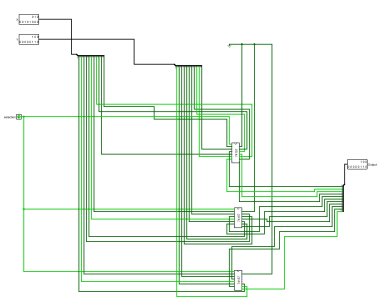
1 Description and Circuit Diagram of Important Blocks

Some libraries and circuits were implemented to enhance and simplify the final circuit design.Those are :

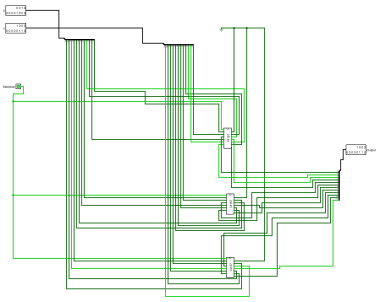
1.1 Multiplexer Library

The modular circuits in this library are as follows

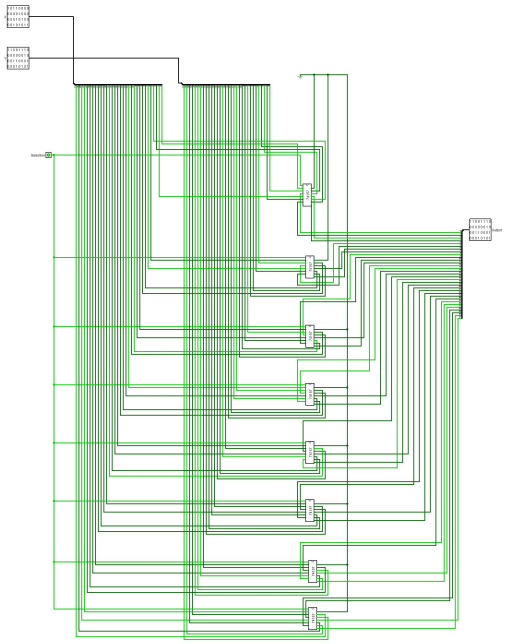
- 11 bit 2 to 1 Mux
- 12 bit 2 to 1 Mux
- 32 bit 2 to 1 Mux



