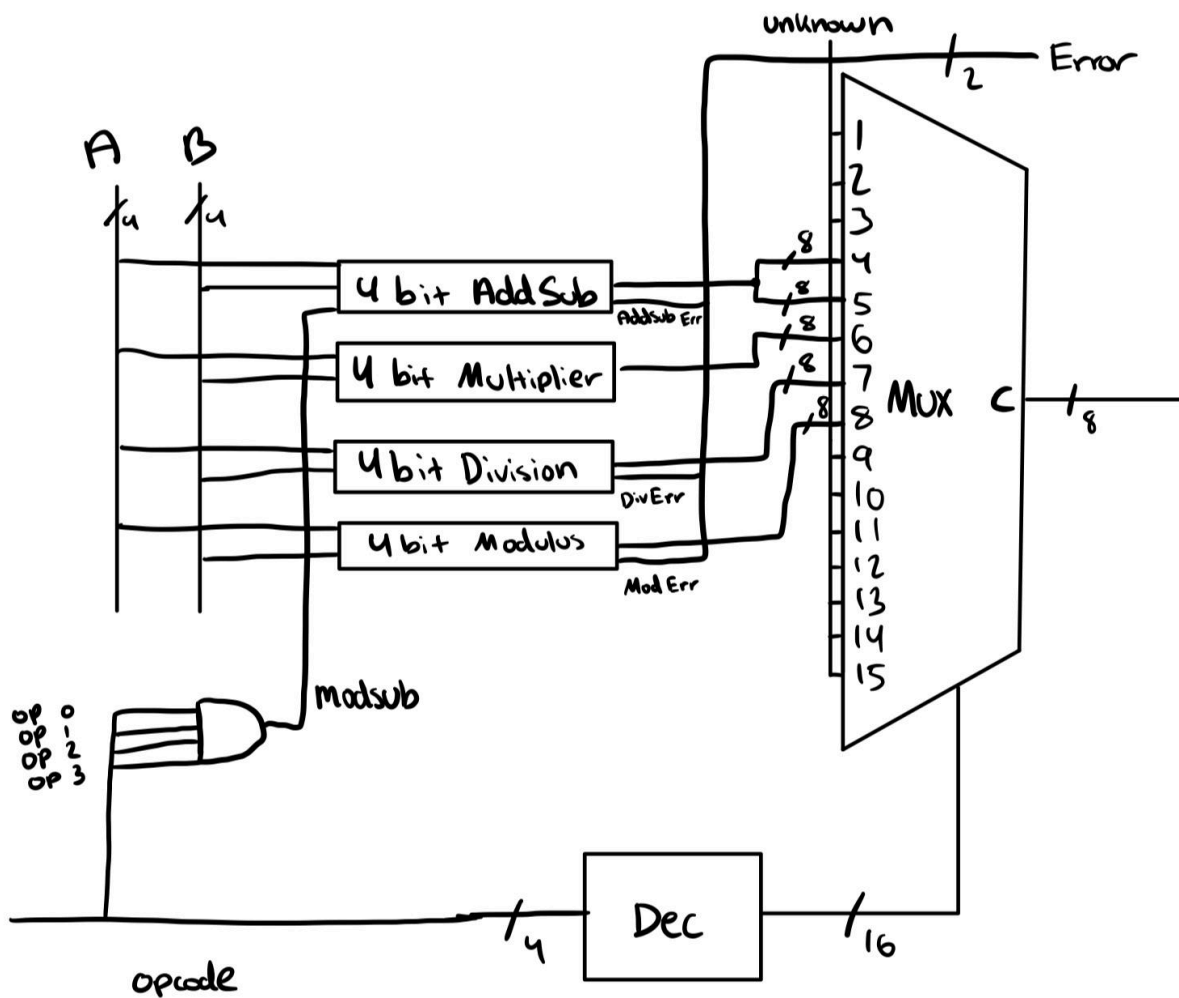


3.1



3.2

3.2.1

Input A: 4 bits, first operand input

Input B: 4 bits, second operand input

Opcode: 4 bits, Opcode decides what operation to do out of addition, subtraction, multiplication, and division.

