Subiect I

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Grup 914

• $\begin{cases} x = 167230_{(8)} \\ y = 22417_{(8)} \end{cases}$

$c: 1\ 1\ 0\ 0\ 0\ 0$

$x + y = 167230_{(8)} + 22417_{(8)}$

$s = 211647$

it1: $0_{(8)} + 0_{(8)} + 7_{(8)} = 0 + 7 = 7$
$7 : 8 = 0 \quad r = 7 = 7_{(8)}$

it2: $0_{(8)} + 3_{(8)} + 1_{(8)} = 3 + 1 = 4$
$4 : 8 = 0 \quad r = 4 = 4_{(8)}$

it3: $0_{(8)} + 2_{(8)} + 4_{(8)} = 2 + 4 = 6$
$6 : 8 = 0 \quad r = 6 = 6_{(8)}$

it4: $0_{(8)} + 7_{(8)} + 2_{(8)} = 7 + 2 = 9$
$9 : 8 = 1 \quad r = 1 = 1_{(8)}$

it5: $1_{(8)} + 6_{(8)} + 2_{(8)} = 1 + 6 + 2 = 9$
$9 : 8 = 1 \quad r = 1$

it6: $1_{8} + 1_{8} = 1 + 1 = 2$
$2 : 8 = 0 \quad r = 2$

• $z = AB2CD3_{(16)}$

$t = 4_{(16)}$

$c: 2\ 0\ 3\ 3\ 0\ 0$

$z \cdot t = AB2CD3_{(16)} \cdot 4_{(16)}$

$p = 2ACB34C_{(16)}$

it1: $0 + 3_{16} \cdot 4_{16} = 0 + 3 \cdot 4 = 12$
~~$12 : 8 = 1 \quad r = 4$~~ $12 : 16 = 0 \quad r = 12 = C_{16}$

it2: $0_{(16)} + D_{(16)} \cdot 4_{(16)} = 0 + 13 \cdot 4 = 52$
$52 : 16 = 3 \quad r = 4 = 4_{16}$

it3: $3_{16} + C_{16} \cdot 4_{16} = 3 + 12 \cdot 4 = 51$
$51 : 16 = 3 \quad r = 3 = 3_{(16)}$

it4: $3_{(16)} + 2_{(16)} \cdot 4_{(16)} = 3 + 8 = 11$
$11 : 16 = 0 \quad r = 11 = B_{(16)}$

it5: $0_{16} + B_{16} \cdot 4_{16} = 0 + 11 \cdot 4 = 44$
$44 : 16 = 2 \quad r = 12 = C_{(16)}$

it6: $2_{16} + A_{(16)} \cdot 4_{(16)} = 2 + 10 \cdot 4 = 2 + 40 = 42$
$42 : 16 = 2 \quad r = 10 = A_{(16)}$

Subject 2

Jalmas Aliosi-Horaton

$y = CAF,B9F_{(16)} = ?_{(6)}$

CAF | 6
1 ... 21D | 6
6A ... 3D ... 5A | 6
4F ... 1 ... F | 6
1 ... 1 ... 0 ... 3 ... 2 | 6
2 ... 0

$CAF_{16} = 23011_{(6)}$ (1)

it1: $C_{16} = 12$
$12 : 6 = 2$ r 0
it2: $A_{16} = 10$
$10 : 6 = 1$ r 4
it3: $4F = 4 \cdot 16 + 15 = 79$
$79 : 6 = D_{16}$ r = 1
it4: $21_{16} = 33$
$33 : 6 = 5$ r 3
it5: $3D_{16} = 61$
$61 : 6 = A$ r = 1
it6: $5A = 5 \cdot 16 + 10 = 90$
$90 : 6 = F$ r = 0
it6: $F_{16} = 15$
$15 : 6 = 2$ r = 3

4 3 5 0
0, B9F ·
6
4, 5BA

it1: $0_{16} + F_{16} \cdot 6_{16} = 0 + 15 \cdot 6 = 90$
$90 : 16 = 5$ r $= A_{16}$
it2: $5_{16} + 9_{16} \cdot 6_{16} = \cancel{10} + 54 = 59$
$59 : 16 = 3$ r $= 11 = B_{16}$
it3: $3_{16} + B_{16} \cdot 6_{16} = 3 + 66 = 69$
$69 : 16 = 4$ r = 5