(a) 11 bit 2×1 MUX



(b) 12 bit 2×1 MUX

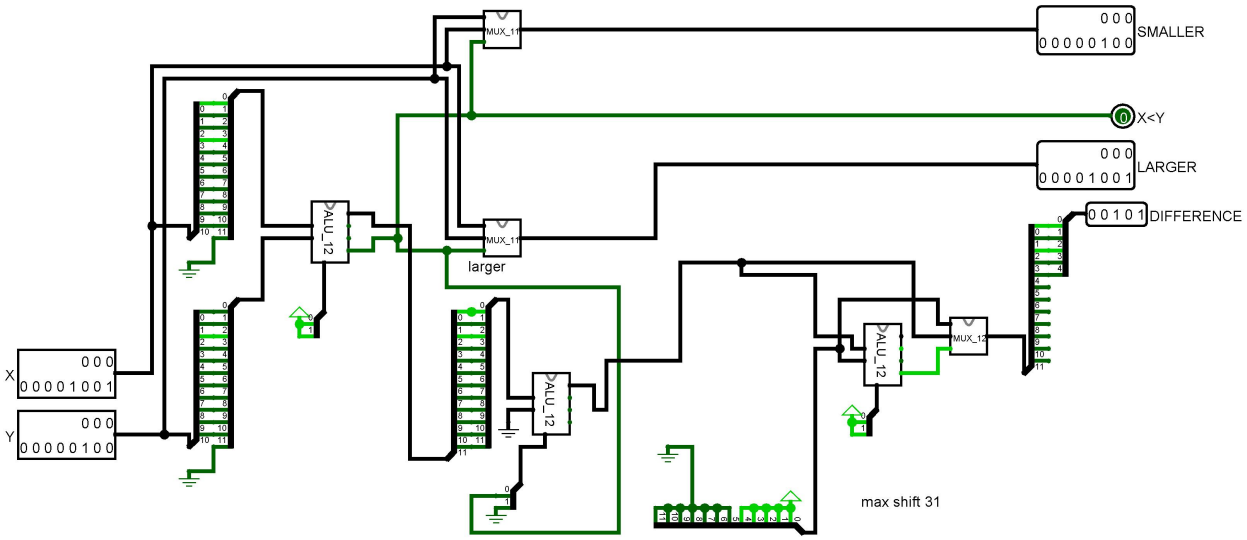


(c) 32 bit 2×1 MUX

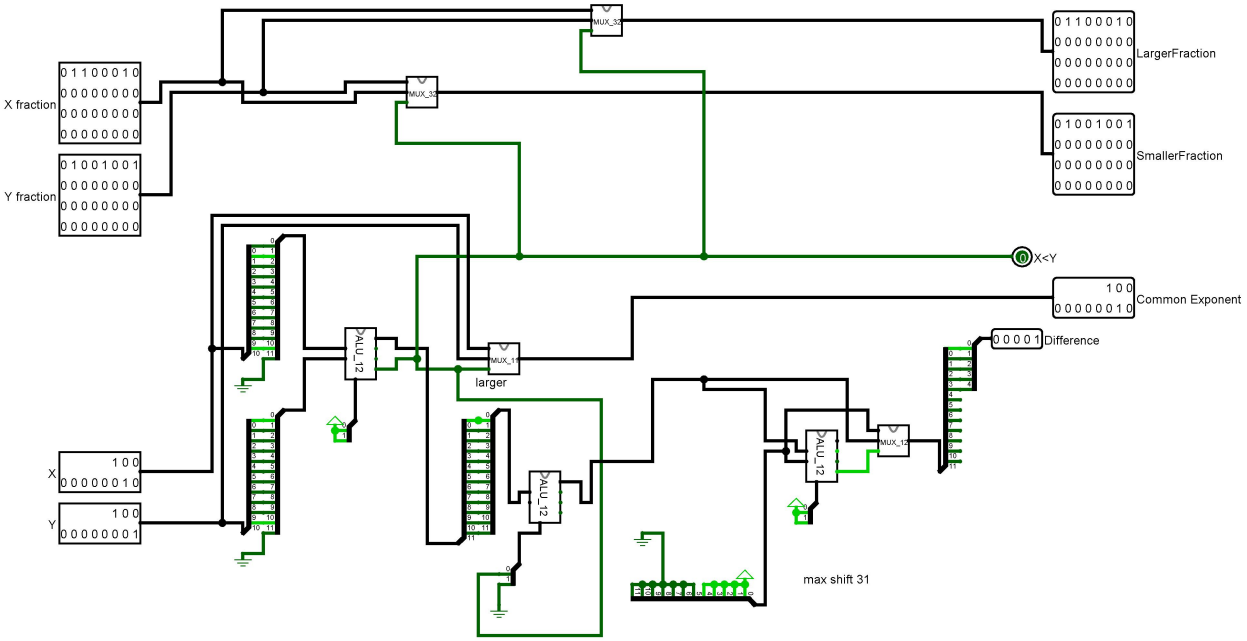
Figure 1: Multiplexer Circuits

1.2 Comparator Library

An comparator library was constructed to compare the exponenets . This library contains 2 circuits i.e. an 11 bit magnitude comparator and a comparator for small fractions.



(a) 11 Bit Magnitude Comparator



(b) Smaller Fractions Magnitude Comparator

Figure 2: Magnitude Comparators

1.3 Adder-Subtractor Library

A 32 bit adder-subtractor circuit was implemented to add or subtract 2 signed numbers

