

1. 1a.)

$$91058_{(10)} = \cancel{0100} \cancel{1010} \cancel{0011} \cancel{1011} \cancel{0010}_{(2)}$$

$91058_{(10)}$:	2	=	45529	R0
$45529_{(10)}$:	2	=	22764	R1
$22764_{(10)}$:	2	=	11382	R0
$11382_{(10)}$:	2	=	5691	R0
$5691_{(10)}$:	2	=	2845	R1
$2845_{(10)}$:	2	=	1422	R1
$1422_{(10)}$:	2	=	711	R0
$711_{(10)}$:	2	=	355	R1
$355_{(10)}$:	2	=	177	R1
$177_{(10)}$:	2	=	88	R1
$88_{(10)}$:	2	=	44	R0
$44_{(10)}$:	2	=	22	R0
$22_{(10)}$:	2	=	11	R0
$11_{(10)}$:	2	=	5	R1
$5_{(10)}$:	2	=	2	R1
$2_{(10)}$:	2	=	1	R0
$1_{(10)}$:	2	=	0	R1



$$91058_{(10)} = 163B2_{(16)}$$

$91058_{(10)}$:	16	=	5691	R2
$5691_{(10)}$:	16	=	355	R3
$355_{(10)}$:	16	=	22	R3
$22_{(10)}$:	16	=	1	R6
$1_{(10)}$:	16	=	0	R1

$$\text{FACE}_{(16)} = 64206_{(10)}$$

$$\begin{aligned}\text{FACE}_{(16)} &= 15_{(10)} \cdot 16^3 + 10_{(10)} \cdot 16^2 + 12_{(10)} \cdot 16^1 + 14_{(10)} \cdot 16^0 \\ &= 61440_{(10)} + 2550_{(10)} + 192_{(10)} + 14_{(10)} \\ &= 64206_{(10)}\end{aligned}$$

$$64206_{(10)} = 11111 \ 1010 \ 1100 \ 1110_{(2)}$$

64206	(10)	:	2	=	32103	R0
32103	(10)	:	2	=	16051	R1
16051	(10)	:	2	=	8025	R1
8025	(10)	:	2	=	4012	R1
4012	(10)	:	2	=	2006	R0
2006	(10)	:	2	=	1003	R0
1003	(10)	:	2	=	501	R1
501	(10)	:	2	=	250	R1
250	(10)	:	2	=	125	R0
125	(10)	:	2	=	62	R1
62	(10)	:	2	=	31	R0
31	(10)	:	2	=	15	R1
15	(10)	:	2	=	7	R1
7	(10)	:	2	=	3	R1
3	(10)	:	2	=	1	R1
1	(10)	:	2	=	0	R1

$$1011 \ 0011 \ 1000_{(2)} = 2872_{(10)}$$

$$= 2^3 + 2^4 + 2^5 + 2^8 + 2^9 + 2^{11}$$

$$2872_{(10)} = B38_{(16)}$$

2872	(10)	:	16	=	179	R8
179	(10)	:	16	=	11	R3
11	(10)	:	16	=	0	R3

$$12776_{(8)} = 45054_{(10)}$$

$$= 1 \cdot 8^5 + 2 \cdot 8^4 + 7 \cdot 8^3 + 7 \cdot 8^2 + 7 \cdot 8^1 + 6 \cdot 8^0$$

$$45054_{(10)} = AFFE_{(16)}$$

45054	(10)	:	16	=	2815	RE
2815	(10)	:	16	=	175	RF
175	(10)	:	16	=	10	RF
10	(10)	:	16	=	0	RA

45054	(10)	:	2	=	22527	R0
22527	(10)	:	2	=	11263	R1
11263	(10)	:	2	=	5631	R1
5631	(10)	:	2	=	2815	R1
2815	(10)	:	2	=	1407	R1
1407	(10)	:	2	=	703	R1
703	(10)	:	2	=	351	R1
351	(10)	:	2	=	175	R1
175	(10)	:	2	=	87	R1
87	(10)	:	2	=	43	R1
43	(10)	:	2	=	21	R1
21	(10)	:	2	=	10	R1
10	(10)	:	2	=	5	R0
5	(10)	:	2	=	2	R1
2	(10)	:	2	=	1	R0
1	(10)	:	2	=	0	R1

Das "=" fehlt

$$45054_{(10)} = 1010011111110_{(2)}$$

a. a. b.) <JAVA-Banner_ma(h)len!> XML?

3C (16)
74 (10)
61 (16)
118 (10)
97 (10)
101101 (2)
66 (10)

< JAVA_BANNER ->

Positionslst?

