

Technische Informatik: Abgabe 9

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Exercise 9.1 (Adding)

a) $20+15$

dec	bin	$K_2(bin)$
20	010100	010100
15	001111	001111
(35)	100011	011101 = -29

b) $-13+7$

dec	bin	$K_2(bin)$
-13	001101	110011
7	000111	000111
(-6)	111010	000110 = -6

c) $11-28$

dec	bin	$K_2(bin)$
11	001011	001011
-28	011100	100100
(-17)	101111	010001 = -17

d) $-13+7$

dec	bin	$K_2(bin)$
-19	010011	101101
-22	010110	101010
(-41)	(1)010111	101001 = 25

Exercise 9.3 + 9.4 (Number representations)

a) To perform the actual calculation, we transform everything into the binary representation:

$$(8.125)_{10} = (1000.001)_2$$

$$(B3.09)_{16} = (10110011.00001001)_2$$

$$(27.65)_8 = (10111.110101)_2$$

Then we just calculate, step by step (everything binary if not stated otherwise):

$$1000.001 - 111.011 = 0.11$$

$$0.11 + 10110011.00001001 = 10110011.11001001$$

$$10110011.11001001 - 10111.110101 = 10011011.11110101 = (155.95703125)_{10}$$

From the last binary representation we see that the representation in required floating point format is $+(0.9BF5)_{16} \cdot 16^2$. Unfortunately, not all the bits required to represent the number fit into mantissa:

$$0 \quad 1001101111 \quad 00010$$

The resulting error is $(0.00110101)_2 = 3/16 + 1/64 + 1/256 = (0.2070325)_{10}$.

b) (omitted)