Green house monitoring and control

Introduction:

The Greenhouse monitoring and controlling project is used to measure the various parameters like Temperature, Humidity, Light and soil moisture. Microcontroller displays these parameters on an LCD. Temperature, Humidity, and Light is sensed by respective sensors, soil moisture is sensed by 2 thin metal rods or metal wires. The sensor output of Temperature is amplified and along with the other 3 sensors, it is given to Analog to Digital Converter ADC. The microcontroller controls these parameters and keeps them below predefined levels using relay interface and motor drivers. These relays can be connected to Fan/Heater and DC motors can be connected to respective devices. For demo purposes, we have connected a 12 volt DC fan and a 12 volt DC bulb and two 12 volt DC motors. Values of temperature, humidity, light and soil moisture are sent to a computer through the serial port.

Description:

It mainly consist of following blocks:

1. Sensors: we are going to use temperature sensor, humidity sensor and light sensor to sense temperature humidity and light respectively. Metal thin rods or wires are used to sense soil moisture. These sensors sense the parameters and gives corresponding voltage output.

2. Amplifier: As the voltage output from the sensors is in miliVolts, it has to be increased to 0 to 5 volts range. We are going to use linear amplifier for this purpose.
3. ADC: The main part of our project is microcontroller which reads only digital input. (0V & 5V) But the output of Amplifier is in analog form, so it has to be converted into digital format, for this purpose we are going to use ADC to convert analog output from amplifier into the digital output to be given to microcontroller
4. Microcontroller: This is the CPU (central processing unit) of our project. We are going to use microcontroller of 8051 family. The various functions of microcontroller are like:
    I. Reading the digital input from ADC which is derived from Temperature and Light sensor. II. Sending this data to LCD so that the person operating this project should read the values of temperature and light. III. Controlling the parameters like Temperature, light, turning On/Off the respective relays IV. Sending the values of temperature and light to the computer using serial port
5. Relay: We have used 2 relays in our project. First one will be turned on when the temperature goes above the desired value. And the second relay will be turned on when humidity goes above the desired value. (e.g. if the desired value of temperature is 35 degree C and for humidity it is 50%, then Relay 1 will be turned on when temperature is 36 or above and Relay 2 will be turned on when humidity is 51 or above)

6. DC Motors: We are going to use two 12 volt DC motors. First DC motor will be turned on when Light goes above threshold level. Second DC motor will be turned on when Soil moisture goes below threshold level.
7. PC Interfacing: We are going to use max 232 IC for pc interfacing, the values of temperature and light will be sent to pc when the key is pressed

Applications and Advantages:

1. Can be used in green houses to control the temperature, soil moisture, humidity and light for the proper growth of plants

2. With little modification, this project can be used in Mechanical companies to measure various parameters of operating machines like temperature and light.

3. Temperature monitoring and controlling action can be used in home or various halls like conference room, seminar hall to control the temperature of room

Future Development:

1. We can monitor more parameters like Humidity, PH of soil, pressure, water level and at the same time control them

2. We can send this data to a remote location using mobile or internet

3. We can draw graphs of variations in these parameters using computer.