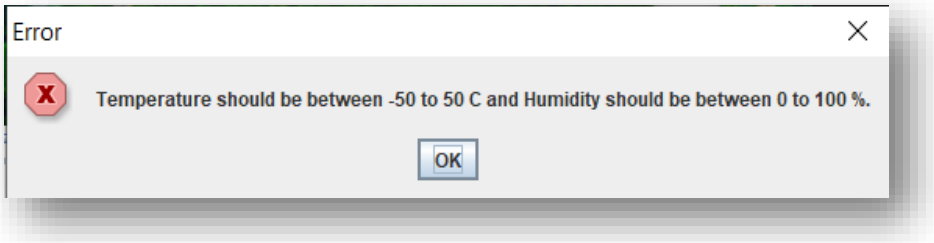
If there is any input which does not come in these ranges then one alert box appears showing the error according to the input.



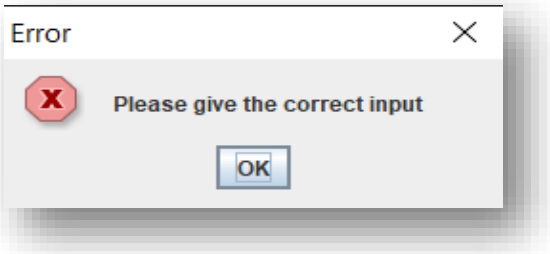




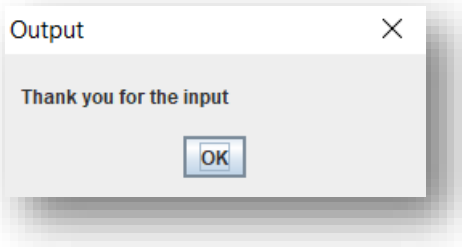


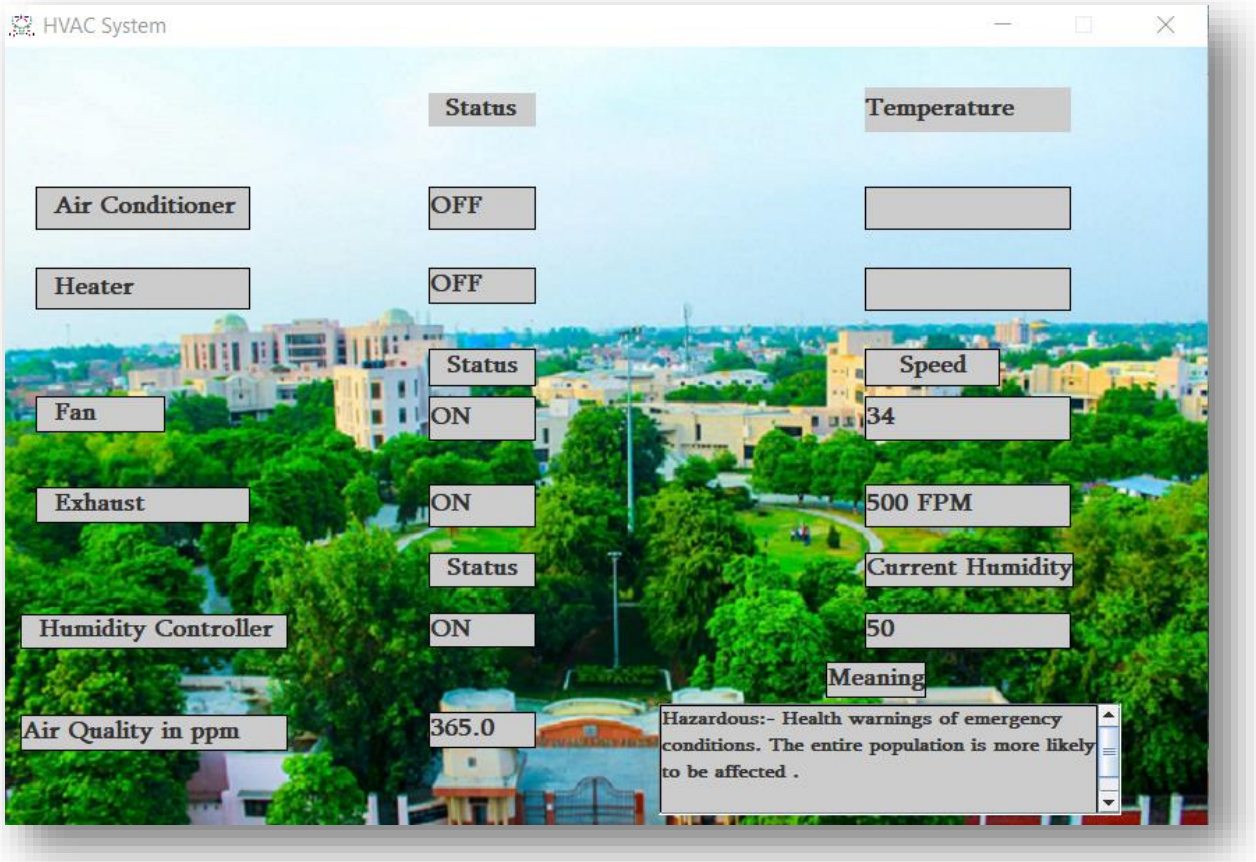


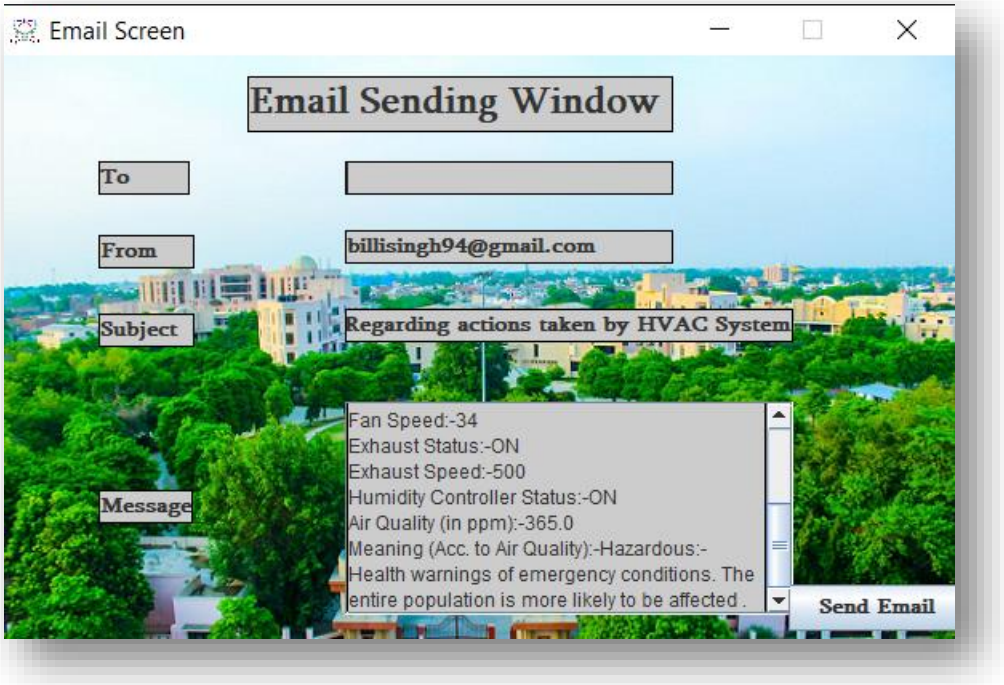
If all input out of range



And if all the input is within the ranges then 2 screens (or jframes) occur one is navigation window and the other is email screen with the alert box with the message Thank you for the input.