2 4 3 0
· 0, 5BA ·
6
2, 25C

it1: $0_{16} + A_{16} \cdot 6_{16} = 60$
$60 : 16 = 3$ r $= C_{16}$
it2: $3_{16} + B_{16} \cdot 6_{16} = 3 + \cancel{66} \; 6 \cdot 11 = 69$
$69 : 16 = 4$ r = 5
it3: $4 + 5_{16} \cdot 6_{16} = 34$
$34 : 16 = 2$ r = 2

2 4 0
· 0, 25C ·
6
0, E26

it1: $0_{16} + C_{16} \cdot 6_{16} = 12 \cdot 6 = 72$
$72 : 16 = 4$ r = 6
it2: $4_{16} + 5_{16} \cdot 6_{16} = 34$
$34 : 16 = 2$ r = 2
it3: $2_{16} + 2_{16} \cdot 6_{16} = 14$
$14 : 16 = 0$ r $= 14 = E_{16}$

$0,B9F \cdot 6 = 4,5BA$
$0,5BA \cdot 6 = 2,25C$
$0,25C \cdot 6 = 0,E26$

$0,B9F_{16} = 0,420_{(6)}$ (2)

(1), (2) => $CAF,B9F_{(16)} = 23011,420_{(6)}$

Group 9/4. Idrees Nasr-Hatton

II. Theory part

$(16 > 6)$

Since the ~~[illegible]~~ source base is greater than the destination base, we use the method of successive divisions/multiplication.

Calculations are performed in the source base. For the integer part the method of successive divisions by the destination base (here 6) is applied. For the fractional part we apply successive multiplication, once again by the destination base (6).

$\boxed{x = 12345,12}$

$\cancel{x} = 12345 = 8,192 + 4096 + 32 + 16 + 8 + 1 = 2^{13} + 2^{12} + 2^{5} + 2^{4} + 2^{3} + 2 =$

11

$= 11000000111001_{(2)}$

$x = 11000000111001,000\ 111\ 101\ 011_{(2)} =$

$= \underbrace{1}_{\substack{\text{hidden}\\ \text{not represented}}},1000000111001,000\ 111\ 101\ 011_{(2)} \cdot 2^{12} \Rightarrow e = 12$

$0,12 \cdot 8 = 0,96$

$0,96 \cdot 8 = 7,68$

$0,68 \cdot 8 = 5,44$

$0,44 \cdot 8 = 3,52$

$c = e + 9 = 12 + 127 = 139 =$

$= 2^{7} + 2^{3} + 2^{1} + 2^{0} =$

$= 10001011_{(2)}$

$0,12 = 0,753_{(8)} = 000\ 111\ 101\ 011_{(2)}$

$$\underbrace{0}_{s}\ \underbrace{10001011}_{c}\ \underbrace{1000\ 000\ 111\ 01000111\ 10101}_{m} =$$

4 5 C 0 E 8 F 6

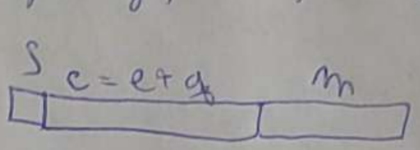
$= 45C0E8F6_{(16)}$

Subject III, option 4, Zolnos Ákos-Márton,

Group 914

Theory part for subject III: Group 914 Idnos Akos-Milton

For floating point representation the memory location is the following:



, where

S - is the sign bit
c = exponent + bias
q - constant
e - exponent from the binary representation with mantissa and exponent
m: mantissa ——— n ———

For example:

$$1101{,}0011_{(2)} = \underbrace{0{,}11010011_{(2)}}_{\text{mantissa}} \cdot \underbrace{2}_{\text{base}}^{4 \,\to\, \text{exponent}}$$

here it is smaller than 1
$m < 1$,
But it can be $1 \le m < 2$

With single precision we have: $n = 32$ bits, c on 8 bit, m on 23 bits, $q = 127$

Firstly we convert our number into ~~decimal~~ binary, but initially only the integer part. Then we write the number with exponent and a ~~man~~ 1 ≤ mantissa < 2. The 1 is a hidden bit, not represented internally. This integer part ~~part~~ is put into the mantissa part in the memory.

Furthermore with successive ~~&~~ multiplication we obtain the fractional part and we fill the remaining empty bits with them from ~~left~~ left to right until we reach the last bit on the mantissa part.

Then we calculate c, ~~so~~ its binary representation is put in it position (on those 8 bits)

Lastly we also modify the sign bit ~~if needed~~ corresponding to our number

(here it is zero since we have a positive number).

János Kiss-Nádor