Assignment -04 (Conditional Statement)

(If…else , case , casex , casez)

Using if else

- **2-to-1 Multiplexer (**Select between two inputs based on a select signal (sel).)
- **4-to-1 Multiplexer** (Extend the 2-to-1 multiplexer to select one of four inputs.)
- **8 bit comparator**(Compare two 8-bit numbers and determine if one is greater, lesser, or equal.)
- **Odd-Even Parity Checker** (Check if an 8-bit number is **odd or even** using if-else)
- **Binary to Gray Code Converter**(Convert a **4-bit binary number** into **Gray code**.)
- **Majority Detector** (Design a circuit that checks if the majority of 3 inputs are 1)
- **Binary Coded Decimal (BCD) to 7-Segment Display Decoder**(Convert a **4-bit BCD** input to a **7-segment display output**.)
- **Priority Encoder (8-to-3)** (Encode an **8-bit input** into a **3-bit output**, selecting the highest priority 1)
- **4 Bit Up Down counter (First write up counter and then add control termina for up down counter)**
- Arithmetic & Logical Unit (Perform basic arithmetic (ADD, SUB, AND, OR) based on a 2-bit control signal.)

Using Case ,Casex and Casez

- **8:1 Multiplexer**
- **Simple Pattern Detector (casex) :** Design a module that uses a casex statement to detect a specific pattern (e.g., if the MSB of a 3-bit input is 1) and assert an output signal.
- **Instruction Decoder (casex) :** Create an instruction decoder that interprets a 4-bit opcode with don’t care bits using casex to generate appropriate control signals.
- **ALU Operation Selector (casex) :** Implement a basic ALU selector module where a 4-bit opcode chooses between arithmetic or logic operations using casex to handle uncertain input bits.
- **BCD to 7-Segment Display Decoder (casez) :** Build a decoder that converts a 4-bit BCD input into a 7-segment display output, using casez to manage any high-impedance or don’t care conditions in the input.

- **Priority Encoder (casez) :** Design a priority encoder that outputs the highest priority active input from an 8-bit signal, using casez to simplify handling of don’t care conditions.