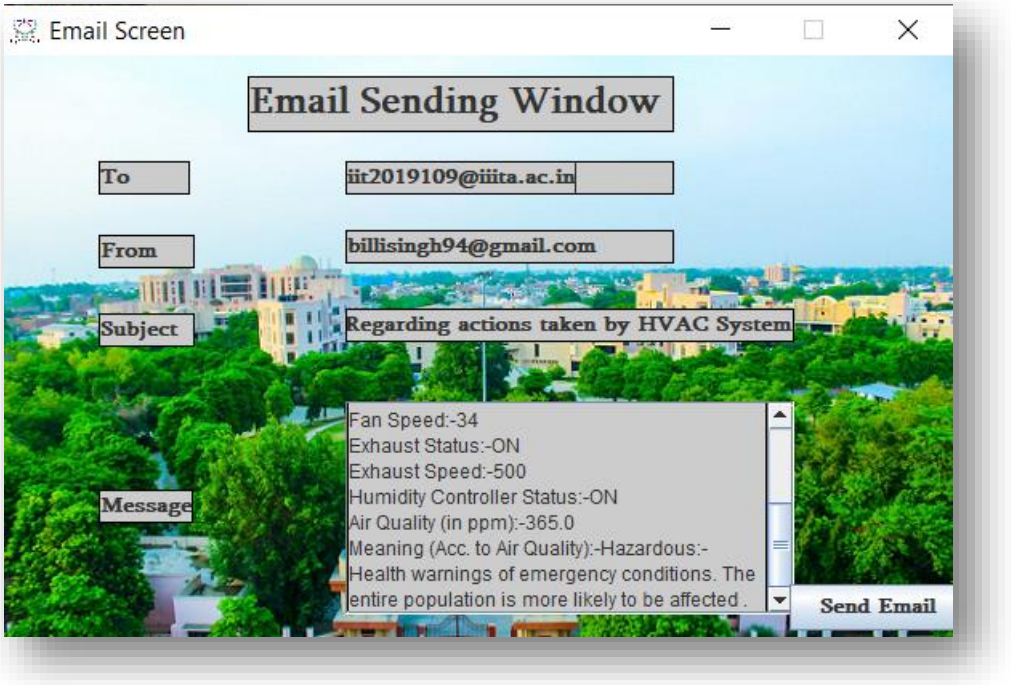




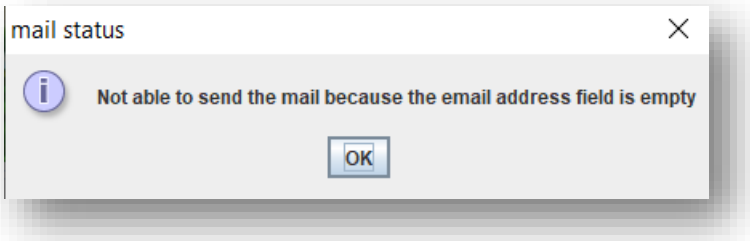


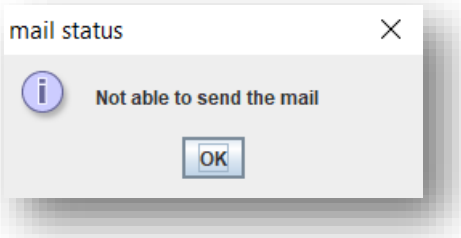
In navigation window the status of ac, heater, fan, exhaust, humidity controller is displayed and if any device is on then the speed or temperature according to the device is also displayed. At the bottom of navigation window there is aqi value displayed and according to the aqi value meaning of the air at that time is displayed.

On the email screen, there we displayed all the condition (aqi, device status) of the CC-3 building according to the input from the user in the form of the body of the mail which is to be sent. We also displayed the subject and the mail address from which the mail is to be sent. We need to put the email address to which we were sending all the information of the present condition of devices and air quality. We send mail through the button which is displayed on the emailScreen jFrame

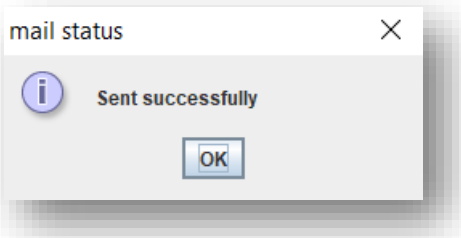


and if the mail field is empty then the alert window appears displaying the error message.

