Assignment #11

Loops

Forever Loop

- **Blinking LED Simulation** – Toggle an LED every few time units using the forever loop.
- **Clock Signal Generation** – Implement a clock signal with a forever loop.
- **Continuous Counter** – Implement an always-on counter that increments continuously.
- **Pulse Generator** – Create a pulse waveform that toggles between 0 and 1 indefinitely.
- **Clock Divider** – Use forever to generate a divided clock signal.

Repeat Loop

- **Fixed Iteration Counter** – Use repeat (10) to increment a counter exactly 10 times.
- **Data Shift Register** – Implement an 8-bit shift register using repeat.
- **Pattern Generator** – Output a specific binary pattern for a fixed number of cycles.
- **PWM Signal Generator** – Generate a Pulse Width Modulation (PWM) waveform using repeat.

While Loop

- **Variable Iteration Counter** – Implement a counter that stops at a threshold using while.
- **Bitwise Parity Calculator** – Use while to count the number of 1s in a binary number.
- **Factorial Calculation** – Compute factorial of a number using while.
- **Clock Edge Detection** – Detect rising/falling edges of a signal.
- **Dynamic Shift Register** – Shift data dynamically based on a control signal.

For Loop

- **N-bit Ripple Counter** – Use for to iterate over N bits and implement a counter.
- **Binary to Gray Code Conversion** – Convert an N-bit binary number to Gray code using for.
- **Bit Reversal Operation** – Reverse the order of bits in an N-bit number.
- **Fibonacci Sequence Generator** – Compute N Fibonacci numbers using for.

Loop termination (disable)

- **Clock Generator with Enable Control :** Implement a clock generator using a forever loop. Use the disable statement to stop the loop when the enable (EN) signal is low (0).
- **Pulse Generator with Conditional Termination :** Generate a periodic pulse signal using a while loop. Terminate the loop using disable when a reset signal (RST) is asserted.
- **Counter with Early Termination :** Create an up-counter using a for loop. Stop counting when a stop condition (e.g., reaching a limit or detecting an external signal) is met using disable.