Abstract:

The idea of my project already been implemented in so many ways. You will find it in every computer, game console and server. It is really important for all these devices that I just mentioned and they will not survive without it. It is very important to have a cooling system or temperature controlled fan so it will detect if your machine is if getting hot and then start cooling the system. My project is technically a cooling system being controlled by a temperature sensor (LM35). Based on that temperature the fan will start spinning and the hotter it gets the faster the fan spin. There are maximum and minimum temperature, so if the current temperature is below the minimum the fan will not start and if the current temperature reached the maximum there will be a red LED will turn on as a way of warning. So if the temperature is between the max and min the fan will be running all the time. I was able also to hook up a Bluetooth chip to it so I can read the current temperature and also I will be able to change the Minimum temperature.

Introduction:

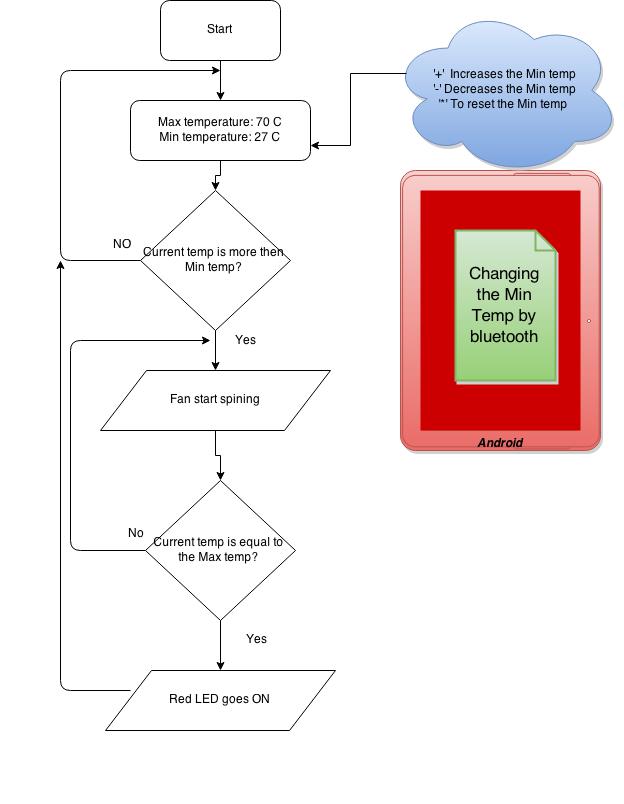
The project I worked on can go both ways! I would work as a cooling system for devices and also work as a home cooling fan as a concept. The fan I am using is 12v fan size 92mm x 25mm. that is what led me to the small cooling system for devices. The goal of this project is to achieve an acceptable concept of the device that work with no problems. The other goal is to use what I have learn in the class like how to deal with boards and their ports. I was thinking of making to boards talk to each other but I did not have time to do it since we learn that at the end of the semester. I got motivated for this project because it opened a door for me in the programming and hardware path. I never tried to do any kind of projects alone by myself. I am really looking now to do my own small project after this semester is finished and also it got me to think of couple of ideas that I want to try.

Background:

In my project I used Arduino Uno as my main hardware. It is not complicated to deal with and it uses a language really close to C, which is also perfect because I know C very well. However, I faced some problems I could not solve. For example, when I uses the Bluetooth to send and receive the temperature, I had a problem that I am not sending integers or float but characters. It really upset me because I was not able to convert it to int. So the problem was when I send a ‘1’ it read it as 49 decimal. So I decided that the only way to change the min temperature is to by doing by increasing one degrees up or one degrees down. As I said before my idea could be used in different cases and places. For example it could be used in a lot of devices the simplest one is a computer. All computers must have cooling system especially the heavy duty one.

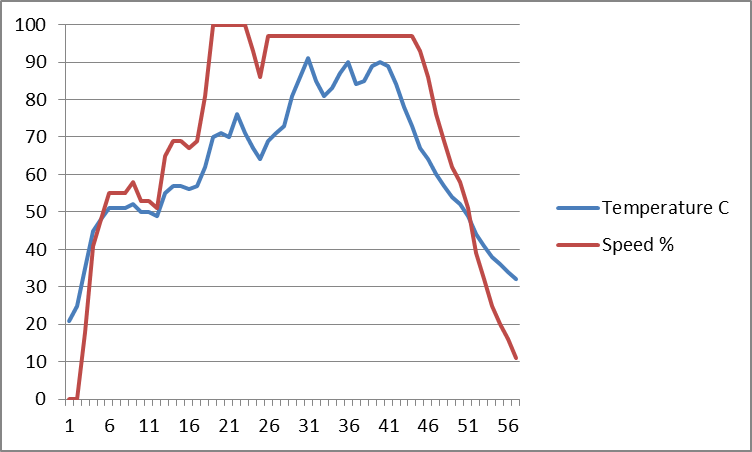
Proposed method / system description /Implementation:

I used a temperature sensor to give the room temperature. And using the sensor I managed at what temperature the fan will start and until what is the limit temperature. Also I was just able to say how much present is the speed of the fan which is a little bit gamic and I think it not exact. But it will show at least the level of the fan acceleration. Also using the Bluetooth hardware and my android tablet I can send commands to the Arduino to decrease or increase the Min temp. The app I am using is ready from the market.

