Foundations of Information Systems

Winter Semester 2024–25, Exercise 2

For discussion on Wednesday, October 29, 2025

1. Perform the following conversion to different number systems:
   (a) $(\mathrm{DC})_{16} = (\ldots)_2 = (\ldots)_{10}$
   (b) $(110101)_2 = (\ldots)_{10} = (\ldots)_{16}$
   (c) $(1000)_{10} = (\ldots)_2 = (\ldots)_{16}$
2. Convert the following decimal numbers into binary. Note that the resulting binary representation may not terminate and become periodic.
   (a) $(9.5)_{10}$
   (b) $(\frac{44}{7})_{10}$
3. Convert from binary to decimal.
   (a) $(1101.0111)_2$
   (b) $(0.0\overline{1001})_2$
4. Convert from decimal to hexadecimal (a) or back (b).
   (a) $(39.75)_{10}$
   (b) $(F.42)_{16}$
5. Find the 8-bit two's complement of $(67)_{10}$.
6. Which integer is represented by the bit pattern 10111010 interpreted as 8-bit two's complement representation?
7. Show that the two's complement of the two's complement of a bit pattern returns the original bit pattern.