COMP110 EXERCISE SHEET I: NUMBER BASES

Version 1.0
BSc Computing for Games
COMP110

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To complete this worksheet:

- **complete** the following problems using **pen and paper**; and
- **hand in** your solutions in the COMP110 workshop session in week 3.

Marks will only be awarded for correct answers **with working shown**! You **may** use online calculators or other aids to check your answers, but you **must** demonstrate that you have first performed the calculations manually.

1. Convert the following numbers from decimal to 8-bit binary:
   (a) 211
   (b) 130
   (c) 79
   (d) 141
   (e) 31
2. Convert the following numbers from binary to decimal:
   (a) 01111111
   (b) 11001100
   (c) 11101011
   (d) 11001001
   (e) 00000001
3. For each of the following sums:
   - Convert the numbers from decimal to 8-bit binary
   - Perform the addition
   - Convert the answer back to decimal

   (a) $11 + 76$
   (b) $39 + 73$
   (c) $72 + 89$
   (d) $81 + 72$
   (e) $4 + 77$
4. For each of the following differences:
   - Convert the numbers from decimal to 8-bit binary
   - Convert the second number to 2's complement representation
   - Perform the addition
   - If the result is negative (i.e. if the leftmost bit is 1), convert from 2's complement
   - Convert the answer back to decimal, giving the result with the appropriate sign (i.e. $+$ or $-$)

   (a) $100 - 86$
   (b) $97 - 71$
   (c) $30 - 33$
   (d) $34 - 73$
   (e) $74 - 5$