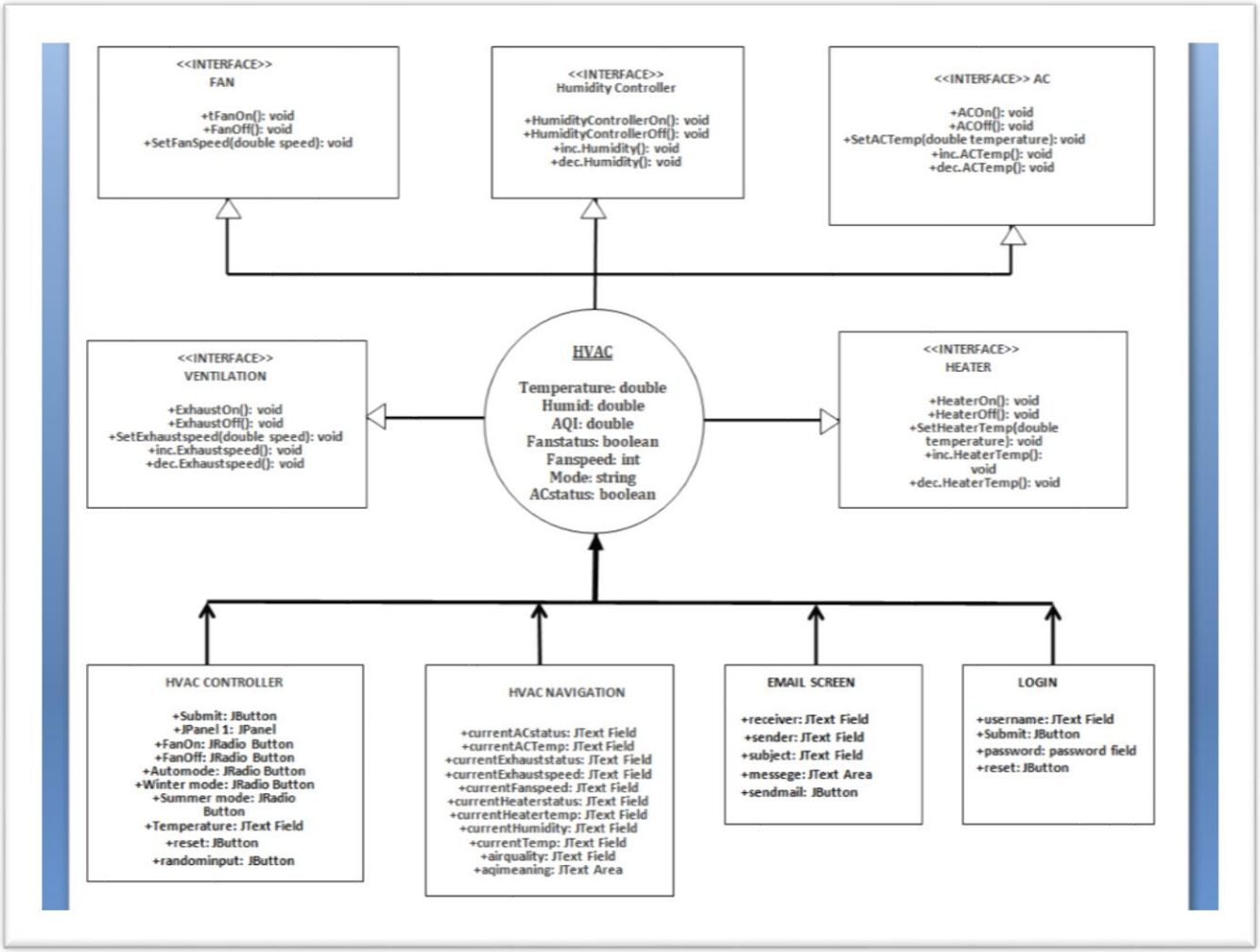




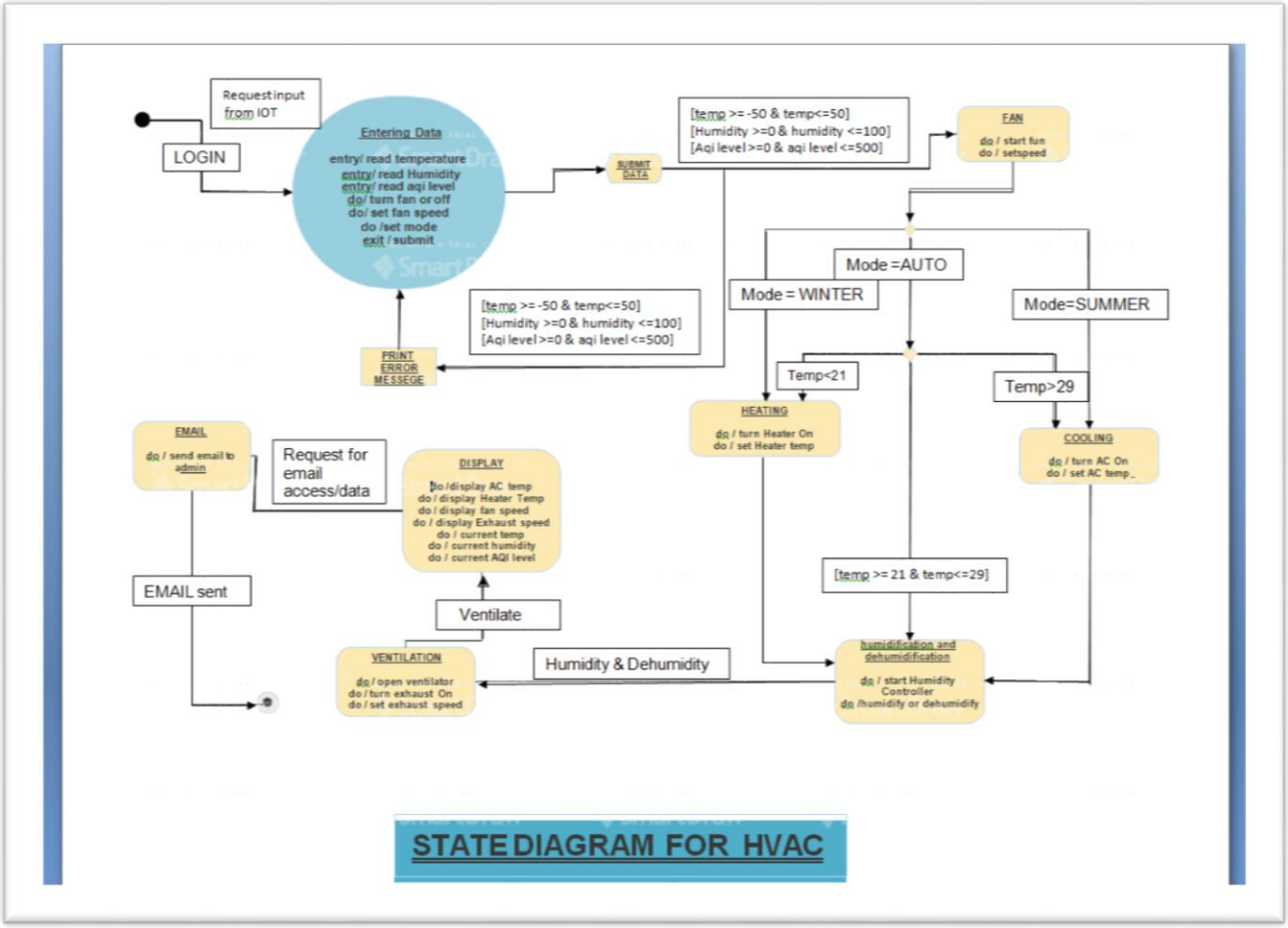
During the process of these mail on the console there is one message preparing mail and after the successful sent of the mail alert box appear with the message **mail sent successfully**.



