CM1101: COMPUTATIONAL THINKING

TUTORIAL – DATA REPRESENTATION

02 October 2018

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1. Count from 0 up to 15 in binary, octal, hexadecimal, and base 5.
2. Convert the following integers to binary:
   (a) 27_{10}
   (b) 34_{10}
   (c) 55_{10}
   (d) 451_{10}
   (e) 987_{10}
   (f) 2016_{10}
3. Convert the integers from question 2 to octal.
4. Convert the integers from question 2 to hexadecimal.
5. Convert the following numbers to binary, accurate to four binary places after point:
   (a) 18.25_{10}
   (b) 19.625_{10}
   (c) 12.125_{10}
   (d) 14.11_{10}
   (e) 2314.34_{10}
   (f) 21.97_{10}
6. Carry out the following binary arithmetic:
   (a) 101101 + 10101
   (b) 100111 – 11100
   (c) 1101110 + 111100 + 100101
7. Show how the following decimal numbers would be represented in a 12-bit register, using sign and magnitude and two's complement representation:
   (a) +14
   (b) +63
   (c) – 256
   (d) – 1032

8. Interpret the following bit pattern in the different ways requested below:

   1011001110101000

   (a) as four hexadecimal digits.

   (b) as two 8-bit two's complement integers, interpreting your answer in decimal.

9. An 8-bit register is used to store non-negative numbers using the fixed point representation. The first 6 most significant bits of the register represent the integer part, and the remaining 2 bits represent the fractional part. What is the range of the register? What is the precision of the register?

END OF QUESTIONS