

ECE 554 Minilab0 Report

The GitHub repository was created by navigating to [www.github.com](https://github.com), logging into my GitHub account, and following the standard workflow to create a new repository named **ECE554**. The repository was then cloned to my local machine. The **Minilab0** directory, containing all relevant source files and screenshots, was committed locally and pushed to the remote repository located at: <https://github.com/InterGalactic946/ECE554/tree/main/Minilab0>.

The snapshot below shows the waveform and simulation log, confirming that all tests executed successfully. The individual testbench and design *.sv files can be found in the repository for reference.

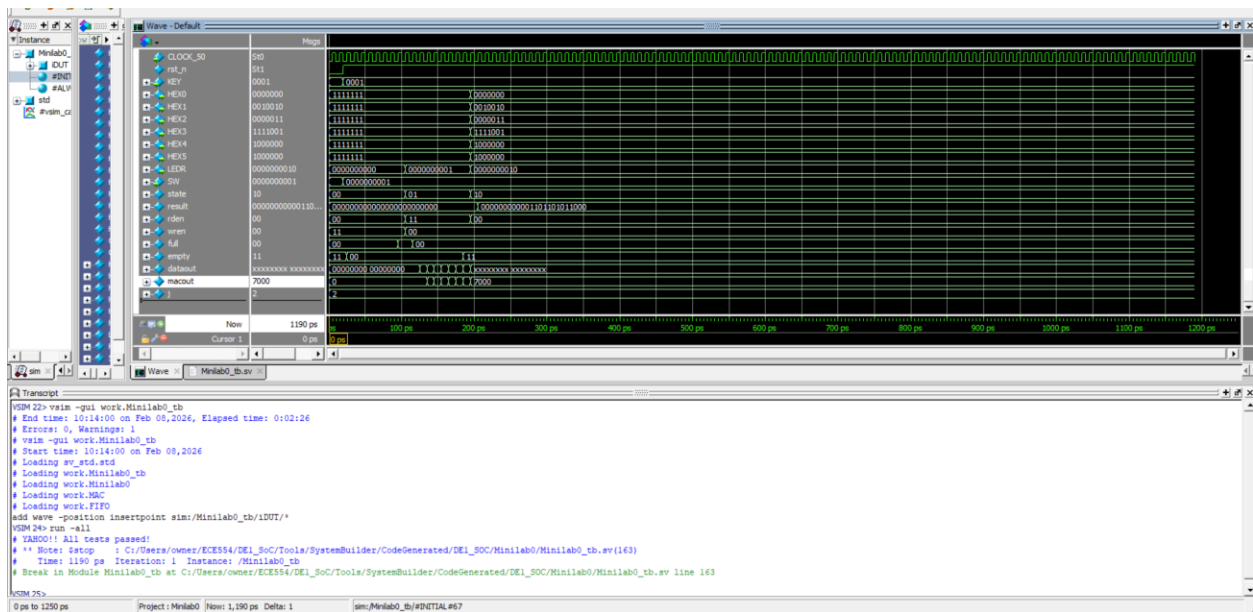


Figure 1. Snapshot showing the log output and waveforms without using IP blocks.

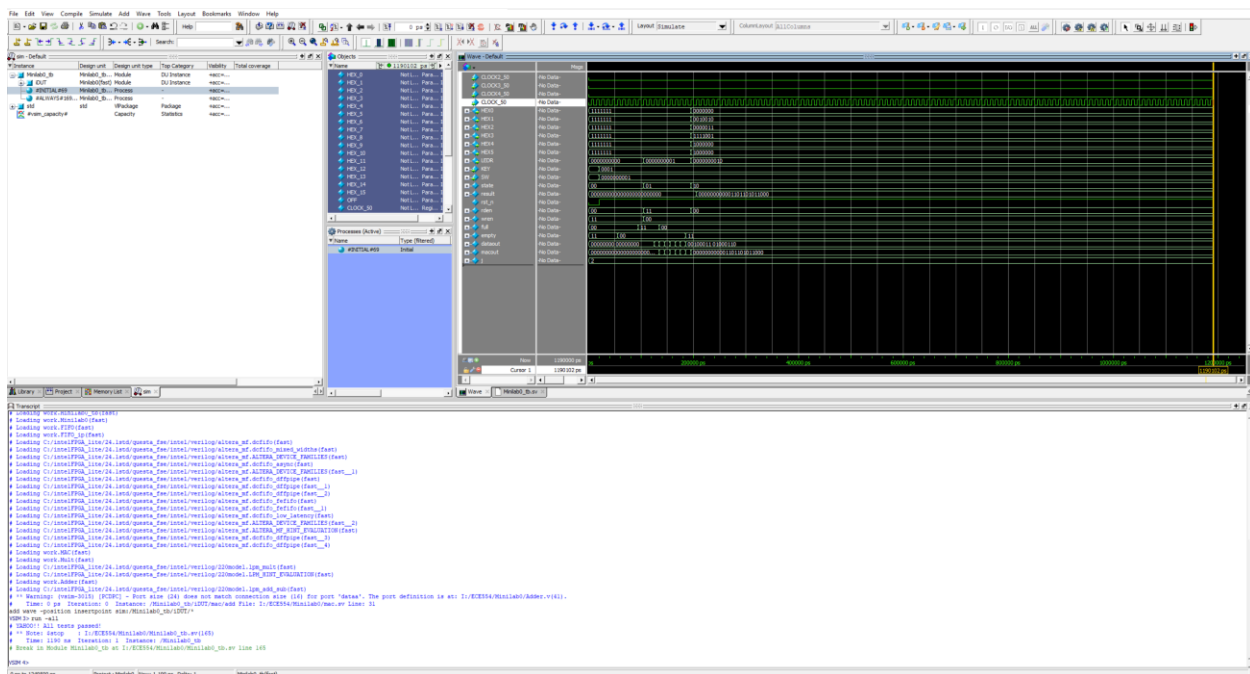


Figure 2. Snapshot showing the log output and waveforms using IP blocks.

Compared to the non-IP implementation, the IP-based design significantly reduces ALM and register usage by offloading storage into block memory and using more optimized combinational logic. This resulted in lower fan-out, improved resource efficiency, and a more scalable hardware implementation while preserving identical I/O and DSP usage as per the resource reports generated by Quartus on synthesis.