

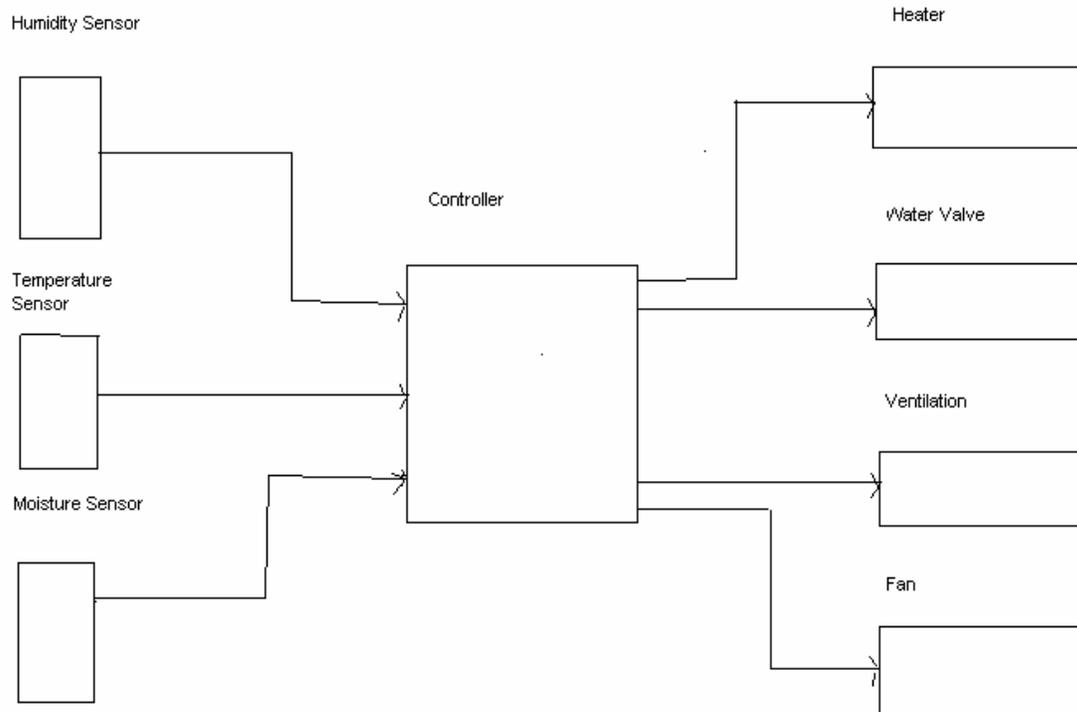
## **Introduction:**

Many people in this day in age have many things going on in their lives. A lot of these activities they don't really have the time for. For instance, my cousin Tye has a 250 acre orchard in Wenatchee, WA that he is in charge of and that alone is a full time job. On top of that, he also runs a large nursery 30 miles south in the tri-cities and six 30 by 160 foot greenhouses that are on the orchard. He is running all over the place throughout the week taking care of these three responsibilities. This is why I have come up this project. I thought it would be really great if I could come up with a way to take care of some of the daily chores for the greenhouse.

I have a plan to create a climate control system that will do all the work for my cousin. This system will vary the temperature by controlling a fan, heater, and ventilation. This system will also take in set times from the user to water the plants in the greenhouse.

## **Description:**

The point of doing this project for me is to save my cousin some time so this needs to take care of most of the basic needs for optimal performance of the greenhouse. The system that I will demonstrate in the end, will be much more basic then the one I will implement in Tye's greenhouse but it will paint a clear picture of what I want. It will have a sensor for each of the following: temperature and humidity. This information is continuously feed into a controller that will process the data. There are certain parameters that need to be met and the microcontroller will make sure that these parameters are met.



For instance there is a set temperature range that the greenhouse will need to stay within and it will use the heater, fan, and ventilation to control this. For example if it got too warm it would open shutters and turn on fans to cool it down. The humidity will also be controlled by the fan and the ventilation. The last variable is the soil moisture, where we are mostly concerned with the plants getting dried out. For this the controller will open and close a water valve that supplies drip sprinklers. For all climate conditions that the system will control the user will have the ability to program and change settings with the use of a keypad and LCD display. This will allow my cousin to change the parameters when there is not much in the greenhouse and for when the temperature outside changes during the season.

### **Benefits:**

The benefits of an automated climate control for a greenhouse are plenty. Taking care of a greenhouse is a twenty four hour a day job because many plants are very prone to damage when they are not in their element. Greenhouse plants could suffer damage from getting too hot or cold, they could harvest mold if the air is too humid, or they could die from lack of or too much water, so it needs to be kept within its parameters 24 hours a day. This system will take care of all the chores like watering, opening windows, and turning on fans, so you can take care of the many other things going on instead of dealing with the water and temperature control yourself. Also everybody from time to time just forgets to water their plants at home and when they finally remember the flowers are on their last leg or it was already too late. This is the same for a greenhouse. Sometimes things are forgotten and plants could be damaged. With this control system you shouldn't have to worry much about these things. It will do the sensing and take care of the duties of the care taker, and will save you a lot of time.

### **Comparison:**

There are many of these systems out there on the market and they make use of much newer and expensive equipment to take care of a greenhouse. I've seen some different systems out there and they work great, but there is quite a price tag to go along with them. This is why I wanted to do this project. There is no doubt in my mind that if Tye could afford greenhouse climate control, he would do it in a heart beat. So I will make him one and just give it to him to make his life a little easier. My greenhouse controller is much more basic than the others out there but it will take care of the needs that it must. I could eventually use more up to date and state-of-the-art heaters, cooling system and etc., but that is just not practical for my time and financial situation. Basically mine won't be quite as good as the other products out there but it will be much less expensive.

## **Development:**

My project will consist of sensor equipment, a controller, and equipment that will vary the climate of the greenhouse. I will be looking online for the different sensors that I will need. I think that I can just go to the different home and garden stores in town to get the hardware for the project like, Heaters, valves, and fans. When I get everything all together I will do mostly all the work and assembly in Etec 340 of the Ross Engineering Technology Building of Western Washington University. There will be hardware and software components, and this lab has all the necessary tools at my disposal to complete my project. For demonstration, I will have three sensors and I will display how they affect the equipment when a change in climate occurs.