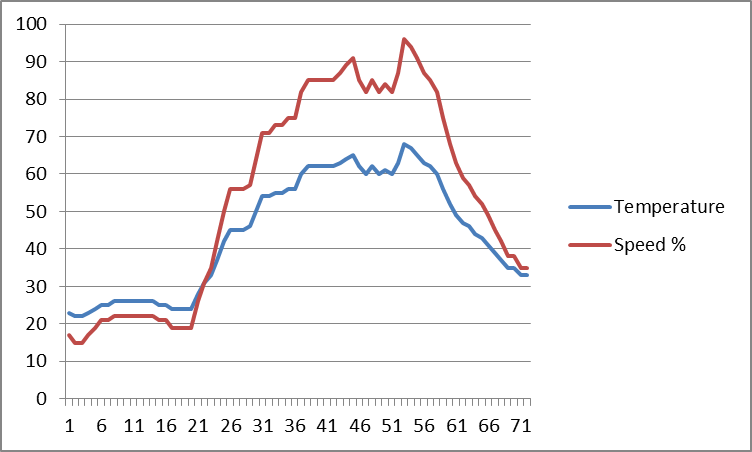


Experiments and Results:

I did so many testes to make sure that the device is working properly. I tested different cases like the case where the fan is not moving for a while. And also I tested the case when it maximum temperature and finally tested when it in between the maximum and the minimum where the fan it in normal speed. The more tricky cases where the one with Bluetooth because I had to make lots of changes to make the device look good. I guess I ran my program 30 around times at least. I divided the work as hardware and software! I finished assembling the circuits then started programing.



Testing the case were the temperature and speed were at Maximum



Testing the case were the temperature and speed were at Maximum

Testing the case the heat of my hand (barely moved).

Discussion and Conclusions:

The result seems convincing to me if look at the graph and see the video I included. So the graphs shows that the speed and temperature kind of go together. For example if you look at the graph where we are testing the max you will see both of them rising and falling. As the matter fact that exactly what I explain and what I wanted to do. Some of the problem I faced with the hardware part is that I bought I a lot of part I could not use or did not know how to make them work. For example. I bought two LCD boards to show the speed and temperature but both boards were confusing and one of them I could not turn it on. I learn from this experience how to make a project by myself and taught me to a lot about the Arduino I always thought are hard. I have a goal for myself to work more on his device and make better by using better temperature measuring and other programing thing I learn from this class I had not time to use it now. Finally, I would like to say I think my project is not the best but is something I am so proud of and I personally think it’s better than other people I saw. They were software all the way.

Appendices:

//Yousiff Abdulreheim

int tempPin = A1;   // the output pin of LM35

int fan = 11;       // the pin where fan is

int led = 8;        // led pin

int temp;

int tempMin = 27;   // the temperature to start the fan

int tempMax = 70;   // the maximum temperature when fan is at 100%

int fanSpeed;

//int fanLCD;

int remtCont =0;;

void setup() {

  pinMode(fan, OUTPUT); //declearing the pin for the fan

  pinMode(led, OUTPUT); //declearing the pin for the LED

  pinMode(tempPin, INPUT); //declearing the pin for the sensor

  Serial.begin(9600); //to be able to print and recive data from bluetooth

}

void loop() {

  if(Serial.available() > 0){

    remtCont = Serial.read();

      if(remtCont == '+'){

          tempIn();

        }

      else if (remtCont == '-'){

  tempDec();

      }

      else if(remtCont == '\*'){ //to reset the tempMin

         reSet();

      }

      else{

//        remtCont = Serial.read() -'0';

        tempMin = remtCont;

      }

  }

   temp = readTemp();     // get the temperature

   if(temp < tempMin) {   // if temp is lower than minimum temp

       fanSpeed = 0;      // fan is not spinning

       digitalWrite(fan, LOW);

   }

   if((temp >= tempMin) && (temp <= tempMax)) {  // if temperature is higher than minimum temp

       fanSpeed = map(temp, tempMin, tempMax, 32, 255); // the actual speed of fan

       analogWrite(fan, fanSpeed);  // spin the fan at the fanSpeed speed

   }

   if(temp > tempMax) {        // if temp is higher than tempMax

     digitalWrite(led, HIGH);  // turn on led

   } else {                    // else turn of led

     digitalWrite(led, LOW);

   }

    Serial.print("TEMP ");

     Serial.print(temp);

      Serial.print("C ");

      Serial.print("\t ");

     Serial.print("FAN: ");

     Serial.print("%");

     Serial.print("\t ");

     Serial.print("tempMin");

     Serial.print(tempMin);

     Serial.print("\t \n");

   delay(2000);

}

int readTemp() {  // get the temperature and convert it to celsius

  temp = analogRead(tempPin);

  return temp \* 0.48828125;

}

int tempIn(){ //inrcease the tempMin by one

  tempMin ++;

}

int tempDec(){ //decrease the tempMin by one

  tempMin --;

}

int reSet(){ //to reset the minTemp to 27

  tempMin = 27;