Project Report

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Link to video : https://youtu.be/fyn2fHCIft0

Project Description : In this project we are going to make the DE10-Lite board a digital clock and stopwatch that has the following features:

- Starting, pausing, and resetting the stopwatch. The stopwatch is controlled using the SW0 switch on the board (ie starting and stopping) and reset using the SW1 switch and the board will display the time elapsed.
- Digital clock displays the time (hours, minutes, seconds) on the board and also features an alarm that is set by using switch SW0. key1 and key 0 on the board is used to increment the minutes and hours on the clock. LEDR0 on board will glow to indicate the alarm going off at the set time.

Digital Clock

Digital_clock module: This module serves as the core functionality for a digital clock, processing time input, generating timekeeping signals, and handling alarm functionality based on input conditions.

Functionality: Clock Initialization, Time and Alarm Setting, Timekeeping, Time Output Formatting, Alarm Activation and Deactivation

binarytoBCD module takes binary inputs for hours and minutes and converts them into BCD (Binary-Coded Decimal) format.

Button_debouncer module eliminates or reduces noise or bouncing effects from a digital input signal, like a button press, ensuring a stable and reliable signal.

Decoder_7_segment, is a decoder that translates a 4-bit input into a 7-bit output format suitable for displaying numbers and some letters on a seven-segment display.

Digital_clock_tb module: The purpose of this module is to simulate and test the functionality of the digital clock module.

Stopwatch

Stopwatch module: This module keeps track of time and lap time, and displays it on a seven-segment display.

Functionality: It operates as a stopwatch with start, stop, reset, and lap functionalities.

Pulse module: This module generates a pulse signal based on a clock input. On each clock cycle, the module counts up until it reaches the specified frequency

BCD2SevenSegementdisplay module: This module is a decoder that converts a 4-bit binary-coded decimal (BCD) input into a 7-bit output suitable for displaying numbers on a seven-segment display

Project Breakdown: The project was completed in joint collaboration and both members contributed to the completion of the project and the work was split such that:

Fardad worked on the Digital_clock module and the project video.

Sarimah worked on the Stopwatch module and the project report.