WATER LEVEL INDICATOR

INTRODUCTION:

Design a Verilog module for a water level indicator system that uses four sensors to monitor the water level and controls an indicator and a pump.

BLOCK DIAGRAM:

The water level indicator system is designed to monitor the water level in a tank using four sensors: sensor_empty, sensor_low, sensor_medium, and sensor_high. The system outputs a 4-bit indicator that represents the current water level, where 0001 indicates the tank is empty, 0010 indicates a low level, 0100 indicates a medium level, and 1000 indicates the tank is full. Additionally, the system controls a pump with a pump_on signal, which is activated (1) when the tank is empty and deactivated (0) at all other levels. This simple yet effective design ensures accurate water level monitoring and efficient pump control.

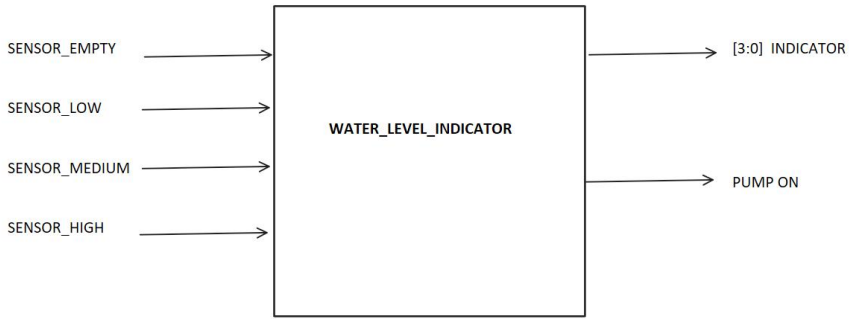

Figure 1: water level indicator

Inputs:

- sensor_empty (input wire): Indicates that the tank is empty.
- sensor_low (input wire): Indicates that the water level is low.
- sensor_medium (input wire): Indicates that the water level is medium.
- sensor_high (input wire): Indicates that the tank is full.

Outputs:

- indicator [3:0] (output reg): Indicates the current water level.
  - 0001: Empty.
  - 0010: Low.
  - 0100: Medium.
  - 1000: High.
- pump_on (output reg): Controls the pump.
  - 1: Pump is on.
  - 0: Pump is off.

Functional Requirements:

- The indicator output should reflect the current water level based on the active sensor.
- The pump_on output should be 1 (pump on) when sensor_empty is active.
- The pump_on output should be 0 (pump off) when any other sensor (sensor_low, sensor_medium, or sensor_high) is active.