

Solutions

Exercises: Binary world

- 1) **Create a 8-bit binary representation of the decimal number 23**

$$23 : 2 = 11 \text{ Rest } 1$$

$$11 : 2 = 5 \text{ Rest } 1$$

$$5 : 2 = 2 \text{ Rest } 1$$

$$2 : 2 = 1 \text{ Rest } 0$$

$$1 : 2 = 0 \text{ Rest } 1$$

----> 10111

- 2) **Create a decimal representation of the binary number 10111111**

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
= 128	= 64	= 32	= 16	= 8	= 4	= 2	= 1
1	0	1	1	1	1	1	1

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

$$128 + 32 + 16 + 8 + 4 + 2 + 1 =$$

$$191$$

- 3) **What is the difference between the representation 0011 0111 and 0000 0111 of the number 7?**

00110111 is the ASCII character representation

00000111 is the binary integer representation

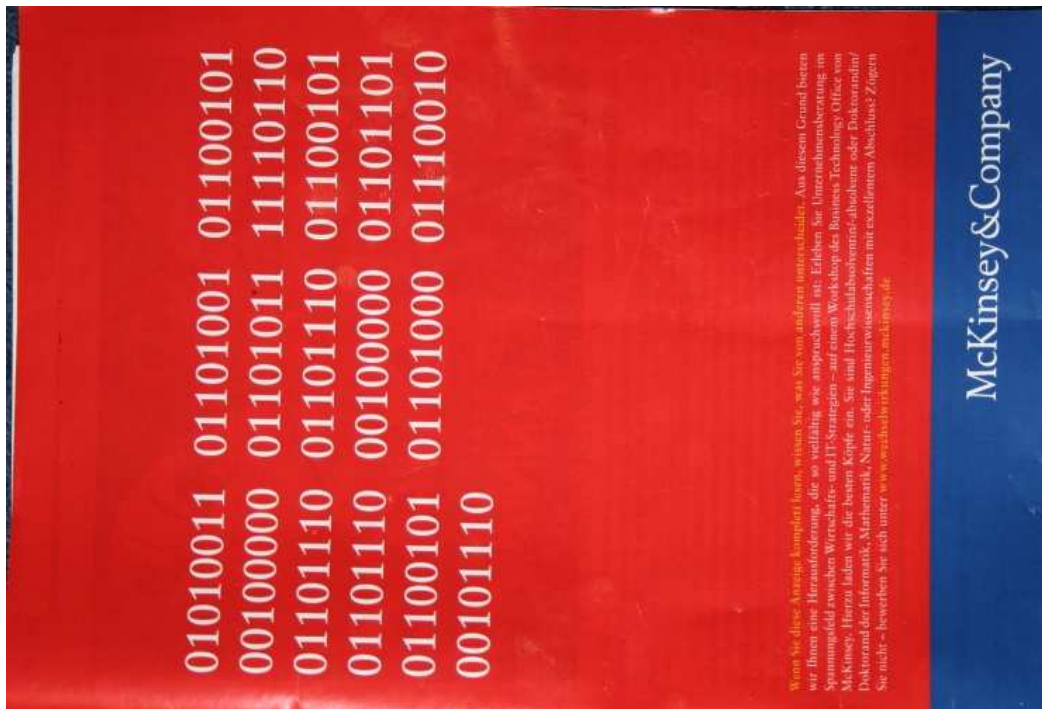
- 4) **How can you easily get the binary representation of an ASCII-number representation?**

e.g. character '9'

'9' - '0' (use the binary operation – to subtract the ASCII representations like they would be binary representations)

$$00111001_{\text{ASCII}} - 00110000_{\text{ASCII}} = 00001001_{\text{BIN}} = 9_{\text{DEC}}$$

5) Which text is coded in the following advertisement poster and which code is used?



Code in decimal notation:

83 105 101
 32 107 246
 110 110 101
 110 32 109
 101 104 114
 46

=> Sie können mehr.

=> ANSI ISO 8859 Part1 (Latin-1 Western European) - code

Check it with Matlab-program:

```
a = [83 105 101 32 107 246 110 110 101 110 32 109 101 104 114 46];
char(a)
```