MAC unit - Assignment-1

MINDS OF MINDROVE

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OVERVIEW

Design an MAC unit that computes multiplication of two inputs and adds the resultant to the third input given.Write bluespec verilog code to compute the design and write python code using cocotb testbench to test the design for given inputs.

GOALS

1. Unpipelined design for int and float
2. Pipelined design for int and float.

SPECIFICATIONS

- Do not use “+” or “*”.
- Use bf16 for float.
- Compute the coverage.

MILESTONES

Int

- Started of by writing separate modules for multiplication and addition in separate files and imported those file in top.bsv file.
- The debugging was unnecessary, hence moved in it to same file.
- Used Ripple Carry adder method to add the values without using “+”.
- Implemented multiplication using the add function multiple times.
- The result was always zero, hence was debugging using gtkwave and found out that the answer is correct but the assertion was wrong because I did not wait for the proper time to receive data.

Float

- Implemented the float MAC in python and debbugged it to get the correct answer.
- Once arrived at the correct answer started building the BSV code to replicate the reference module and got the answer.

Pipeline

- Added FIFO libraries to use it.
- Added extra rule to give the values through FIFO.
- Changed the methods to incorporate FIFO.