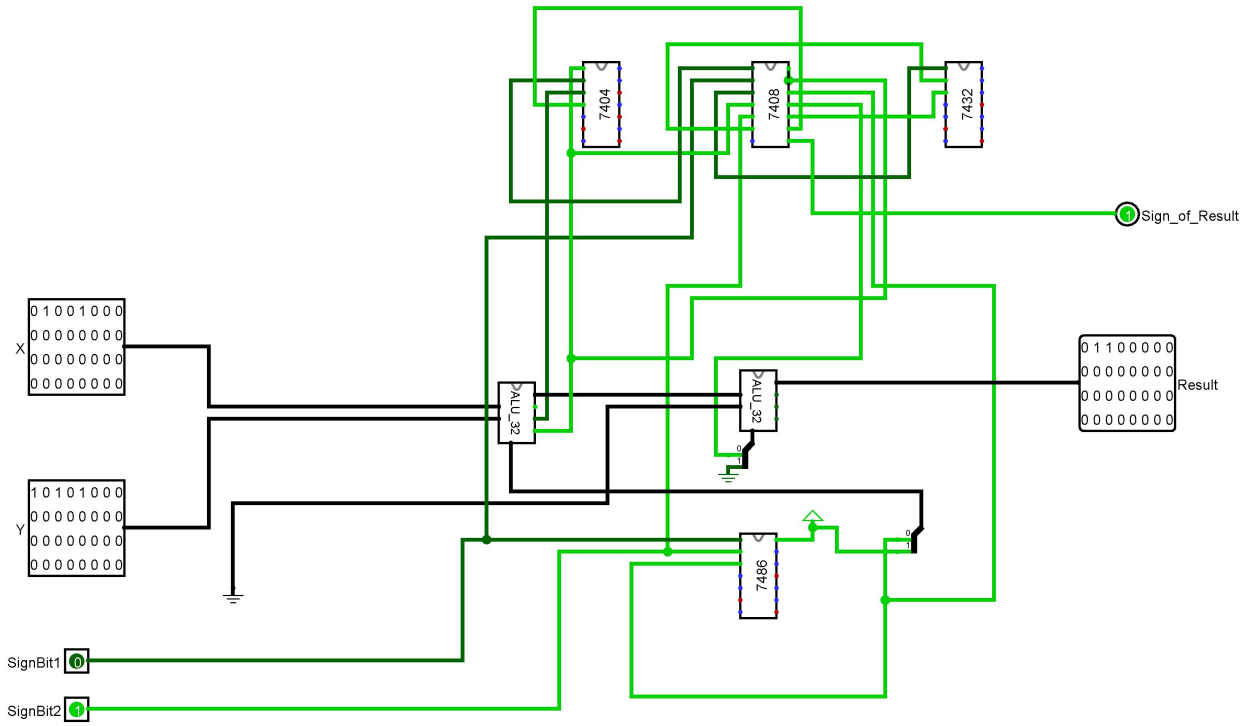
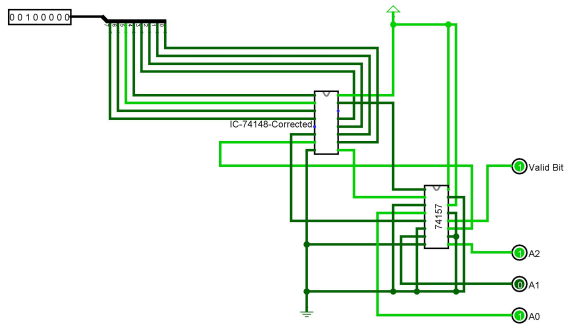


Figure 3: 32 bit Adder−Subtractor

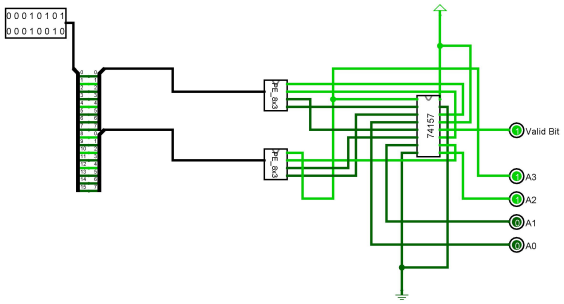
1.4 Encoder Library

To normalize a number, we need to locate the first set bit starting from MSB. 3 priority encoders was used for this purpose. Those are :

