CS286—Computer Organization & Architecture
Possible Quiz Questions (Quiz #3)
on September 10th, 2018

The following is a list of possible questions for our quiz on September 10th. 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.

- It is suggested that you bring your calculator (you can use your calculator during the quiz on September 10th).

#1: What does “performance” in computer system mean (at least four examples)?

#2: What does the following 16-bit two’s complement number mean in the decimal format? Show your calculation.

   “1 0 1 1 1 0 0 0 0 1 0 0 1 0 1”

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

#4: What is the problem in representing fractions using the “fixed-point” method?

#5: What does “floating point” in “floating point fraction numbers” mean?

#6: What are the three components in the floating-point number expressions?

#7: Show (by an example) how a floating-point number expression can represent a huge number.

#8: Show (by an example) how a floating-point number expression can represent a tiny number.

#9: What is “0.01011(2)” in the decimal format? Show your work.

#10: What is the binary bit pattern of +12(10) in the bias of 127? Assume that the bit pattern consists of 8 bits. Show your work.

#11: In IEEE-754 floating-point number standard, how “0” is represented?

#12: In IEEE-754 floating-point number standard, if all the “exponent bits” are “1” (i.e., eight “1”’s), what can it mean?
#13: Translate \(+262.75_{(10)}\) in the \textbf{normalized binary} format. Show your work.

#14: What does “normalization” in IEEE-754 standard mean?

#15: What is the advantage of using “normalized” format in IEEE-754 standard?

#16: Show the binary bit pattern for \(+262.75_{(10)}\) in IEEE-754 format. Show your work.

#17: Show the binary bit patterns for the tiniest positive number in IEEE-754 floating point numbers.

#18: 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 #25).

#19: 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 #25).

#20: 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 #14).

\textbf{Note}: For questions #15 through #17 above, the following figure will be provided in your quiz question sheet:

#21: What are \textbf{the five different types} of the numbers IEEE-754 floating-point numbers that can not be accurately represented by a processor?

\textbf{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.