EE313 Problem Set 1,2,3 Answers

Spring '09

Define Digital.
Answer: Is a system that deals with discrete digits and quantities. Digital deals exclusively with 1s and 0s or ONs and OFFs.

Define Analog.
Answer: Is a system that deals with continuously varying physical quantities that yield an infinite number of different levels.

Provide two examples of analog signals.
Answer: Record Players, Cassette Players, AM/FM radios, etc.

Why do we use digital systems?
Answer: We use digital systems because they provide many advantages over analog systems.

What are ADCs and DACs?
Answer: ADCs and DACs are devices that convert analog and digital signals back and forth from each other.

What are alternate expressions for a digital 1?
Answer: ON, HIGH, TRUE, +5V, etc.

What are alternate expressions for a digital 0?
Answer: OFF, LOW, FALSE, 0V, etc.

Problem 1-1 (a, b, f, i)

a) $0110_2 = 6_{10}$ **b)** $1011_2 = 11_{10}$ **f)** $01001011_2 = 75_{10}$ **i)** $10100111_2 = 167_{10}$

Problem 1-2 (a, c, e)

a) $186_{10} = 10111010_2$ **c)** $27_{10} = 11011_2$ **e)** $146_{10} = 10010010_2$

Problem 1-7 (c, d)

c) $01110100_2 = 74_{16}$ **d)** $11111011_2 = FB_{16}$

Problem 1-9 (c & d)

c) $92_{16} = 10010010_2$ **d)** $AB_{16} = 10101011_2$

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Problem 1-10 (c & d)

c) $107_{10} = 6B_{16}$ **d)** $61_{10} = 4D_{16}$

Problem 1-11 (a, b, c, d, e)

a) 10011000 = 98 **b)** 01101001 = 69 **c)** 01110100 = 74

d) 00110110 = 36 **e)** 10000001 = 81

Problem 1-12 (a, b, c, d, e)

a) 87 = 10000111 **b)** 142 = 000101000010 **c)** 94 = 10010100

d) 61 = 01100001 **e)** 44 = 01000100

Problem 1-13 (b, c)

b) "$" = 0100100 "1" = 0110001 "4" = 0110100

c) "N" = 1001110 "-" = 0101101 "6" = 0110110