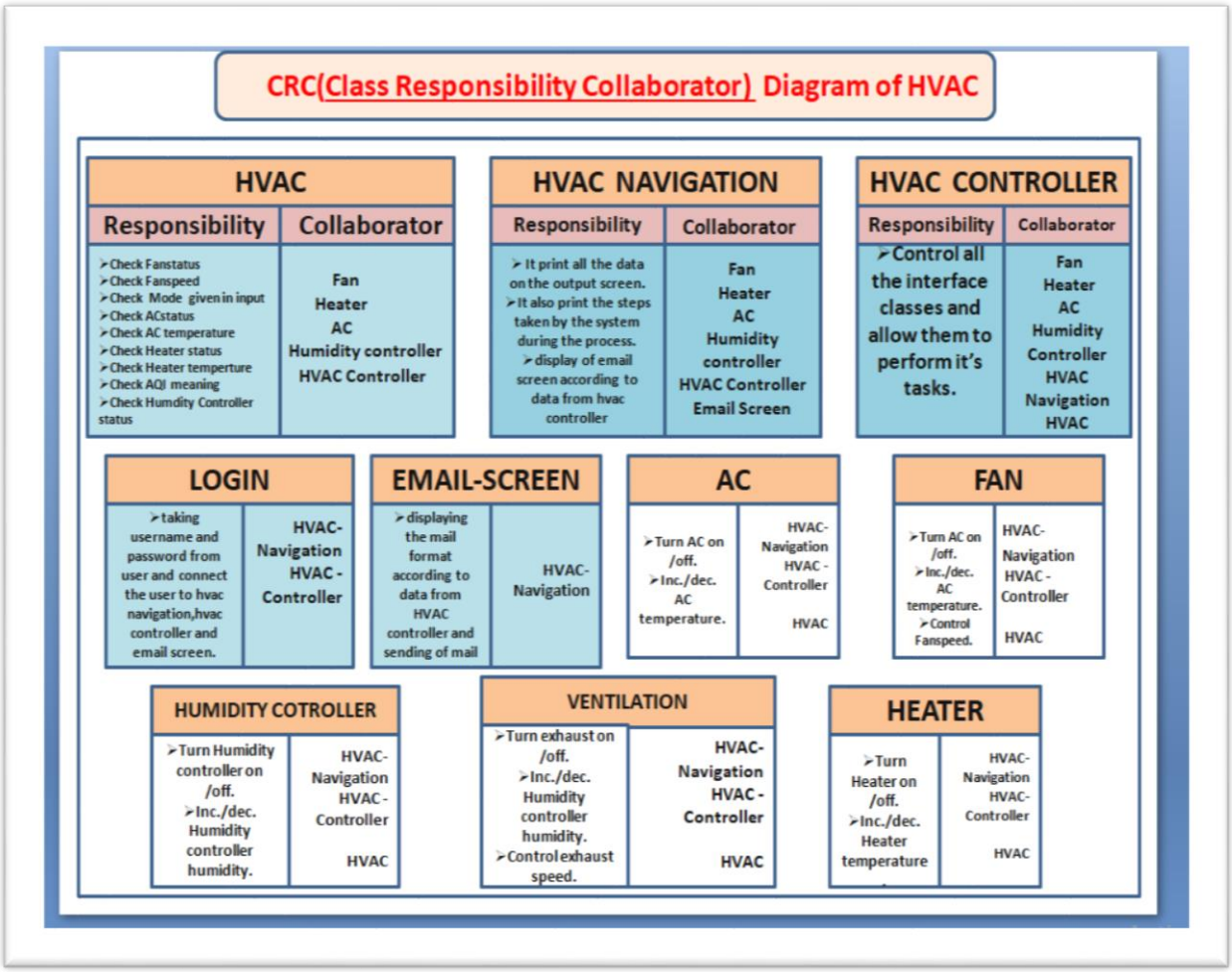
