Note about Sensor Reading Errors

If you get absurd temperature and/or humidity data, first thing to do is to check your code. After debugging any bugs in your code, and you still getting wrong T/H, you probably receive wrong data. The DHT11 module used in this assignment may generate a lot of errors. The raw sensor should not give wrong T/H, but the micro controller in the sensor package may translate the raw readings wrongly due to a number of reasons. First, there may be interference in the data transmission process. Another reason could be the breadboard connection is not as good as a soldered one. Wires could have an unstable electric contact, and touching the wire could (temporarily) break the connection. Yet another reason is that when reading data, the Raspberry Pi may be handling some task of higher priority, which results in delayed execution of your code or wrong time counting.

During this season, the ambient temperature in the Lab should be within the range 22~26℃, and the relative humidity within 15%~19%.

My suggestion is to give your reading function a return value, instead of void, so that you know if you get a correct reading or not. For example:

```
bool readDHTSensor()
{
    // Do all the receiving job here…

    // Check if checksum is correct, if yes return true, if not
return false.
}
```

`bool` data type is declared in header file `stdbool.h`.

And when you try to get a data, you may use the following code:

```
while(readDHTSensor() == false);
```

If you want to see how many wrong data you get, just increment a counter inside the while loop body. And you may want to set a maximum loop times, say 1000, to avoid infinitely looping here. The sensor for sure will give you the right data before 1000 trials, but you may have logic errors in processing the checksum before debugging your code, and return false all the time.

As Dr. Chris said in the email, the whole process is pretty fast, and the sensor is usable.

A log of my testing is attached below. As you can see, I had to read around 11 times to get one correct reading. Sometimes one correct reading comes after 20 wrong readings. The gradual increasing of temperature is because I put my finger on the sensor. It seems that I did not sweat a lot, and since it was supposed to snow heavily, so the RH reading decreased a little bit.

```
====================
log starts here…
====================
pi7:~> cd ~/Desktop/
pi7:~/Desktop> gcc HTsensor.c -lwiringPi -o ht
pi7:~/Desktop> ./ht
Failed 10 times
T: 24.000000
H: 19.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 24.000000
H: 19.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 24.000000
H: 19.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 24.000000
H: 19.000000
pi7:~/Desktop> ./ht
Failed 20 times
T: 25.000000
H: 18.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 25.000000
H: 18.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 25.000000
H: 18.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 26.000000
H: 18.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 26.000000
H: 18.000000
pi7:~/Desktop> ./ht
Failed 20 times
T: 26.000000
H: 18.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 26.000000
H: 18.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 27.000000
```

```
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 27.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 27.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 27.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 27.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 27.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 27.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 27.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 27.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 30 times
T: 28.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 28.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 20 times
T: 28.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 20 times
T: 28.000000
H: 17.000000
pi7:~/Desktop> ./ht
Failed 10 times
T: 28.000000
H: 17.000000
```