NARAYANA SCHOOL STUDENT PROUDLY PRESENTS

SAMSUNG CHIP DESIGN FOR HIGH SCHOOL

WEEK 6 LABS-“COFFEE MACHINE”

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Let me explain the NOT gate part step by step. The NOT gate inverts the signal it receives as input. If the input is 1 (High), the output becomes 0 (Low), and vice versa.

In this project, we need NOT gates to handle specific conditions where we require the opposite state of the input.

Why We Need NOT Gates

1. **Milk Temperature (T):**
    - **If T is 1, the milk is cold, and we don't want to dispense coffee or milk.**
    - **We need a signal that is 1 when T is 0 (milk is hot).**
    - **Use a NOT gate to invert T so that:**
        - **Input: T = 1 (cold) → Output: NOT_T = 0.**
        - **Input: T = 0 (hot) → Output: NOT_T = 1.**
2. **Milk Availability (M):**
    - **If M is 0, milk is unavailable, and we need to indicate insufficient quantity.**
    - **Use a NOT gate to invert M so that:**
        - **Input: M = 1 (available) → Output: NOT_M = 0.**
        - **Input: M = 0 (unavailable) → Output: NOT_M = 1.**
3. **Coffee Powder Availability (C):**
    - **If C is 0, coffee powder is unavailable, and we need to prevent dispensing coffee.**
    - **Use a NOT gate to invert C so that:**
        - **Input: C = 1 (available) → Output: NOT_C = 0.**
        - **Input: C = 0 (unavailable) → Output: NOT_C = 1.**

How to Add NOT Gates in Wokwi

1. **Click the "+" (Add Parts) button in Wokwi.**
2. **Search for NOT Gate.**
3. **Place the NOT gates near the inputs you need to invert (T, M, and C).**
4. **Connect the input of the NOT gate to the button (e.g., T for temperature).**
5. **Use the output of the NOT gate (NOT_T, NOT_M, or NOT_C) in your logic circuit.**

NOT Gate Connections

Here's how you connect the NOT gates:

1. **Inverting T for Hot Milk:**
   - **Connect the T button to the input of the NOT gate.**
   - **Label the NOT gate's output as NOT_T (this is 1 when milk is hot).**
2. **Inverting M for Insufficient Quantity:**
   - **Connect the M button to the input of the NOT gate.**
   - **Label the NOT gate's output as NOT_M (this is 1 when milk is unavailable).**
3. **Inverting C for Coffee Powder:**
   - **Connect the C button to the input of the NOT gate.**
   - **Label the NOT gate's output as NOT_C (this is 1 when coffee powder is unavailable).**

Example of NOT Gate in Wokwi

1. **Add a button for T (temperature).**
2. **Add a NOT gate.**
3. **Connect the button's output to the NOT gate's input.**
4. **Use the NOT gate's output (NOT_T) in your circuit for coffee and milk dispensing logic.**