

Master in Information Technology

University of Malta

Department of Communications and Computer Engineering

Tutorial II

- 1) Discuss the requirement of an Analogue-to-Digital converter.
- 2) Describe a typical architecture of an Analogue-to-Digital converter.
- 3) Describe a typical architecture of a Digital-to-Analogue converter.
- 4) Convert the following binary numbers into decimal:
(a) 1101001.1 (b) 10100.0101
- 5) Convert the following decimal numbers into binary:
(a) 562.4652 (b) 89.912
- 6) Convert the following numbers into octal:
(a) $(768.82)_{10}$ (b) $(2456.245)_{10}$ (c) $(1101011010.110101)_2$
- 7) Convert the following numbers into hexadecimal:
(a) $(872.65)_{10}$ (b) $(432.24)_8$ (c) $(101111101001.10101)_2$
- 8) Encode the following numbers using BCD:
(a) 9821.12 (b) 3219.2
- 9) Assuming a 32-bit representation of a floating-point number, having 1 bit for sign, 8-bit signed exponent and 23-bit mantissa, represent the following decimal numbers in this format:
(a) 3.92×10^2 (b) -0.000256 (c) -12.23×10^8
- 10) Form 1's complement and 2's complement of the following numbers:
(a) 10110101.101 (b) 11010001.0101

11) Perform the addition of the following numbers:

- (a) 01101011 and 10010010 (b) 10111 and 1000101

12) Perform the subtraction of the following numbers using 2's complement subtraction:

- (a) 10000001 – 01110110 (b) 1111110 – 1000101

13) Perform the subtraction of the following numbers using 1's complement subtraction:

- (a) 10011001 – 01010110 (b) 1111010 – 1001101

14) Multiply the following signed numbers. In each case, assume that A is the multiplicand and B is the multiplier.

- (a) A = 011011, B = 010101 (b) A = 1011010, B = 1101011

15) Divide the following numbers:

- (a) 1101101 ÷ 1011 (b) 100101101 ÷ 11010

16) Perform the floating-point addition of the following assuming that you can store only five significant digits and four digits for the exponent.

- (a) 0.0000101101 and 0.001101011 (b) 1010101.101 and 110101.0011
(c) 1.1100×2^{-3} and 1.00101×2^{-2} (d) 1.00101×2^{-1} and -1.1101×2^{-2}

17) Perform the floating-point multiplication of the following assuming that you can store only five significant digits and four digits for the exponent.

- (a) 0.0001101101 and 0.001100011 (b) 1011101.101 and 110101.0001
(c) 1.1101×2^{-3} and 1.00111×2^{-1} (d) 1.00101×2^{-2} and -1.1011×2^{-4}