**RTL CHALLENGE**

**DAY – 25** :- Verilog Code for Implementation of Gray to Binary Converter.

**Software used**:- Xilinx Vivado(2023.1)

**Theory:-**

**A Gray to Binary converter is a digital circuit that converts Gray code, a binary numeral system where two successive values differ in only one bit, back into standard binary numbers. Here's an explanation of how a Gray to Binary converter works:**

**1. Inputs: The input to the converter is the Gray code that needs to be converted back to binary.**

**2. Conversion Algorithm: Converting Gray code to binary involves a slightly more complex algorithm compared to the binary-to-Gray conversion. The algorithm typically involves a series of XOR operations as well.**

**3. Process: To convert Gray code back to binary:**

** Start from the most significant bit (MSB) of the Gray code.**

** Copy the MSB of the Gray code to the corresponding bit of the binary output.**

** For each subsequent bit:**

** Perform an XOR operation between the bit of the Gray code and the previously obtained bit of the binary output.**

** The result becomes the next bit of the binary output.**

**4. Outputs: The output of the converter is the corresponding binary representation of the input Gray code.**

**5. Example: Let's convert the Gray code 1101 back to binary:**

** Gray: 1 1 0 1**

** Binary: 1 (1 XOR 1) (0 XOR 1) (1 XOR 0) = 1101**

**6. Implementation: Similar to the Binary to Gray converter, you can implement the Gray to Binary conversion algorithm using XOR gates in hardware or by writing a program in software.7. Expansion: The conversion process can be scaled up for larger Gray code numbers by applying XOR operations to each pair of corresponding bits.**

**Code:-**





