1. Convert from decimal to binary:

Example of explanation. For example, for part a

2^{10} = 1024	2^9 = 512	2^8 = 256	2^7 = 128	2^6 = 64	2^5 = 32	2^4 = 16	2^3 = 8	2^2 = 4	2^1 = 2	2^0 = 1
			1	1	1	0	1	0	1	0

We perform sums during the process. If the intermediate result is less than the output, we put 1, if it exceeds 234 we will put 0.

128 + 64 = 192

192 + 32 = 224

224 + 16 (240 which exceeds).

So we continue with 224 + 8 = 232

232 + 4 exceeds

So we continue with 232 + 2 = 234.

In this case, for even decimal numbers, don't forget to add as many zeros on the right as needed to complete the binary result.

a. 555 = 1000101011

2^{10} = 1024	2^9 = 512	2^8 = 256	2^7 = 128	2^6 = 64	2^5 = 32	2^4 = 16	2^3 = 8	2^2 = 4	2^1 = 2	2^0 = 1

	1	0	0	0	1	0	1	0	1	1

512+256=768

512+128=640

512+64=+

512+32=544

544+16=+

544+8=552

552+4=+

552+2=554

554+1=555

c. 12321 = 11000000100001

d. 152 = 10011000

2^{10} = 1024	2^{9} = 512	2^{8} = 256	2^{7} = 128	2^{6} = 64	2^{5} = 32	2^{4} = 16	2^{3} = 8	2^{2} = 4	2^{1} = 2	2^{0} = 1
			1	0	0	0	1	0	0	0

128+64=+

128+32=+

128+16=144

144+8=152

In this case, for even decimal numbers, don't forget to add as many zeros on the right as needed to complete the binary result.

e. 32768 = 1000000000000000 (it is a power of 2, so we can save operations)

2. Convert from binary to decimal:

100000000 = 256 (it is a power of 2, so we can save operations)

b. 1011110100 = 756

$1*2^9 + 0*2^8 + 1*2^7 + 1*2^6 + 1*2^5 + 1*2^4 + 0*2^3 + 1*2^2 + 0*2^1 + 0*2^0$

512 + 128 + 64 + 32 +16 + 4 = 756

c. 10011101 = 157

$1*2^7 + 0*2^6 + 0*2^5 + 1*2^4 + 1*2^3 + 1*2^2 + 0*2^1 + 1*2^0$

=157

d. 11111111111 = 2047 (it is a power of 2 subtracting 1)

For exercises 3, 4 and 5 we need to create the corresponding table and group in three for octal conversions and four in case of hexadecimal numbers.

0	0	0	0	**0**
0	0	0	1	**1**
0	0	1	0	**2**
0	0	1	1	**3**

0	1	0	0	**4**
0	1	0	1	**5**
0	1	1	0	**6**
0	1	1	1	**7**
1	0	0	0	**8**
1	0	0	1	**9**
1	0	1	0	**A**
1	0	1	1	**B**
1	1	0	0	**C**
1	1	0	1	**D**
1	1	1	0	**E**
1	1	1	1	**F**

3. Convert from hexadecimal to binary:

a. 45A0 = 100 0101 1010 0000

b. CF = 1100 1111

c. AAB2 = 1010 1010 1011 0010

d. 3020 = 11 0000 0010 0000

4. Convert from binary to hexadecimal:

   a. 0001 1000 1000 = 188

   b. 0001 0001 0110 = 116

5. Complete the following conversions related to octal numeral system:

   a. Convert the numbers from exercise 4 to octal. 110 001 0002 = 610,

   100 010 1102 = 426

   b. Convert the octal 3020 to binary: 11000010000

the binaries the lame ones in 3 format

1. Fill the gaps, using all the conversions you need. You have to write the steps to transform each number.

The same steps and in exercises above

1ºdecimal a binary=

2^{10} = 1024	**2^9 = 512**	**2^8 = 256**	**2^7 = 128**	**2^6 = 64**	**2^5 = 32**	**2^4 = 16**	**2^3 = 8**	**2^2 = 4**	**2^1 = 2**	**2^0 = 1**

					1	0	0	0	0	1

32+16=+

32+8=+

32+1=33

2º hexadecimal to binary I do the same thing as before seeing the table

3rd binary to octal I do the same

FF=binary

1111 1111=binary

binary to decimal=2^8 -1=255

binary to octal=377

377 to binary= ## As before

10 0001 to decimal= $1*2^5 + 0*2^4 + 0*2^3 + 0*2^2 + 0*2^1 + 1*2^{0=}$ 33

as a

BINARY	DECIMAL	HEXADECIMAL	OCTAL
100001	**33**	21	41
1111 1111	255	**FF**	377

1111 1111	255	FF	**377**
10 0001	33	21	41

7. How many bits do you need to represent the following numbers in binary?

You need to convert the numbers and delete ceros on the left, especially for hexadecimal numbers. For example 4B is 0100 1011. But we need to pad ceros to get the minimum digits (7 to represent 100 1011)

   a. hexadecimal: 4B (7), 4AA (11), FF4FA (20), 345F (14)
   b. decimal: 100 (7), 256 (9), 255 (8), 32 (6), 31 (5), 3 (2), 4350 (13), 1024 (11), 45 (6), 230 (31, remember that is 1 and the number of 0 corresponding with the exponent), 63 (6)

8. Solve the following parts using ASCII extended (8 bits).
   a. Write a random text, which contains letters, numbers and other alphanumeric characters.
   b. Encode to hexadecimal, according ASCII table.
   c. Convert to binary.

We selected LIL<:

L = 4C

I =49

L = 4C

3C = <

4C = 01001100

I= 01001001

4C = 01001100

3C=00111100

So, the final binary number will be 00110001 01001001 01001100 00111100