Grundlagen der Betriebssysteme

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22. April 2018

1 Aufgabe

(a)

$$89/2 = 44 \text{ Rest } 1$$
$$44/2 = 22 \text{ Rest } 0$$
$$22/2 = 11 \text{ Rest } 0$$
$$11/2 = 5 \text{ Rest } 1$$
$$5/2 = 2 \text{ Rest } 1$$
$$2/2 = 1 \text{ Rest } 0$$
$$1/2 = 0 \text{ Rest } 1$$
$$\Rightarrow 89_{10} = 1011001_2$$

(b) Zuerst Umrechnung ins Dezimalsystem, um Division zu erleichtern:

$$32_7 = 3 * 7^1 + 2 * 7^0 = 23_{10}$$

$$23/5 = 4 \text{ Rest } 3$$
$$4/5 = 0 \text{ Rest } 4$$
$$\Rightarrow 32_7 = 43_5$$

(c)
$$4360_{10} = 4096_{10} + 256_{10} + 8_{10} = 2^{12} + 2^8 + 2^3 = 1000100001000_2$$

(d)

$$1414215376_8 \qquad =$$
$$001\ 100\ 001\ 100\ 010\ 001\ 101\ 011\ 111\ 110_2 \quad =$$
$$1100\ 0011\ 0001\ 0001\ 1010\ 1111\ 1110_2 \qquad =$$
$$C\ 3\ 1\ 1\ A\ F\ E$$

2 Aufgabe

(a)
$$CAFFEE_{16} = 14\ 12\ 17\ 17\ 16\ 16_8 = 141217171616_8$$

(b)
$$3072 = 2048 + 1024 = 2^{11} + 2^{10} = 110000000000_2$$

(c)
$$1724656_8 = 001\ 111\ 010\ 100\ 110\ 101\ 110_2 = 01111\ 01010\ 01101\ 01110_2 = F\ A\ D\ E_{32}$$

(d)
$$1316_2 = 1024 + 256 + 32 + 4 = 2^{10} + 2^8 + 2^5 + 2^2 = 10100100100_2$$

3 Aufgabe

(a)
$$
\begin{array}{r}
1011001_2 \\
+ \quad 11000_2 \\
{\scriptstyle 1\ 1} \\
\hline
= 1110001_2
\end{array}
$$

(b)
$$
\begin{array}{r}
101101_2 \\
+ \ 1011111_2 \\
{\scriptstyle 1\ 1\ 1\ 1\ 1\ 1\ 1} \\
\hline
= 10001100_2
\end{array}
$$

(c)
$$
\begin{array}{r}
1001100_2 \\
+ \ 1100010_2 \\
{\scriptstyle 1} \\
\hline
= 10101110_2
\end{array}
$$

(d)

$$
\begin{array}{r}
101011_2 \\
+\ 110111_2 \\
{\scriptstyle 1\,1\,1\,1\,1\,1} \\
\hline
=1100010_2
\end{array}
$$

4 Aufgabe

(a)

$$
\begin{aligned}
2018_{10} &= 00000111\ 11100010_2 \\
-2018_{10} &= 11111000\ 00011101_2 + 1 \\
&= 11111000\ 00011110_2
\end{aligned}
$$

(b)

$$
\begin{aligned}
27346_{10} &= 01101010\ 11010011_2 \\
-27346_{10} &= 10010101\ 00101100_2 + 1 \\
&= 1001010100101101_2
\end{aligned}
$$

5 Aufgabe

(a)

$$
\begin{array}{r}
10110_2 \cdot 111_2 \\
\hline
10110_2 \\
+\quad 10110_2 \\
+\qquad 10110_2 \\
\hline
10011010_2
\end{array}
$$

(b)

$$10010010_2 \cdot 1001001_2$$

$$
\begin{array}{l}
10010010_2 \\
+ \quad 0_2 \\
+ \quad\;\; 0_2 \\
+ \quad\quad\; 10010010_2 \\
+ \quad\quad\quad 0_2 \\
+ \quad\quad\quad\;\; 0_2 \\
+ \quad\quad\quad\quad\; 10010010_2 \\
\hline
10100110100010_2
\end{array}
$$

(c)

$$10011110_2 \cdot 10101_2$$

$$
\begin{array}{l}
10011110_2 \\
+ \quad 0_2 \\
+ \quad\;\; 10011110_2 \\
+ \quad\quad\; 0_2 \\
+ \quad\quad\;\; 10011110_2 \\
\hline
110011110110_2
\end{array}
$$

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