Flow of an 8-Bit BCD Adder

1. **Input Breakdown**:
    - Inputs are 8-bit numbers, `A[7:0]` and `B[7:0]`.
    - Split the inputs into **two 4-bit groups**:
        - **Low nibble** (least significant 4 bits): `A[3:0]` and `B[3:0]`.
        - **High nibble** (most significant 4 bits): `A[7:4]` and `B[7:4]`.
2. **Step 1: Low Nibble Addition**:
    - Add the low nibbles: `A[3:0] + B[3:0]`.
    - If the sum is greater than `9` (invalid BCD), correct it by adding `6` (BCD adjustment).
3. **Carry from Low Nibble**:
    - If there is an overflow (carry) from the low nibble addition, pass it as a carry (`C_low`) to the high nibble addition.
4. **Step 2: High Nibble Addition**:
    - Add the high nibbles: `A[7:4] + B[7:4] + C_low` (carry from the low nibble).
    - If the sum is greater than `9` (invalid BCD), correct it by adding `6`.
5. **Carry from High Nibble**:
    - If there is an overflow (carry) from the high nibble addition, it becomes the **final carry out**.
6. **Output Assembly**:
    - Combine the adjusted high nibble and low nibble to form the final 8-bit BCD result.
7. **Outputs**:
    - **Sum**: 8-bit BCD result.
    - **Carry**: Final carry out, indicating overflow beyond 2 digits.