1. **Initial State (IDLE):**
   * **Description:** The system starts in an idle state, waiting for the first 200ms, 500ms, or 1-second event.
   * **Transition:**
     + On timer200msFlag, timer500msFlag, or timer1sFlag, transition to the respective states (CheckButton, CheckTemperature, ControlHeater).
2. **State: CheckButton (200ms check)**
   * **Description:**
     + Every 200ms, the button state is checked. If pressed, the set-point temperature is increased or decreased.
   * **Inputs:**
     + buttonPressed, setPoint.
   * **Actions:**
     + If buttonPressed is true, increment the setPoint by 1 (or adjust accordingly based on the button logic).
     + Reset buttonPressed to false.
   * **Output:** Updated setPoint.
   * **Transition:**
     + After completing the action, return to **IDLE**.
3. **State: CheckTemperature (500ms check)**
   * **Description:**
     + Every 500ms, the current room temperature is read using the I2C transaction.
   * **Inputs:**
     + I2C sensor read values (roomTemp).
   * **Actions:**
     + Use I2C to read temperature data.
     + Update the roomTemp variable.
   * **Output:** Updated roomTemp.
   * **Transition:**
     + After reading the temperature, return to **IDLE**.
4. **State: ControlHeater (1-second check)**
   * **Description:**
     + Every 1 second, the heater is controlled based on the room temperature compared to the set-point. The system also sends an update via UART.
   * **Inputs:**
     + roomTemp, setPoint, heatOn, secondsCounter.
   * **Actions:**
     + Compare roomTemp and setPoint.
     + If roomTemp < setPoint, turn on the heater (heatOn = true).
     + If roomTemp >= setPoint, turn off the heater (heatOn = false).
     + Send a UART message with the format <AA,BB,S,CCCC>.
     + Update secondsCounter.
   * **Output:**
     + Heater (LED) on/off state (heatOn).
     + UART message <AA,BB,S,CCCC>:
       - AA is the room temperature in Celsius.
       - BB is the set-point temperature.
       - S is 1 if the heater is on, 0 if it is off.
       - CCCC is the count of seconds since reset.
   * **Transition:**
     + After controlling the heater and sending the UART message, return to **IDLE**.

**State Transitions:**

* **IDLE to CheckButton:**
  + Trigger: timer200msFlag is set.
* **IDLE to CheckTemperature:**
  + Trigger: timer500msFlag is set.
* **IDLE to ControlHeater:**
  + Trigger: timer1sFlag is set.
* **CheckButton to IDLE:**
  + After checking button and updating setPoint.
* **CheckTemperature to IDLE:**
  + After reading the room temperature via I2C.
* **ControlHeater to IDLE:**
  + After controlling the heater and reporting status via UART.