Capital University of Science and Technology

Department of Computer Science

CS 2523 – Computer Organization and Assembly Language

QUIZ NO. 4: Data Representation, Flags

CLO: 2. Describe how the basic units of the Intel 8088 architecture work together to represent Integer Numbers, Floating Numbers and register representation inside the microprocessor.

[C2- Understanding]

Semester: Summer 22 **Max Marks:** 10

Instructor: Ms. Tayyaba Zaheer **Date:** August 24, 2022 **Max Time:** 15 Minutes

Name: **Reg. No.**

Question No.1 [02 Marks]

Please choose the correct option:

The number of Sign bits in a 32-bit IEEE 754 Format:

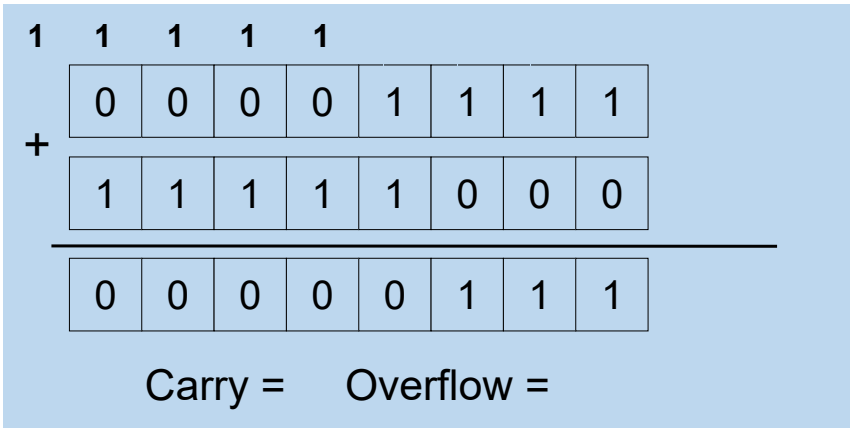
a) 1
b) 11
c) 9
d) 23

Solution: a

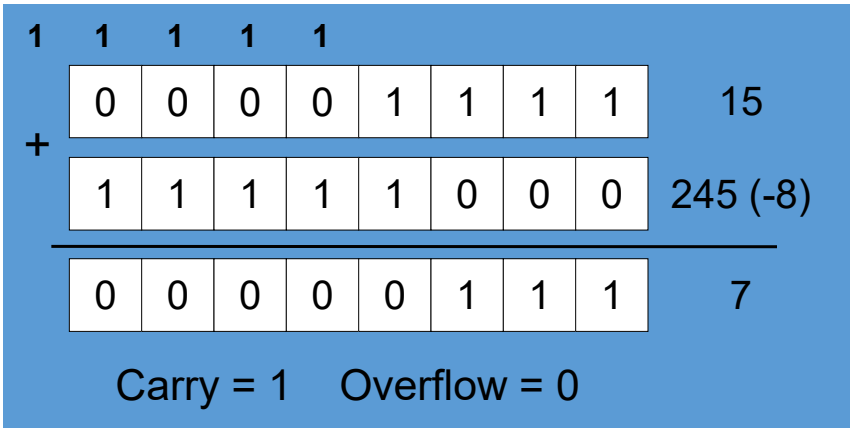
Clarification: There is only one sign bit in all the standards. In 32-bit format, there is 1 sign bit, 8 bits for the exponent and 23 bits for the mantissa.

Question No.2 [04 Marks]

Considering 2's complement signed numbers representation, set or unset the carry and overflow flags in the following scenario:



Solution:



Question No. 3 [04 Marks]

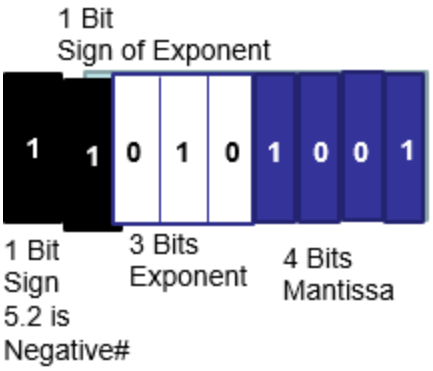
Consider the floating-point representation with 3-bit exponent, 4-bit mantissa, 1-bit sign. Represent the number "**-.05**" into floating point representation.

Solution:

- Float a = -.05
- Binary of 0 = 0
- Binary of Fractional part i.e. ".05" is =
- **0000110011**

$.05^{-2}$	0
.1	0
.2	0
.4	0
.8	1
.6	1
.2	0
.4	0
.8	1
.6	1
.2	

- $(0.05)_{10}=(0.0000110011...)_2$ (Move the fractional point or dot just after the first one)
  - $(00001.10011...)_2 * 2^{-5}$
  - $(1.1001)_2 * 2^{-5}$ (4 bit mantissa)
  - Bias 3; so, -5+3 = -2 = 010



$+(1.1001)_2 * 2^{(-010)_2}$