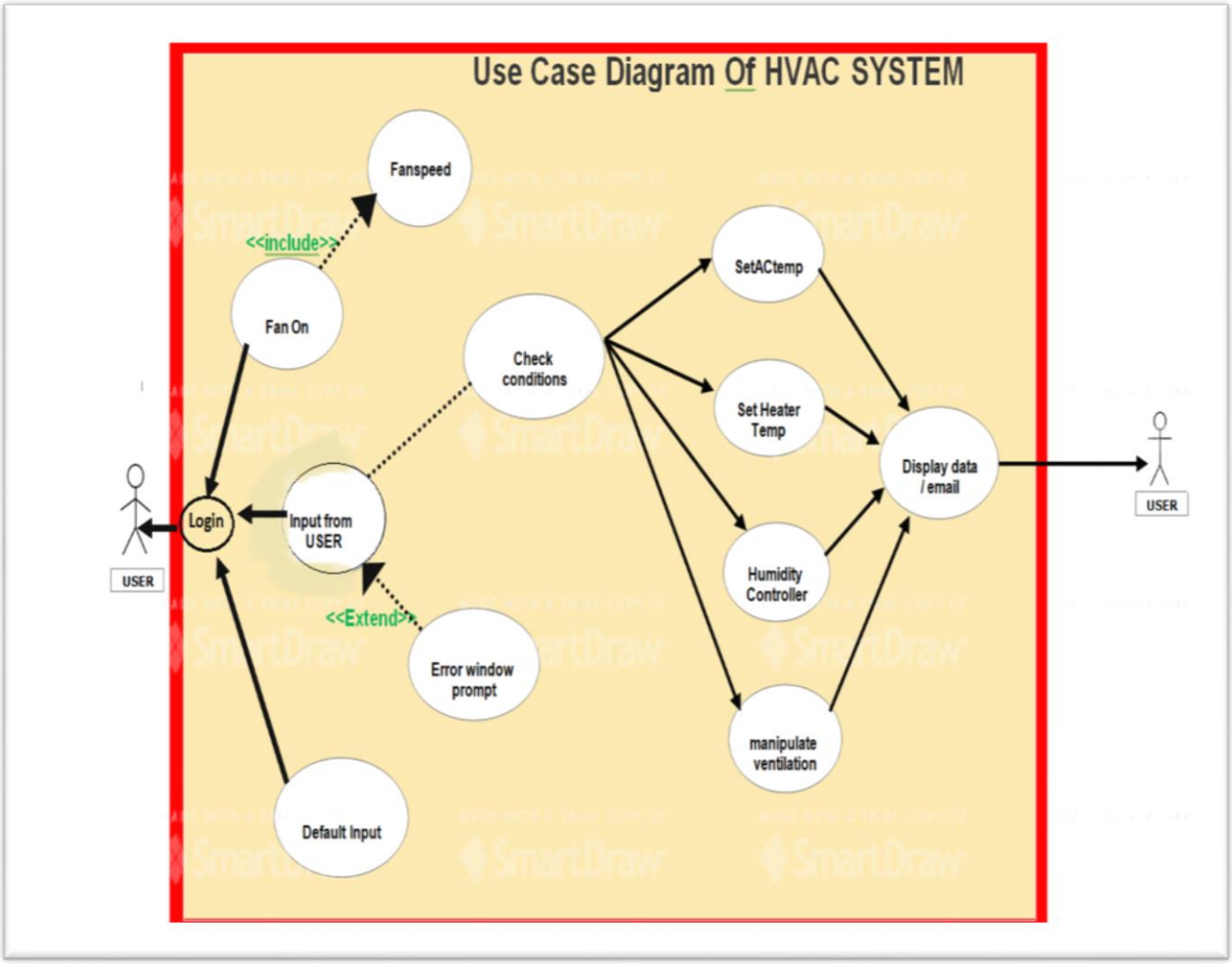
UML diagram


