Computer Science and Mathematics
Summer term 2020

Computer Science, Exercises 1

1. (a) Calculate the decimal value of the binary number 1001111.
   (b) Calculate the hexadecimal representation of the decimal number 999.
   (c) What is the binary expansion of the value 1/3 ?
   (Hint: You can do "written division" analogously to the decimal case, but with doubling the remainder in every step instead of multiplying by 10.)

2. How much digital storage capacity would be necessary for the content of a library with 100,000 books, if we assume that each book has 200 pages, each page has 50 lines and each line has 80 characters, and if a 1-byte ASCII code is used for the characters?

3. Find the 8-bit two's complement representation of the negative integer –84 .

4. ASCII coding:

Below you find a part of an 8-bit ASCII code table from a web page. What character string is encoded by the bit string given in binary representation as

0100'0011'0100'1000'0100'1001'0100'0101'0100'0110 ?

(The apostrophes are only used for better overview.)

Part of 8-bit ASCII code table:

decimal	hexadecimal	character
65	41	A
66	42	B
67	43	C
68	44	D
69	45	E
70	46	F
71	47	G
72	48	H
73	49	I
74	4A	J
75	4B	K
...	...	...