**Designing a Smart Home Climate Control System using SysML v2**

**Objective:** This assignment will help you apply SysML concepts to model the structural and behavioral aspects of a smart climate control system that adjusts temperature and humidity within a home automatically.

**Assignment Description:** You are tasked with creating a SysML model of a smart climate control system. The model should include both structural and behavioral elements to capture the system’s functionality. The system monitors temperature and humidity and adjusts the climate automatically to maintain comfort levels.

**Minimal Requirements:**

1. **Define the Structure of the Climate Control System:**
   * Create a part definition for ClimateControlSystem which includes at least the following parts:
     + TemperatureSensor
     + HumiditySensor
     + ClimateController
     + UserInterface
   * Define each part in detail, specifying any relevant attributes and actions.
2. **Model the Sensors:**
   * Define parts TemperatureSensor and HumiditySensor responsible for detecting current environmental conditions.
   * These parts should have attributes to hold temperature and humidity data and actions (MeasureTemperature and MeasureHumidity) that generate data.
3. **Model the Climate Controller:**
   * Define a part ClimateController that adjusts temperature and humidity based on sensor data.
   * Include an action AdjustClimate which takes temperature and humidity data as input and outputs a control signal for an HVAC unit.
4. **Model the User Interface:**
   * Define a part UserInterface for setting desired climate preferences.
   * This part should include actions DisplayCurrentConditions and SetPreferences.
5. **Use Cases:**
   * Identify and model the primary use cases of the climate control system.
   * Actors could include User and System.
   * Use cases might include StartClimateControl, StopClimateControl, SetTemperaturePreference, and ViewCurrentConditions.
6. **Actions:**
   * Define an action ClimateControlProcess to coordinate actions between TemperatureSensor, HumiditySensor, and ClimateController.
   * Include a StartControl action to initiate climate control.
7. **States:**
   * Design a state machine diagram to represent the system's states.
   * States could include Idle, Monitoring, Adjusting, and Stopped.
   * Define transitions based on events such as startButtonPressed, stopButtonPressed, temperatureThresholdExceeded.
8. **Complete SysML Model:**
   * Combine all parts and actions into a complete SysML package.