↳ 1101111 (2)
104 (10)
6E (16)
101 (10)
1101110 (2)
95 (10)

o
h
n
e
n
-

155 (8)
97 (10)
101000 (2)
104 (10)
41 (10)
6C (16)
65 (16)

m
a
s
h
e
l

110 (10)
33 (10)
11101 (2)
85 (10)
77 (10)
76 (10)
3F (16)
76 (8)

U
M
L
S
V

a. a. c.)

a) $27 + 23 + 2 = 52$

52 (10)	:	2	=	26	R0
26 (10)	:	2	=	13	R0
13 (10)	:	2	=	6	R1
6 (10)	:	2	=	3	R0
3 (10)	:	2	=	1	R1
1 (10)	:	2	=	0	R1

$52_{(10)} = 110100_2$

6 Bits notwendig $\Rightarrow H(a) = 6$

b.) $60 \cdot 60 \cdot 24 \frac{s}{\text{Total}} = 86400 \frac{s}{a}$

86400 (10)	:	2	=	43200	R0
43200 (10)	:	2	=	21600	R0
21600 (10)	:	2	=	10800	R0
10800 (10)	:	2	=	5400	R0
5400 (10)	:	2	=	2700	R0
2700 (10)	:	2	=	1350	R0
1350 (10)	:	2	=	675	R0
675 (10)	:	2	=	337	R1
337 (10)	:	2	=	168	R1
168 (10)	:	2	=	84	R0
84 (10)	:	2	=	42	R0
42 (10)	:	2	=	21	R0
21 (10)	:	2	=	10	R1
10 (10)	:	2	=	5	R1
5 (10)	:	2	=	2	R1
2 (10)	:	2	=	1	R0
1 (10)	:	2	=	0	R1

$86400_{(10)} = 1011100001000000_2$

$\Rightarrow 17$ Bits notwendig

$H(b) = 17$

c)	472000 (10)	:	2 =	236000 RO
	236000 (10)	:	2 =	118000 RO
	118000 (10)	:	2 =	59000 RO
	59000 (10)	:	2 =	29500 RO
	29500 (10)	:	2 =	14750 RO
	14750 (10)	:	2 =	7375 RO
	7375 (10)	:	2 =	3687 R1
	3687 (10)	:	2 =	1843 R1
	1843 (10)	:	2 =	921 R1
	921 (10)	:	2 =	460 R1
	460 (10)	:	2 =	230 RO
	230 (10)	:	2 =	115 RO
	115 (10)	:	2 =	57 R1
	57 (10)	:	2 =	28 R1
	28 (10)	:	2 =	14 RO
	14 (10)	:	2 =	7 RO
	7 (10)	:	2 =	3 R1
	3 (10)	:	2 =	1 R1
	1 (10)	:	2 =	0 R1

$$472000_{(10)} = 11100100111100000_{(2)}$$

$\Rightarrow 19$ Bits notwendig

$$H(c) = 19$$

$$\text{d)} \quad 1 \text{ TiB} = 1024^4 \text{ Byte} = 1024^4 \cdot 8 \text{ Bit}$$

$$= 8 \cdot 796 \cdot 093 \cdot 022 \cdot 208 \text{ Bit}$$

$$H(c) = \cancel{8 \cdot 796 \cdot 093 \cdot 022 \cdot 208}$$

e.) Möglichkeiten pro Zeichen:

24 Buchstaben + 1 Leerzeichen

+ 7 Satzzeichen = 38 Möglichkeiten pro Zeichen

$$1500 \cdot 38 = 57000$$

57000 (10)	:	2 =	28500 RO
28500 (10)	:	2 =	14250 RO
14250 (10)	:	2 =	7125 RO
7125 (10)	:	2 =	3562 R1
3562 (10)	:	2 =	1781 RO
1781 (10)	:	2 =	890 R1
890 (10)	:	2 =	445 R1
445 (10)	:	2 =	222 R1
222 (10)	:	2 =	111 RO
111 (10)	:	2 =	55 R1

$$\begin{array}{rcl}
 55_{(10)} & : 2 & = 27_{(10)} \\
 27_{(10)} & : 2 & = 13_{(10)} \\
 13_{(10)} & : 2 & = 6_{(10)} \\
 6_{(10)} & : 2 & = 3_{(10)} \\
 3_{(10)} & : 2 & = 1_{(10)} \\
 1_{(10)} & : 2 & = 0_{(10)}
 \end{array}$$

$$57\,000_{(10)} = 110\,111\,0110\,1000_{(2)}$$

15 Bit

$$\text{H}(e) = 15$$

f) $5.262.761 :$

$$2^{23} = 8.388.608 \stackrel{?}{=} \underline{\underline{8388607}}$$

$$2^{22} = 4.194.304 ; 2^{23} - 1 = 8388607 \\ \Rightarrow 2^{22} \text{ entspr. } 23 \text{ Bits}$$

$$\text{H}(r) = 23$$

17.5 / 19 Punkte