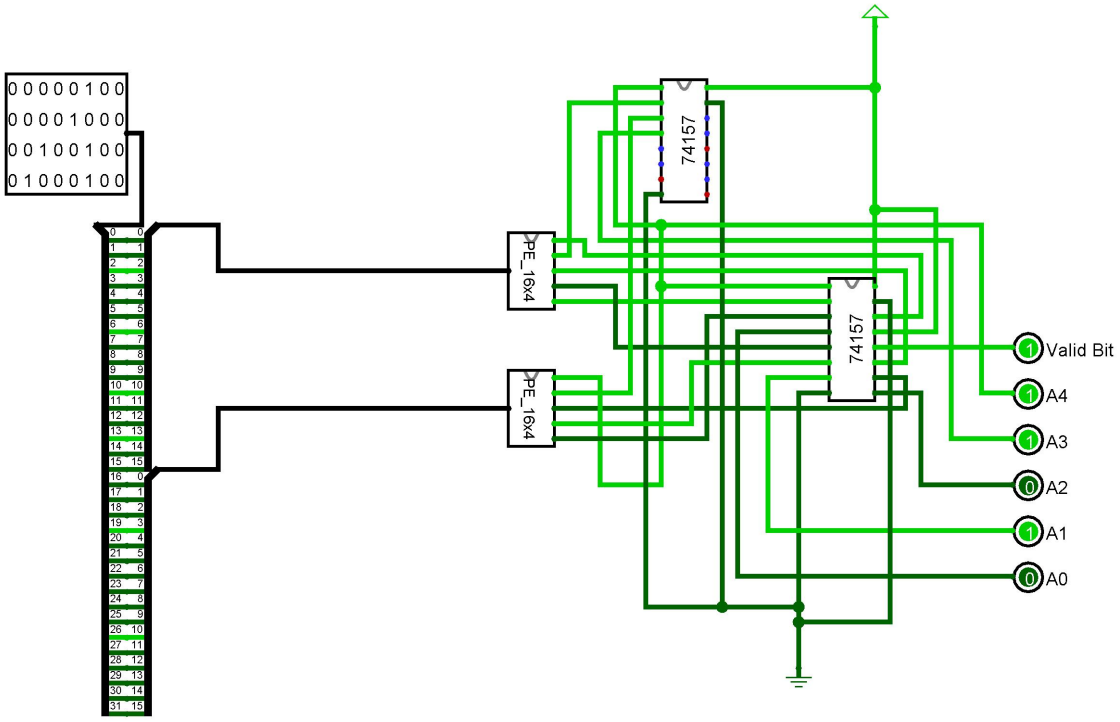
- 8 to 3 priority encoder
- 16 to 4 priority encoder
- 32 to 5 priority encoder



(a) 8×3 Priority Encoder



(b) 16×4 Priority Encoder



(c) 32×5 Priority Encoder

Figure 4: Encoder Circuits

1.5 Normalizer Circuit

The normalizer circuit does necessary change in mantissa and exponent to change the number in operable form for other circuits.

