# Exercises about representation of information

**Add a few explanations to demonstrate how to perform each conversion. For example, from decimal to binary we use powers and then explain the corresponding operations.**

1. Convert from decimal to binary:
   1. 234 = 1110 1010
   2. 555= 10 0010 1011
   3. 12321
   4. 152
   5. 32768
2. Convert from binary to decimal:
   1. 100000000 = 256 (2^8)
   2. 1011110100 = 2^2+2^4+2^5+2^6+2^7+2^8+2^10=
   3. 10011101
   4. 11111111111
3. Convert from hexadecimal to binary:
   1. 45A0 = 17824(d) = 100 0101 1010 0000
   2. CF = 207(d) = 1100 1111
   3. AAB2 = 43698(d) = 1010 1010 1011 0010
   4. 3020 = 12320(d) = 11 0000 0010 0000
4. Convert from binary to hexadecimal:
   1. 1 1000 1000 = 188(h) = 610(o)
   2. 1 0001 0110 = 116(h) = 426(o)
5. Complete the following conversions related to octal numeral system:
   1. Convert the numbers from exercise 4 to octal.
   2. Convert the octal 3020 to binary. 11 0000 0010 0000
6. Fill in the gaps, using all the conversions you need. You have to write the steps to transform each number.

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| **BINARY** | **DECIMAL** | **HEXADECIMAL** | **OCTAL** |
| 10 0001 | **33** | 21 | 41 |
| 11111111 | 255 | **FF** | 377 |
| 11111111 | 255 | FF | **377** |
| **10 0001** | 33 | 21 | 41 |

1. How many bits do you need to represent the following numbers in binary?
2. hexadecimal:

* 4B = 0100 1011 = 8 bits,
* 4AA = 0100 1010 1010 = 12 bits,
* FF4FA = 1111 1111 0100 1111 1000 = 20 bits,
* 345F = 0011 0100 0101 1111 = 16 bits.

1. decimal:

* 100 = 0110 0100 = 8 bits,
* 256 = 1 0000 0000 = 9 bits,
* 255 = 111 1111 = 7 bits,
* 32 = 10 0000,
* 31 = 1 1111 = 5 bits,
* 3 = 11 = 2bits,
* 4350 = ,
* 1024 = 100 0000 0000 = 10 bits,
* 45,
* 230 = bits ,
* 63

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