

CS286 Computer architecture & Organization
Fall 2026
Exercise Questions for September 28, 2026

EXERCISE #1

Show the binary bit pattern for $+14.5_{(10)}$ using IEEE-754 FP format. Show the procedure.

EXERCISE #2

Show the binary bit pattern for $-7.75_{(10)}$ using IEEE-754 FP format. Show the procedure.

EXERCISE #3

Show the binary bit pattern for $-0.4375_{(10)}$ using IEEE-754 FP format. Show the procedure.

EXERCISE #4

Using IEEE-754 floating-point format, what is the tiniest positive number that can be represented? Show its bit pattern.

EXERCISE #5

Using IEEE-754 floating-point format, what is the largest positive number that can be represented? Show its bit pattern.

EXERCISE #6

Using IEEE-754 floating-point format, what is the smallest negative number that can be represented? Show its bit pattern.

EXERCISE #7

Using IEEE-754 floating-point format, what is the tiniest negative number that can be represented? Show its bit pattern.

EXERCISE #8

- (a) What is the difference between the 1264th tiniest and the 1265th tiniest **positive** numbers (we called the difference “interval”) in IEEE-754 floating point number system (i.e., “single precision IEEE-754 floating point numbers”)?
- (b) How many other positive numbers in IEEE-754 floating point number(s) have the same interval to the next tiniest number? (c) Briefly justify your solution.

Note: the grading weight for this question: 40% to (a) and 60% to (b).

