Jorza Ionut
Student '2

Team Homework

Subject I

$S = 211647_{(8)}$

$y = 22417_{(8)}$

$p = 2ACB34C_{(16)}$

$f = 4_{(16)}$

$$S - y = \begin{array}{r} {\scriptstyle -1\ -1\ 0\ 0\ 0\ 0} \\ 211647_{(8)} \\ -\ 22417_{(8)} \\ \hline 167230_{(8)} \end{array}$$

$it_1) 0 + 7 - 7 = 0$

$it_2) 0 + 4 - 1 = 3$

$it_3) 0 + 6 - 4 = 2$

$it_4) 0 + 1 - 2 = -1 < 0 \Rightarrow b = -1$ (with $-1 + 8 = 7$)

$it_5) -1 + 1 - 2 = -2 < 0 \Rightarrow b = -1$ (with $-2 + 8 = 6$)

$it_6) -1 + 2 = 1$

$p : f = 2ACB34C_{(16)} : 4_{(16)} = 0AB2CD3_{(16)}$

$2 : 4 = 0$ r 2

$it_1) 0 \cdot 16 + 2 = 2$

$2 : 4 = 0$ r 2

$it_2) 2 \cdot 16 + A = 32 + 10 = 42$

$42 : 4 = 10$ r 2

$it_3) 2 \cdot 16 + C = 32 + 12 = 44$

$44 : 4 = 11$ r 0

$it_4) 0 \cdot 16 + B = 11$

$11 : 4 = 2$ r 3

$it_5) 3 \cdot 16 + 3 = 48 + 3 = 51$

$51 : 4 = 12$ r 3

$it_6) 3 \cdot 16 + 4 = 48 + 4 = 52$

$52 : 4 = 13$ r 0

$it_7) 0 \cdot 16 + C = 12$

$12 : 4 = 3$

~~Subiectul~~

Subject II (Student 2)

$b = 6$

$h = 16$

$x = 23011,421$

A20+
288
6
1.
0,AAA
0,0E3
0,012
CAF,B9F

Forza
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Group 914

$23011,421_{(6)} = ?_{(16)} = CAF,B9F_{(16)} \Rightarrow y = CAF,B9F$

$2_{16} \cdot 6^4_{16} + 3_{16} \cdot 6^3_{16} + 0_{16} \cdot 6^2_{16} + 1_{16} \cdot 6^1_{16} + 1_{16} \cdot 6^0_{16} + 4_{16} \cdot 6^{-1}_{16} + 2_{16} \cdot 6^{-2}_{16} + 1_{16} \cdot 6^{-3}_{16}$

$A20 + 288 + 0 + 6 + 1 + 0,AAA + 0,0E3 + 0,012$

~~$6 \cdot 6 = 36 \cdot 16 = 2\ r\ 4 = 6^2_{16}$~~

~~$24 \cdot 6 = 144 : 16 = 13\ r\ 8$~~

(16) 6· 6 24	$6 \cdot 6 = 36 : 16 = 2\ r\ 4$	$6^2_{(16)} = 24_{(16)}$
(16) 24· 6 D8	$4 \cdot 6 = 24 : 16 = 1\ r\ 8$ $1 + 2 \cdot 6 = 13 : 16 = 0\ r\ 13$	$6^3_{(16)} = D8_{(16)}$
(16) D8· 6 510	$8 \cdot 6 = 48 : 16 = 3\ r\ 0$ $3 + 13 \cdot 6 = 81 : 16 = 5\ r\ 1$	$6^4_{(16)} = 510_{(16)}$
510· 2 A20	$0 \cdot 2 = 0 : 16 = 0\ r\ 0$ $1 \cdot 2 = 2 : 16 = 0\ r\ 2$ $5 \cdot 2 = 10 : 16 = 0\ r\ A$	$2_{(16)} \cdot 6^4_{(16)} = A20_{(16)}$
D8· 3 288	$8 \cdot 3 = 24 : 16 = 1\ r\ 8$ $1 + 13 \cdot 3 = 40 : 16 = 2\ r\ 8$	$3_{(16)} \cdot 6^3_{(16)} = 288_{(16)}$
~~4 : 6 =~~ 4,000 : 6 = 0,AAA 1 40 1 40 1 40	$40 = 4 \cdot 16 + 0 = 64 : 6 = 10\ r\ 4$ $40 = 4 \cdot 16 + 0 = 64 : 6 = 10\ r\ 4$	$4_{(16)} \cdot 6^{-1}_{(16)} = 0,AAA_{(16)}$