3.2.2

Output C: 8 bit, Shows the result of the operation from the two inputted operands, which is the result of addition, subtraction, multiplication, or modulus operations depending on the opcode
 Error: 2 bit, Shows which operation the error came from; the first bit represents overflow during addition and subtraction, and the second bit demonstrates errors like division by 0/originating from the modulus operation

3.2.3

8 bit outputADDSUB from FourBitAddSub to channel 4 MUX. Interface represents the result addition to the MUX.

8 bit outputADDSUB from FourBitAddSub to channel 5 MUX. Interface represents the result of subtraction to the MUX.

8 bit outputMUL from FourBitMultiplier to channel 6 MUX. Interface represents the result of multiplication to the MUX.

8 bit outputDIV from FourBitDivision to channel 7 MUX. Interface represents the result of division to the MUX.

8 bit outputMOD from FourBitModulus to channel 8 MUX. Interface represents the result of modulus to the MUX.

16 bit select from 4 to 16 decoder to MUX selector. Interface represents the selector signal of which operation was selected from the imputed opcode.

1 bit Adderror from AddSub to MUX error. Interface represents an error occurring during addition or subtraction.

1 bit DIVerror from Division to MUX error. Interface represents an error occurring during division.

1 bit MODerror from Modulus to MUX error. Interface represents an error occurring during modulus.

3.2.4

FourBitAddSub is responsible for doing add and subtract operations.

FourBitMultiplier is responsible for doing the multiplication operation.

FourBitDivision is responsible for doing the division operation.

FourBitModulus is responsible for doing the modulus operation.

16 x 1 MUX is responsible for selecting a channel based on the select interface from the decoder.

4 x 16 Decoder is responsible for sending a select interface based on the input opcode.

3.2.5

0000	Unknown
0001	Unknown
0010	Unknown
0011	Unknown
0100	Add
0101	Subtract
0110	Multiply
0111	Divide
1000	Modulus

1001	Unknown
1010	Unknown
1011	Unknown
1100	Unknown
1101	Unknown
1110	Unknown
1111	Unknown

3.3

The input decoder remains the same number of bits, because it represents an operation type, not a magnitude of data. The number of operations remains the same, and thus so does the input of the decoder. There are 16 channels in the MUX so the decoder will need n inputs where the output is 2^n , resulting in an input of 4 channels and output of 16 channels.

Input:

Input A: 16 bits, first operand input

Input B: 16 bits, second operand input

Opcode: 16 bits, Opcode decides what operation to do out of addition, subtraction, multiplication, and division.

Output:

Output C: 32 bit, Shows the result of the operation from the two inputted operands, which is the result of addition, subtraction, multiplication, or modulus operations depending on the opcode

Error: 2 bit, Shows which operation the error came from; the first bit represents overflow during addition and subtraction, and the second bit demonstrates errors like division by 0/originating from the modulus operation

Interfaces:

32 bit outputADDSUB from SixteenBitAddSub to channel 4 MUX. Interface represents the result addition to the MUX.

32 bit outputADDSUB from SixteenBitAddSub to channel 5 MUX. Interface represents the result of subtraction to the MUX.

32 bit outputMUL from SixteenBitMultiplier to channel 6 MUX. Interface represents the result of multiplication to the MUX.

32 bit outputDIV from SixteenBitDivision to channel 7 MUX. Interface represents the result of division to the MUX.

32 bit outputMOD from SixteenBitModulus to channel 8 MUX. Interface represents the result of modulus to the MUX.

16 bit select from 4 to 16 decoder to MUX selector. Interface represents the selector signal of which operation was selected from the imputed opcode.

1 bit Adderror from AddSub to MUX error. Interface represents an error occurring during addition or subtraction.

1 bit DIVerror from Division to MUX error. Interface represents an error occurring during division.

1 bit MODerror from Modulus to MUX error. Interface represents an error occurring during modulus.

Parts:

SixteenBitAddSub is responsible for doing add and subtract operations.

SixteenBitMultiplier is responsible for doing the multiplication operation.

SixteenBitDivision is responsible for doing the division operation.

SixteenBitModulus is responsible for doing the modulus operation.

16 x 1 MUX is responsible for selecting a channel based on the select interface from the decoder.

4 x 16 Decoder is responsible for sending a select interface based on the input opcode.

