PROJECT REPORT

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SPI Protocol

* Studied Serial Peripheral Interface Protocol for operating Master-Slave Device.
* Implemented it using Verilog HDL.
* Created a Slave-MUX combination using Verilog.
* Implemented SPI protocol for 8 slaves where at a time each one the slave will be active based on their enable signal.
* Created and 8-1 MUX that will select connect the miso of the active SLAVE out of 8 to the master.

Optimising Algorithm

* Searched for an algorithm which has high time complexity with an aim to reduce its time complexity using parallel processing and by increasing Hardware Complexity.
* Worked on algorithm of Matrix Multiplication of 2 ‘n X n’ square matrix that has time complexity of O(n3) using naïve approach.
* The entries of the matrix is 32-bit floating point number according to IEEE 754.
* Created module for Multiplication and Addition of Floating-point number.
* Created a module that will take 2 vectors of length ‘n’ and will return the sum of product of corresponding element, where n is the order of input matrixes, basically dot product using the Multiplication and Addition Module.
* Since in multiplication of 2 square matrixes, there will be n2 vector dot products, so I made n2 module of dot-products so that all the vectors are multiplied simultaneously and generates the result in time complexity of O(1).