Cryptography
Dr. Patrick Mehlitz, M.Sc. Ameen Naif

Exercise Sheet 7
Version 04.06.2020

Exercise 1.

Consider the following binary block code $C \subseteq \mathbb{Z}_2^7$:

$$C := \{(c_1, ..., c_7) \in \mathbb{Z}_2^7 \mid \quad c_1 + c_2 + c_3 + c_5 = 0, c_1 + c_2 + c_4 + c_6 = 0, c_2 + c_3 + c_4 + c_7 = 0\}.$$

Show that C is 1-error detecting perfect code.

Exercise 2.

Find the ISIN-*control character* of the share of the following stock companies:

c) Volkswagen: DE000766400□,

d) Peugeot: FR000012150□ and

e) Toyota: JP363340000□.

Exercise 3.

Consider the following ISBN10 parity code of length 10 to the base 11 with weigths $w_i := 11 - i$, $i = 1, ..., 10$.

a) Find the *control character* of the ISBN10 code 360893823□ of the 6th. edition of the novel *"The Lord of the Rings"* in the publisher Klett Cotta.

b) Show that the following equation can also be used to find the the *control character* c_{10} of ISBN10 codes: $1 \cdot c_1 + ... + 9 \cdot c_9 \equiv c_{10} \bmod 11$.

c) Show that the exchange of any two position of an ISBN10 code will be detected.