Aufgabe 1:

The `Mathematica`-funtions `FromCharacterCode[n]`, `ToCharacterCode[s]`, `IntegerDigits[n,b]`, `FromDigits[l,n]`, `BaseForm[n,b]` and n^^b do the conversion between different alphabets. Familiarize yourself with those functions and solve the following exercise.

(a) Complete the following table:

basis 10	basis 2	basis 3	basis 16
1000			
	1101101		
		1201201	
			$ABBA$77

(b) Convert the number 1234_{10} in the numeral systems $B = 2, \ldots, 16$ using the function `Table`.

(c) Interpret the numbers of the list

$$\{2102_3, 2211_3, 2122_3, 2120_3, 2110_3, 10001_3, 2102_3\}$$

as ASCII-numbers and compute the corresponding string using the ASCII-table.

(d) Complete the following table using the function `Table`, by building a table whose lines are itself lists.

Zahl	ASCII-Zeichen	Hex-Darstellung	Binäre Darstellung
48	0	30_{16}	110000_2
$\vdots$	$\vdots$	$\vdots$	$\vdots$
95	–	$5F_{16}$	1011111_2

Use the command `Prepend` to put the line { "B=10", "ASCII", "B=16", "B=2" } as title in front of the matrix.

(10 Punkte)

Exercise 2:

Define in *Mathematica* a function which determines the prime factorization of a given integer using a simple (not necessarily efficient) approach. Test your function on the number 504.

(6 Punkte)