Cadd - JOB assignment (write up)

Floating Point Multiplier

(a) Steps for 32-bit Floating Point Multiplication

Extract Fields: Extract the sign, exponent, and mantissa from both 32-bit floating-point inputs.

Sign Calculation: XOR the sign bits of the two inputs to get the sign of the result.

Exponent Calculation: Add the exponents of the two inputs and subtract the bias (127 for single precision).

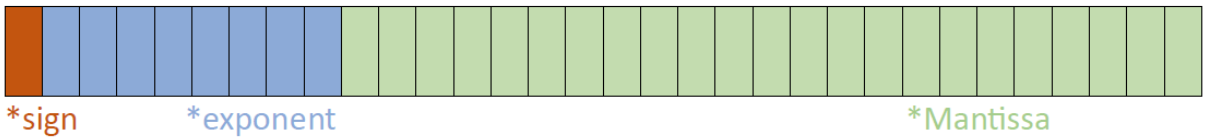
Mantissa Calculation: Multiply the mantissas of the two inputs. Normalize the result if necessary.

Normalization: Adjust the exponent and mantissa to ensure the mantissa is in the correct range.

Rounding: Apply round toward zero (truncate).

Assemble Result: Combine the sign, exponent, and mantissa to form the final 32-bit floating-point result.

SKETCH



Input A (Sign | Exponent | Mantissa) -> Input B (Sign | Exponent | Mantissa) -> Sign Calculation -> Exponent Addition -> Mantissa Multiplication -> Normalization -> Rounding -> Assemble Result.

32 bit prefix adder

Delay Calculation:
The delay of the 32-bit prefix adder can be calculated based on the number of stages in the prefix tree. Assuming each two-input gate delay is 100 ps, the delay can be estimated by counting the number of stages