<<INTERFACE>>
FAN
+tFanOn(): void
+FanOff(): void
+SetFanSpeed(double speed): void
<<INTERFACE>>
Humidity Controller
+HumidityControllerOn(): void
+HumidityControllerOff(): void
+inc.Humidity(): void
+dec.Humidity(): void
<<INTERFACE>> AC
+ACOn(): void
+ACOff(): void
+SetACTemp(double temperature): void
+inc.ACTemp(): void
+dec.ACTemp(): void
<<INTERFACE>>
VENTILATION
+ExhaustOn(): void
+ExhaustOff(): void
+SetExhaustspeed(double speed): void
+inc.Exhaustspeed(): void
+dec.Exhaustspeed(): void
HVAC
Temperature: double
Humid: double
AQI: double
Fanstatus: boolean
Fanspeed: int
Mode: string
ACstatus: boolean
<<INTERFACE>>
HEATER
+HeaterOn(): void
+HeaterOff(): void
+SetHeaterTemp(double temperature): void
+inc.HeaterTemp(): void
+dec.HeaterTemp(): void
HVAC CONTROLLER
+Submit: JButton
+JPanel 1: JPanel
+FanOn: JRadio Button
+FanOff: JRadio Button
+Automode: JRadio Button
+Winter mode: JRadio Button
+Summer mode: JRadio Button
+Temperature: JText Field
+reset: JButton
+randominput: JButton
HVAC NAVIGATION
+currentACstatus: JText Field
+currentACTemp: JText Field
+currentExhauststatus: JText Field
+currentExhaustspeed: JText Field
+currentFanspeed: JText Field
+currentHeaterstatus: JText Field
+currentHeatertemp: JText Field
+currentHumidity: JText Field
+currentTemp: JText Field
+airquality: JText Field
+aqimeaning: JText Area
EMAIL SCREEN
+receiver: JText Field
+sender: JText Field
+subject: JText Field
+messege: JText Area
+sendmail: JButton
LOGIN
+username: JText Field
+Submit: JButton
+password: password field
+reset: JButton

