

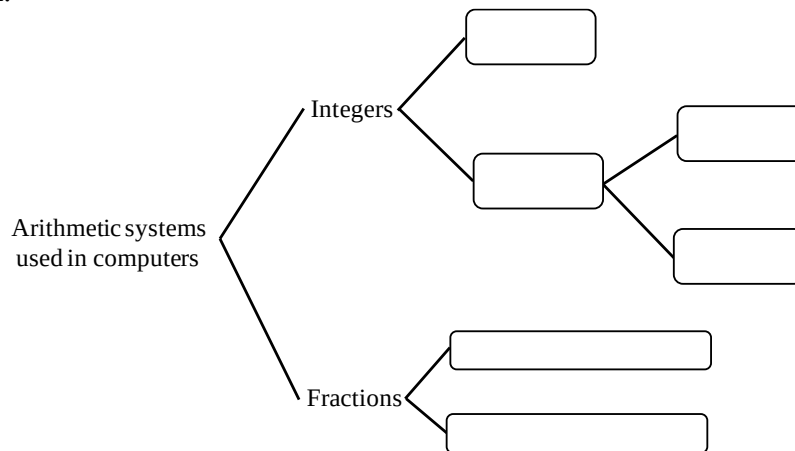
CS286-Computer Organization & Architecture

Quiz Question List (Quiz #5)

for September 30th, 2026

The following is a list of possible questions for our quiz on **September 30th**. Some of the questions will not be asked in the quiz. All the questions that will appear in the quiz will appear exactly as shown below (however, numeric parameters may be changed). The quiz is closed textbook, closed notes and closed neighbors. Note that the questions, which did not appear in this quiz, still may appear in the exams. You will find a solution for these questions during lectures.

#1: Complete the following figure by specifying number systems we discussed in the classroom.



#2: What is “Overflow Flag” in a processor (how is it used) for handling operations on two’s complement integers?

#3: What is “Carry Flag” in a processor (how is it used) for handling operations on two’s complement integers?

#4: Show the binary bit pattern for “-5” in 4-bit two’s complement integer.

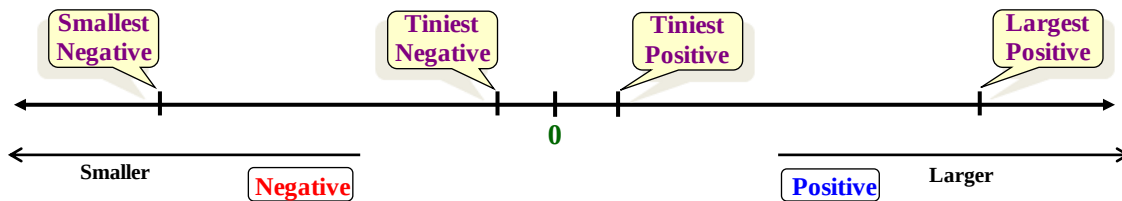
#5: What is “Overflow Flag” in a processor (how is it used) for handling operations on two’s complement integers?

#6: Assuming 4-bit two’s complement integers, will the following calculation cause:

- (a) The overflow flag. If yes, show how. If no, show how not.
- (b) The carry flag. If yes, show how. If no, show how not.

$$\begin{array}{r}
 0011 = +3 \\
 + 0100 = +4 \\
 \hline
 \end{array}$$

- #7: In IEEE-754 floating-point number standard, how is “0” represented?
- #8: In IEEE-754 floating-point number standard, if all the “exponent bits” are “1” (i.e., eight “1”s), what can it mean?
- #9: Translate $+262.75_{(10)}$ in the normalized binary format (as a decimal number). Show your work.
- #10: What does “normalization” in IEEE-754 standard mean?
- #11: What is the advantage of using “normalized” format in IEEE-754 standard?
- #12: Show the binary bit pattern for $+262.75_{(10)}$ in IEEE-754 format. Show your work.
- #13: Show the binary bit patterns for the tiniest positive number in IEEE-754 floating point numbers.



- #14: Show the binary bit patterns for the tiniest negative number in IEEE-754 floating point numbers (for the definition of “the tiniest negative”, use the definition in #7).
- #15: Show the binary bit patterns for the largest positive number in IEEE-754 floating point numbers (for the definition of “the tiniest positive”, use the definition in #7).
- #16: Show the binary bit patterns for the smallest negative number in IEEE-754 floating point numbers (for the definition of “the smallest negative”, use the definition in #7).
- #17: What are the five different types of the numbers IEEE-754 floating-point numbers that can not be accurately represented by a processor?

Note: This question does not ask descriptions of the five different types of the numbers. Instead, it asks the name of the five different types of the numbers.