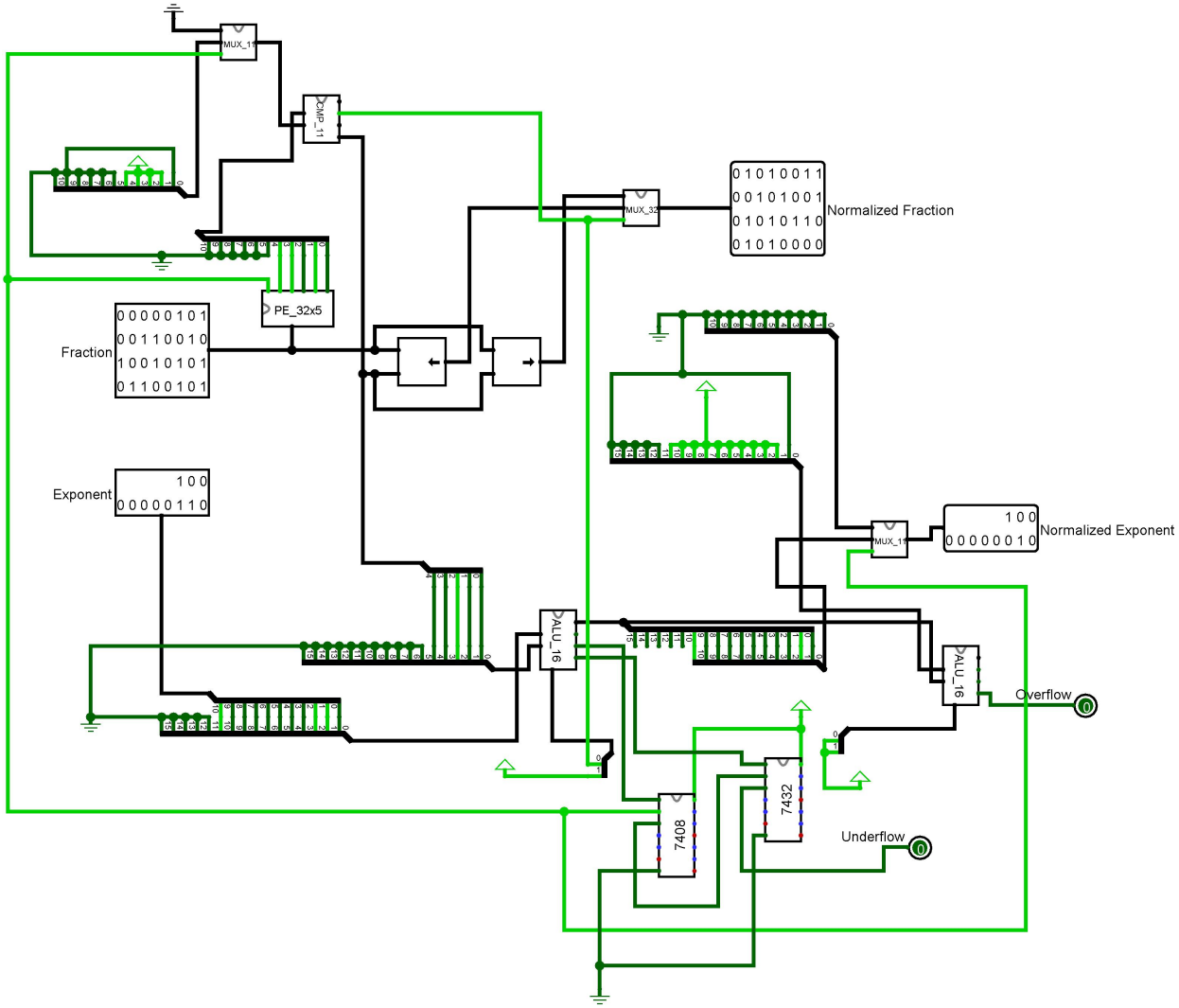


Figure 5: Normalizer Circuit

1.6 Rounder Circuit

This circuit does the