

15-213

“The course that gives CMU its Zip!”

Floating Point Sept 2, 2008

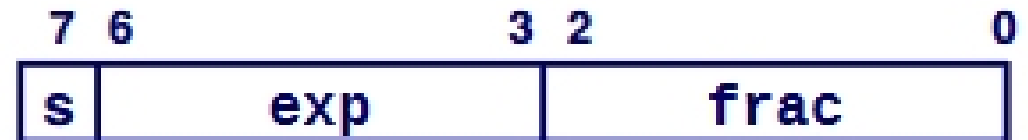
Topics

- IEEE Floating Point Standard
- Rounding
- Floating Point Operations
- Mathematical properties

Creating Floating Point Number

Steps

- Normalize to have leading 1
- Round to fit within fraction
- Postnormalize to deal with effects of rounding

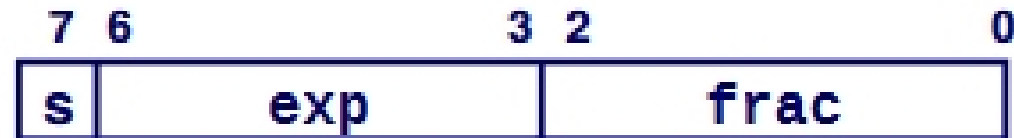


Case Study

- Convert 8-bit unsigned numbers to tiny floating point format
- Example Numbers

128	10000000
15	00001101
33	00010001
35	00010011
138	10001010
63	00111111

Normalize



Requirement

- Set binary point so that numbers of form 1.xxxxx
- Adjust all to have leading one
 - Decrement exponent as shift left

Value	Binary	Fraction	Exponent
128	10000000	1.00000000	7
15	00001101	1.10100000	3
17	00010001	1.00010000	5
19	00010011	1.00110000	5
138	10001010	1.00010100	7
63	00111111	1.11111000	5