State diagram



CRC diagram


CRC(Class Responsibility Collaborator) Diagram of HVAC
HVAC
Responsibility
Collaborator
➢Check Fanstatus
➢Check Fanspeed
➢Check Mode given in input
➢Check ACstatus
➢Check AC temperature
➢Check Heater status
➢Check Heater temperture
➢Check AQI meaning
➢Check Humdity Controller status
Fan
Heater
AC
Humidity controller
HVAC Controller
HVAC NAVIGATION
Responsibility
Collaborator
➢ It print all the data on the output screen.
➢It also print the steps taken by the system during the process.
➢display of email screen according to data from hvac controller
Fan
Heater
AC
Humidity controller
HVAC Controller
Email Screen
HVAC CONTROLLER
Responsibility
Collaborator
➢Control all the interface classes and allow them to perform it's tasks.
Fan
Heater
AC
Humidity Controller
HVAC
Navigation
HVAC
LOGIN
➢taking username and password from user and connect the user to hvac navigation,hvac controller and email screen.
HVAC-Navigation
HVAC - Controller
EMAIL-SCREEN
➢displaying the mail format according to data from HVAC controller and sending of mail
HVAC-Navigation
AC
➢Turn AC on /off.
➢Inc./dec. AC temperature.
HVAC-Navigation
HVAC - Controller
HVAC
FAN
➢Turn AC on /off.
➢Inc./dec. AC temperature.
➢Control Fanspeed.
HVAC-Navigation
HVAC - Controller
HVAC
HUMIDITY COTROLLER
➢Turn Humidity controller on /off.
➢Inc./dec. Humidity controller humidity.
HVAC-Navigation
HVAC - Controller
HVAC
VENTILATION
➢Turn exhaust on /off.
➢Inc./dec. Humidity controller humidity.
➢Control exhaust speed.
HVAC-Navigation
HVAC - Controller
HVAC
HEATER
➢Turn Heater on /off.
➢Inc./dec. Heater temperature
HVAC-Navigation
HVAC-Controller
HVAC

Use Case diagram