2,000 : 6 = 0,555

1/20

2 · 16 = 32 : 6 = 5 ост 2

1/20

0,555 : 6 = 0,0E3

1/05

5 : 6 = 0 ост 5

1/55

5 · 16 + 5 = 85 : 6 = 14 ост 1

1/15

1 · 16 + 5 = 21 : 6 = 3 ост

$2_{(16)} \cdot 6^{-2}_{(16)} = 0,0E3_{(16)}$

~~1 : 6 = 0,~~

1,000 : 6 = 0,2AA

1/10

1 · 16 + 0 = 16 : 6 = 2 ост 4

1/40

4 · 16 = 64 : 6 = 10 ост 4

1/40

0,2AA : 6 = 0,071

1/02

2 · 16 + 10 = 42 : 6 = 7 ост 0

1/2A

0 · 16 + 10 = 10 : 6 = 1 ост 4

1/0A

$1_{(16)} \cdot 6^{-3}_{(16)} = 0,012_{(16)}$

0,071 : 6 = 0,012

1/00

~~07 = 11~~

0 · 16 + 7 = 7 : 6 = 1 ост 1

1 · 16 + 1 = 17 : 6 = 2 ост 5

Subject III, option 4 (Student 2) Jorza Ionut

Group 914

$M_{(16)} = 4640E7A_{(16)}$ Floating point repr. SP, mantissa > 1

S C M

0	100 0110	0	100 0000 1110 0100 0111 1010

4 6 4 0 E 4 7 A

$C = 10001100_{(2)} = 2^7 + 2^3 + 2^2 = 128 + 8 + 4 = 140$

$C = 127 + e \Rightarrow e = 140 - 127 = 13$

$x = 1,10000001110010001111010_{(2)} \cdot 2^{(13)}$

$x = 11000000011100,1000111101$ $\quad 000\,111\,101_{(2)} = 075_{(8)} = 0,12_{(10)}$

$x = 2^{13} + 2^{12} + 2^5 + 2^4 + 2^3 + 2^0 = 8192 + 4096 + 52 + 16 + 8 + 1$

$= 12345 + 0,12 =$ **12345,12**

Subject I

Iohnas Khos-Hilton
Group 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

Jolnas Alcos-Madison

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

$CAF \mid 6$ → $21D \mid 6$ → $5A \mid 6$ → $F \mid 6$ → $2 \mid 6$ → 0

Remainders: (1) (1) (0) (3) (2)

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

$$\begin{array}{r} 4\ 3\ 5\ 0 \\ 0,B9F \cdot \\ 6 \\ \hline 4,5BA \end{array}$$

it1: $0_{16} + F_{16} \cdot 6_{16} =$
$= 0 + 15 \cdot 6 = 90$
$90 : 16 = 5$ r = A_{16}

it2: $5_{16} + 9_{16} \cdot 6_{16} =$ ~~10~~ $5 + 54 = 59$
$59 : 16 = 3$ r = $11 = B_{16}$

it3: $3_{16} + B_{16} \cdot 6_{16} = 3 + 66 = 69$
$69 : 16 = 4$ r = 5

$$\begin{array}{r} 2\ 4\ 3\ 0 \\ 0,5BA \cdot \\ 6 \\ \hline 2,25C \end{array}$$

it1: $0_{16} + A_{16} \cdot 6_{16} = 60$
$60 : 16 = 3$ r = C_{16}

it2: $3_{16} + B_{16} \cdot 6_{16} = 3 +$ ~~66 = 6~~ $6 \cdot 11 = 69$
$69 : 16 = 4$ r = 5

it3: $4_{16} + 5_{16} \cdot 6_{16} = 34$
$34 : 16 = 2$ r = 2

$$\begin{array}{r} 2\ 4\ 0 \\ 0,25C \cdot \\ 6 \\ \hline 0,E26 \end{array}$$

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

II. Theory part.

Group 3/4. Idrees Nasrullah

$(16 > 6)$

Since the ~~solu~~ source base is greater than the destination base, we use the method of successive divisons/ multiplication.

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

[X = 12345,12]

~~X~~ $= 12345 = 8192 + 4096 + 32 + 16 + 8 + 1 = 2^{13} + 2^{12} + 2^5 + 2^4 + 2^3 + 2^0 =$

$= 11000000111001_{(2)}$

11

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

$= 1,1000000111001,000\ 111\ 101\ 011_{(2)} \cdot 2^{13} \Rightarrow e = 13$

hidden, not represented

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

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

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

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

$c = e + q = 13 + 127 = 140 =$

$= 2^7 + 2^3 + 2^2$ ~~$+ 2^0$~~

$=$ ~~$10001011_{(2)}$~~ 10001100_2

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

4 6 4 0 E 8 7 A

| 0 | 10001100 | 1000000 000 111001 0001111 1010 | =

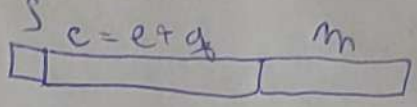
s — c — m

$=$ ~~$45C0E8F6_{(16)}$~~ $4640E87A_{(16)}$ Subject III, option 4, Janos Akos-Marton, Group 914

Theory part for subject III:

Group 914 Jânos Akos-Kálmán

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:

$1101,0011_{(2)} = 0,11010011_{(2)} \cdot 2^4$

mantissa | base | exponent

here it is smaller than 1

$m < 1$,

But it can be $1 < m < 2$

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~~ $1 \leq$ 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 ~~B~~ 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).

[illegible]