rounding of the mantissa in the result.

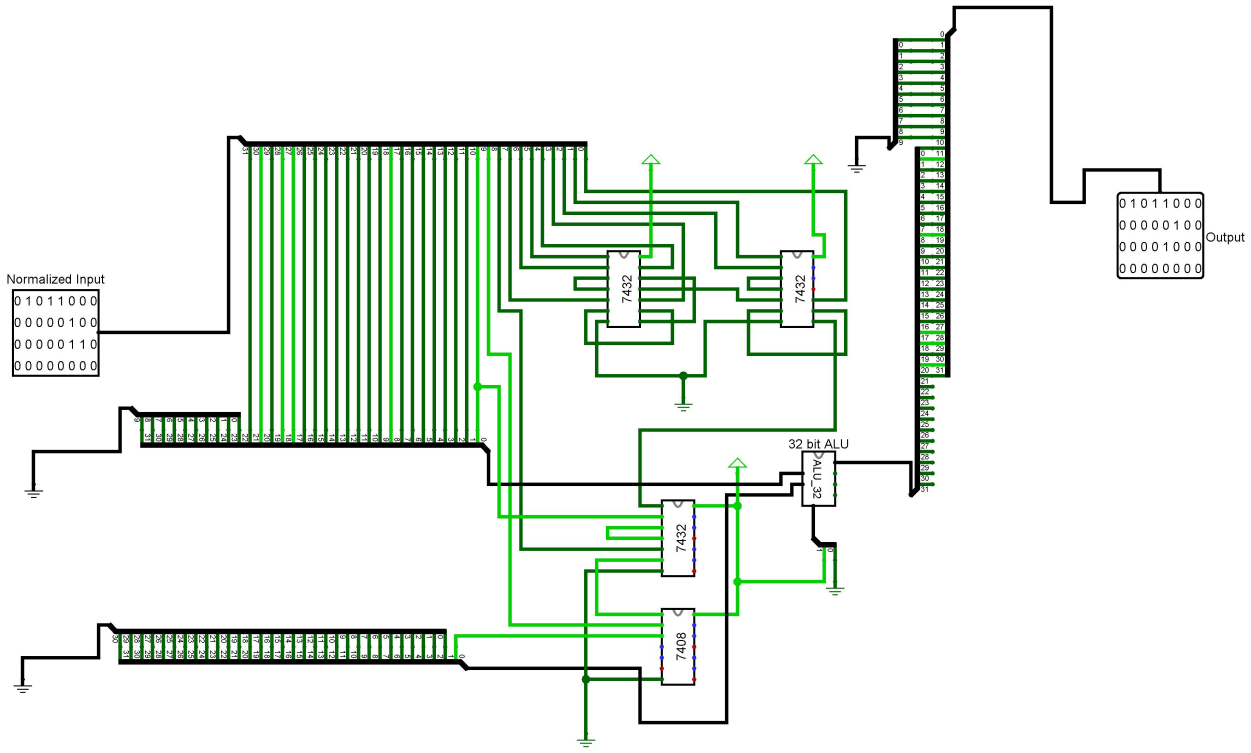
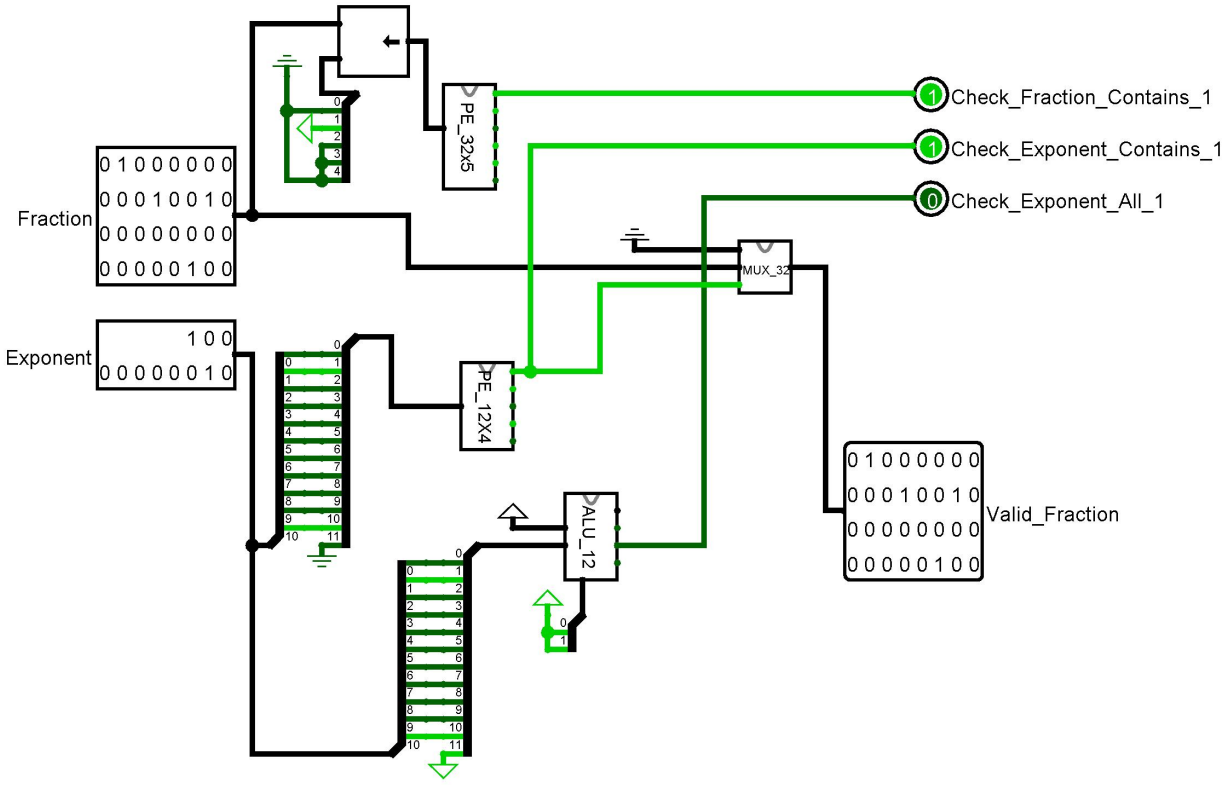


