**CSE331 ASSIGNMENT 2**

**REPORT**

ENES AYSU

1901042671

PART 1

control.v

Control has 5 state. It controls product value and status of write and shift-right signals. In first state checks product value wheter1 or 0. If it is 1, adds multiplicant to the left half of product. Places to result in the left half of product register and passes third state. If its 0 it passes third state too. In third state shifts the product register right 1 bit and passes fourth register. It checks that is repetition number (count) less than 32. If answer is yes returns first state. If answer is no operation is done.

datapath.v

Datapath controls shift-right, write and add operations according to control units directions.

mult32.v

Multiplication takes two 32 bit numbers. When operation handle, shifts the first number and according to the second inputs less significant bit adds shifted first number to the result. When shifting operation is over, addition result equals to multiplication result.

PART 2

alu32.v

Alu32 includes 8 different operations. These operations handle here and results goes to 8x1 multiplexer. ALUop as selection input decides which result will be printed.

mux8\_1.v

Mux selects which mathematical or logical operation to perform according to selection inputs from alu32.

adder32.v

Adder uses 1 bit full adders 32 times to addition for 32 bit numbers.

subs32.v

Substractor takes 2’s complement of the second input and adds the second input to first input with adder. To take 2’s complement of a number, substractor uses not operation. And adds 1 to the selected number using adder.

xor32.v

Xor uses 1 bit xor gates 32 times to xor operation for 32 bit numbers.

and32.v

And uses 1 bit and gates 32 times to and operation for 32 bit numbers.

or32.v

Or uses 1 bit or gates 32 times to or operation for 32 bit numbers.

slt32.v

Set less than substracts second input from first input and returns most significant bit of the result.

nor32.v

Nor uses 1 bit nor gates 32 times to nor operation for 32 bit numbers.