Number systems and binary

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Practice problems

Solutions are available online[1]

[1] https://liucs.net/cs101f19/numbers-practice-sol.pdf

1. Convert the base ten (decimal) number 83 into the following bases:
   - base 4 : _____
   - base 5 : _____
   - base 6 : _____
   - base 7 : _____
2. Convert the following numbers from the specified bases into base ten.
   - 232_4 = _____
   - 414_5 = _____
   - 205_6 = _____
   - 164_7 = _____
3. Convert the following base ten (decimal) numbers into binary.
   - 6 = _____
   - 18 = _____
   - 51 = _____
   - 63 = _____
4. Convert the following unsigned binary numbers into base ten.
   - 1010 = _____
   - 1101 = _____
   - 1000 = _____
   - 10001 = _____
5. What do all **odd** numbers have in common, when written in binary? (Hint: try writing the quantities 3, 5, 7, 9 in binary.)

6. Using 7-bit **signed two's complement** binary numbers, what is the **largest** positive number? What is the **most negative** number?

7. Convert the following 5-bit **signed two's complement** binary numbers into base ten.
   - `01101` = _____
   - `01111` = _____
   - `10011` = _____
   - `11111` = _____
8. Convert the following 16-bit binary number into octal and hexadecimal.

   `0 1 1 1 1 1 1 1 0 0 1 1 1 0 1 0`

9. Convert the following **hexadecimal** numbers into binary:
   - `9D` = _____
   - `C4` = _____
   - `D05` = _____
   - `A17E` = _____
10. Convert the following **octal** numbers into binary:
    - `37` = _____
    - `415` = _____
    - `620` = _____
11. Add and verify the following **unsigned** binary numbers.

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  1 0 1 1 1 1
+   1 1 1 0 1
_______________
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