Figure 6: Rounder

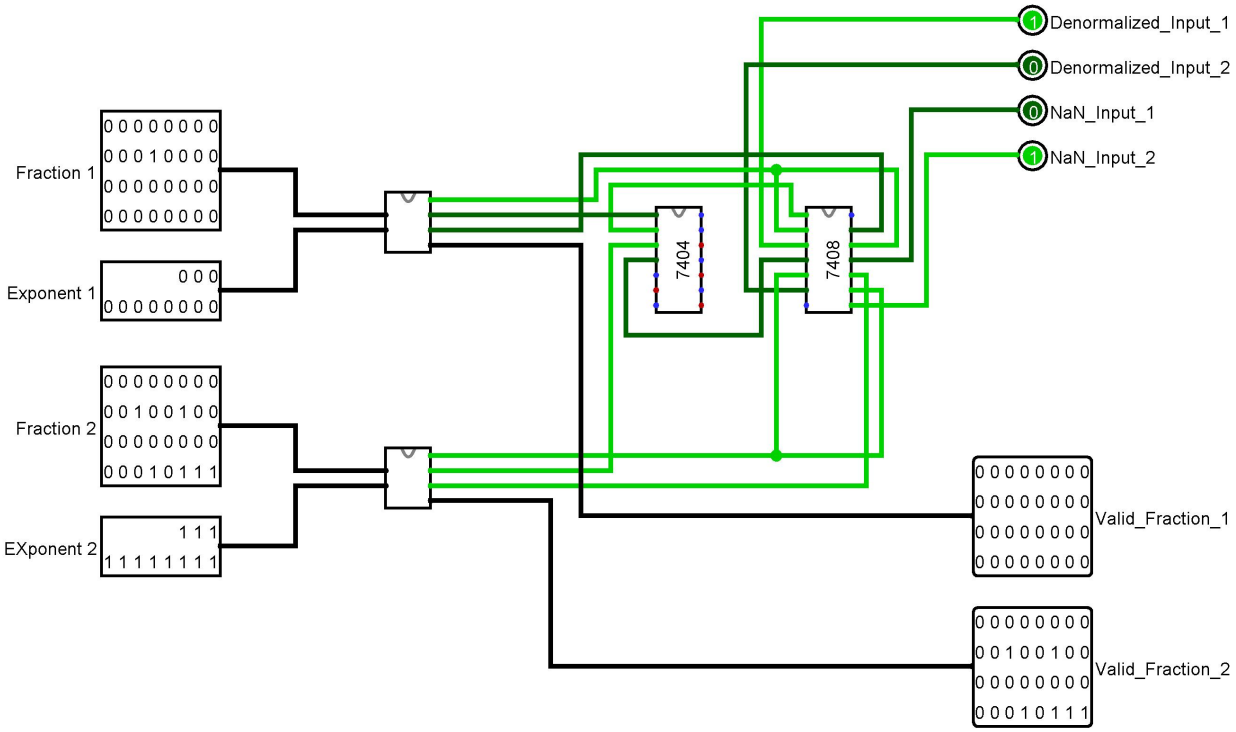
1.7 Input Pre-processors

This module validates the input given by user . It contains:

- A Single Input Checker that shows the validity of a single floating point number input
- A Input Validator containing 2 single input checkers to validate the whole input



(a) Single Input Checker



(b) Input Validator

Figure 7: Input Processing Utility

1.8 ALU

The 32 bit Arithmetic Logic Unit is used in several places in the circuit to perform add operation

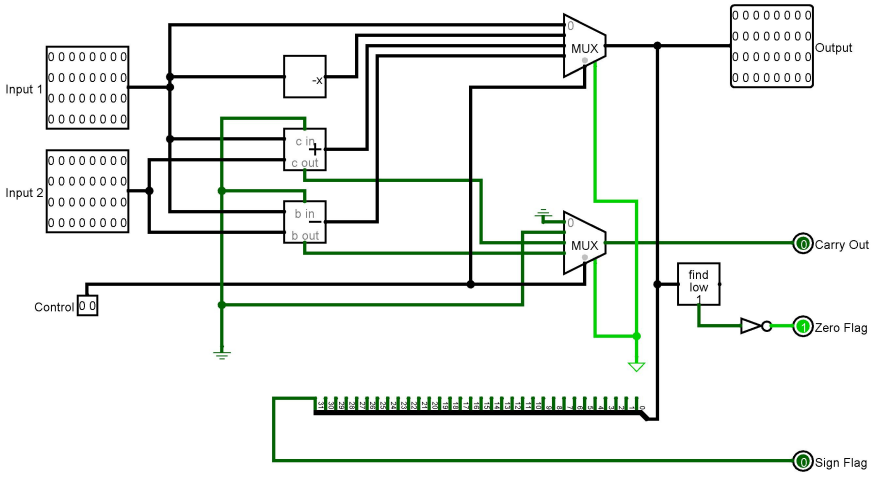


Figure 8: 32 bit ALU

1.9 Floating Point Adder

This is the actual floating point adder circuit which includes all the other libraries and circuits.

