ECE 554 Minilab1a Report

GitHub Repository Creation

The GitHub repository was created by first navigating to **www.github.com** and logging into my GitHub account. From the dashboard, I selected **"New Repository"**, entered the repository name **ECE554_Minilabs**, chose the appropriate visibility settings, and initialized it with a README.

After the repository was created on GitHub, I copied the repository URL and used the git clone command in the terminal to clone the repository to my local machine. This created a local working directory linked to the remote repository.

The **Minilab1a** directory, containing all relevant source files and screenshots, was then added to the local repository using git add. A commit was created using git commit with an appropriate commit message describing the changes. Finally, the changes were uploaded to the remote GitHub repository using git push, making the project files available at the remote repository location located at:

https://github.com/InterGalactic946/ECE554_Minilabs/tree/main/Minilab1a.

Simulation Logs

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.

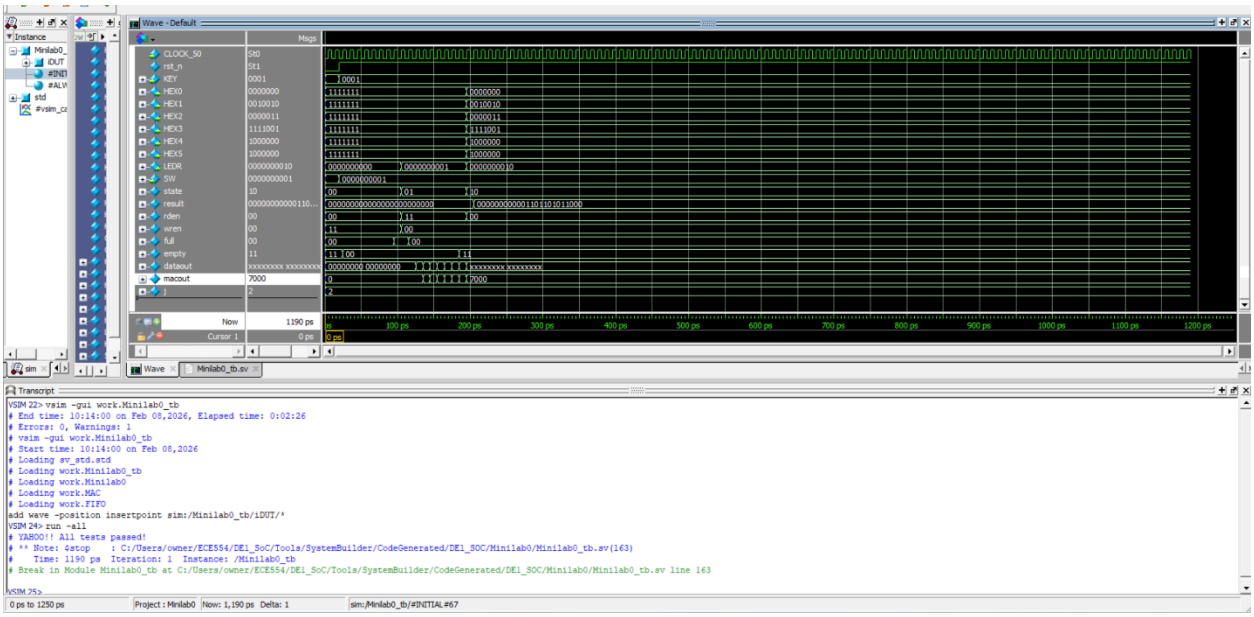

Figure 1. Snapshot showing the log output and waveforms without using IP blocks.

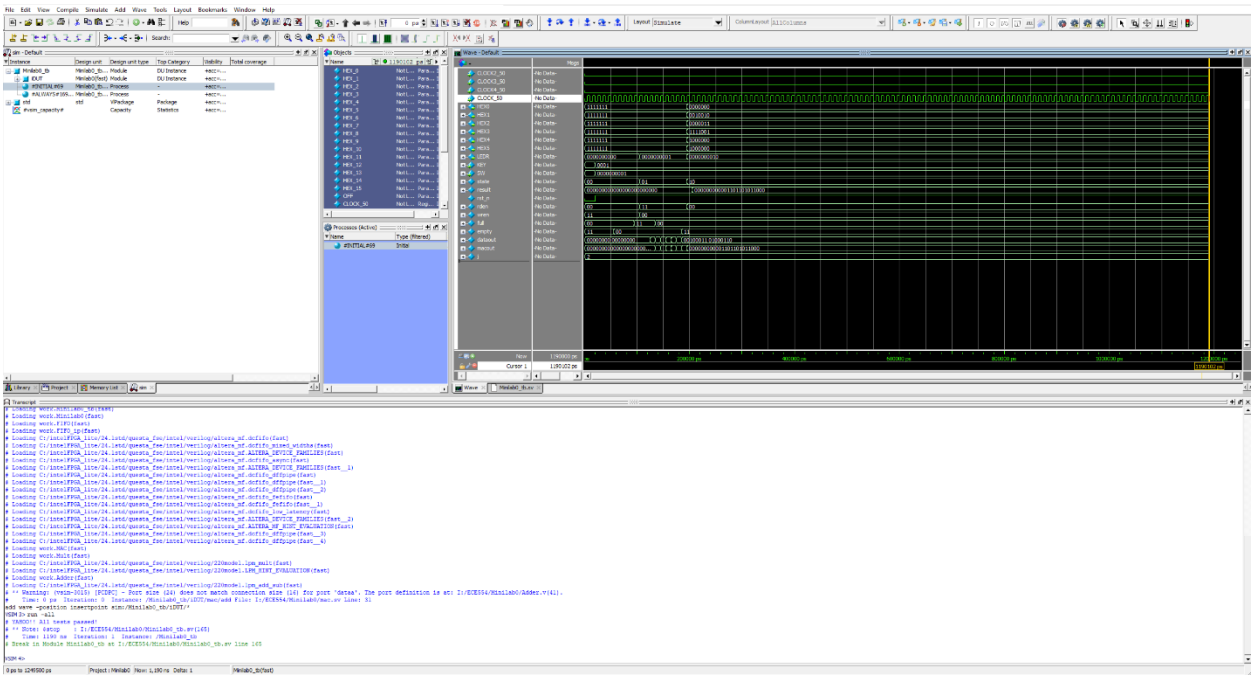

Figure 2. Snapshot showing the log output and waveforms using IP blocks.

Resource Utilization Discussion

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.