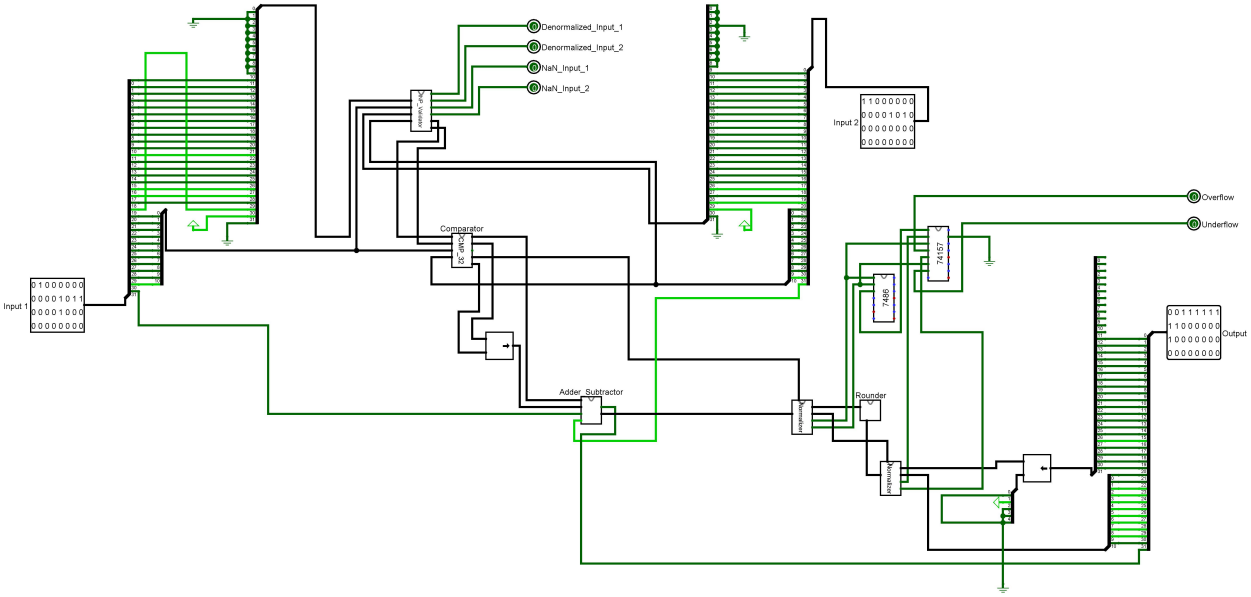


Figure 9: Floating Point Adder

1.10 Miscellaneous

This is a circuit tester used for checking whether the output matches the desired answer or not.

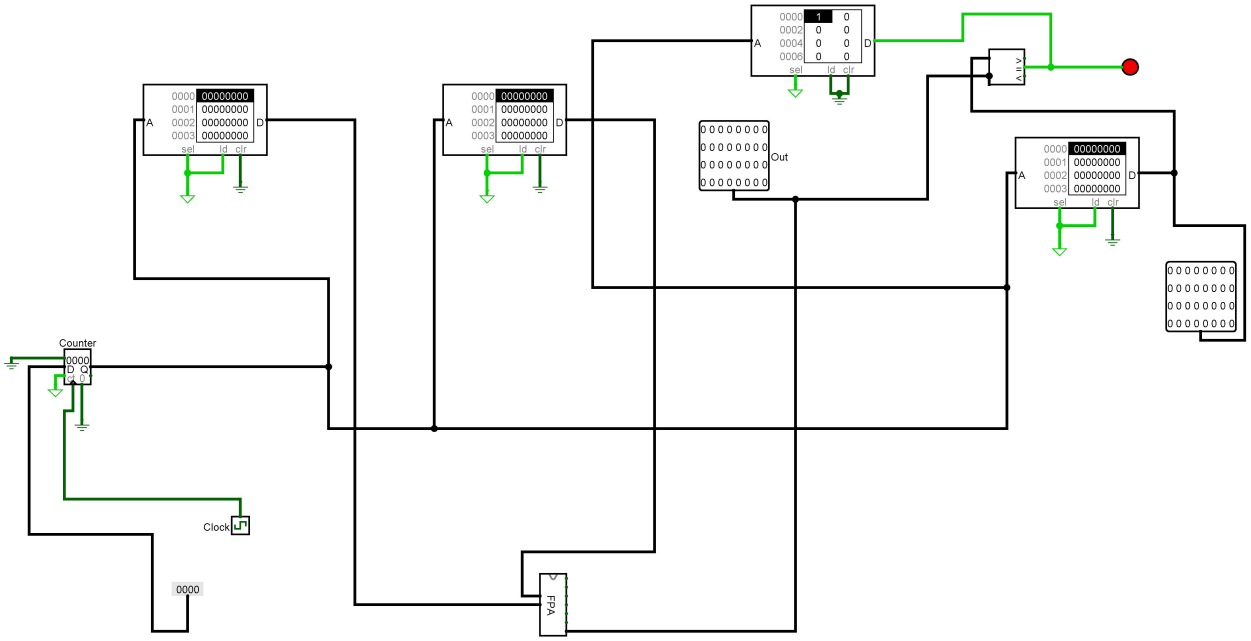


Figure 10: Circuit Tester