Aritmetica Binaria - Esercizi

1. Conversione binario → decimale

- **(06)**
  - **$1101_2 \rightarrow ?_{10}$** (13)
  - **$11100110_2 \rightarrow ?_{10}$** (230)
  - **$1010100_2 \rightarrow ?_{10}$** (84)
  - **$111000100_2 \rightarrow ?_{10}$** (452)

- **(07,08,09)**
  - **$10110110_2 \rightarrow ?_{10}$** (182)
  - **$1111111_2 \rightarrow ?_{10}$** (127)
  - **$10000001_2 \rightarrow ?_{10}$** (129)

- **(10)**
  - **$10011101_2 \rightarrow ?_{10}$** (157)
  - **$1111011_2 \rightarrow ?_{10}$** (123)
  - **$11001001_2 \rightarrow ?_{10}$** (201)

- **(11)**
  - **$10101101_2 \rightarrow ?_{10}$** (173)
  - **$1101001_2 \rightarrow ?_{10}$** (105)
  - **$10100101_2 \rightarrow ?_{10}$** (165)

- **(12,13)**
  - **$10010101_2 \rightarrow ?_{10}$** (149)
  - **$1001011_2 \rightarrow ?_{10}$** (75)
  - **$10110111_2 \rightarrow ?_{10}$** (183)

- **(14)**
  - **$1111_2 \rightarrow ?_{10}$** (15)
  - **$1000011_2 \rightarrow ?_{10}$** (67)
  - **$10001001_2 \rightarrow ?_{10}$** (137)

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2. Conversione decimale → binario

- **(06)**
  - $\mathbf{83_{10} \rightarrow ?_2}$ (1010011_2)
  - $\mathbf{330_{10} \rightarrow ?_2}$ (101001010_2)
  - $\mathbf{2291_{10} \rightarrow ?_2}$ (100011110011_2)
  - $\mathbf{9902_{10} \rightarrow ?_2}$ (10011010101110_2)

- **(07,08)**
  - $\mathbf{237_{10} \rightarrow ?_2}$ (11101101_2)
  - $\mathbf{3172_{10} \rightarrow ?_2}$ (110001100100_2)
  - $\mathbf{8873_{10} \rightarrow ?_2}$ (10001010101001_2)

- **(09)**
  - $\mathbf{369_{10} \rightarrow ?_2}$ (101110001_2)
  - $\mathbf{2570_{10} \rightarrow ?_2}$ (101000001010_2)
  - $\mathbf{8460_{10} \rightarrow ?_2}$ (10000100001100_2)

- **(10)**
  - $\mathbf{119_{10} \rightarrow ?_2}$ (1110111_2)
  - $\mathbf{3320_{10} \rightarrow ?_2}$ (110011111000_2)
  - $\mathbf{5110_{10} \rightarrow ?_2}$ (1001111110110_2)

- **(11)**
  - $\mathbf{125_{10} \rightarrow ?_2}$ (1111101_2)
  - $\mathbf{3184_{10} \rightarrow ?_2}$ (110001110000_2)
  - $\mathbf{7569_{10} \rightarrow ?_2}$ (1110110010001_2)

- **(12,13)**
  - $\mathbf{93_{10} \rightarrow ?_2}$ (1011101_2)
  - $\mathbf{2782_{10} \rightarrow ?_2}$ (101011011110_2)
  - $\mathbf{6711_{10} \rightarrow ?_2}$ (1101000110111_2)

- **(14)**
  - $\mathbf{101_{10} \rightarrow ?_2}$ (1100101_2)
  - $\mathbf{3032_{10} \rightarrow ?_2}$ (101111011000_2)
  - $\mathbf{5454_{10} \rightarrow ?_2}$ (1010101001110_2)

3. Conversione binario → esadecimale

- **(06)**
  - $\mathbf{110101_2 \rightarrow ?_{16}}$ (35_{16})
  - $\mathbf{101011_2 \rightarrow ?_{16}}$ ($2B_{16}$)
  - $\mathbf{100111100000_2 \rightarrow ?_{16}}$ ($9E0_{16}$)
  - $\mathbf{11110100010_2 \rightarrow ?_{16}}$ ($7A2_{16}$)

- **(07,08)**
  - $\mathbf{10011_2 \rightarrow ?_{16}}$ (13_{16})
  - $\mathbf{110010010000_2 \rightarrow ?_{16}}$ ($C90_{16}$)
  - $\mathbf{11011011011_2 \rightarrow ?_{16}}$ ($6DB_{16}$)

- **(09)**
  - $\mathbf{101001_2 \rightarrow ?_{16}}$ (29_{16})
  - $\mathbf{101011110000_2 \rightarrow ?_{16}}$ ($AF0_{16}$)
  - $\mathbf{10100011010_2 \rightarrow ?_{16}}$ ($51A_{16}$)

- **(10)**
  - $\mathbf{110111_2 \rightarrow ?_{16}}$ (37_{16})
  - $\mathbf{110000011000_2 \rightarrow ?_{16}}$ ($C18_{16}$)
  - $\mathbf{11100111010_2 \rightarrow ?_{16}}$ ($73A_{16}$)

- **(11)**
  - $\mathbf{101100_2 \rightarrow ?_{16}}$ ($2C_{16}$)
  - $\mathbf{111101001010_2 \rightarrow ?_{16}}$ ($F4A_{16}$)
  - $\mathbf{10110000001_2 \rightarrow ?_{16}}$ (581_{16})

- **(12,13)**
  - $\mathbf{1011001_2 \rightarrow ?_{16}}$ (59_{16})
  - $\mathbf{110100010010_2 \rightarrow ?_{16}}$ ($D12_{16}$)
  - $\mathbf{11011000000010_2 \rightarrow ?_{16}}$ (3602_{16})

- **(14)**
  - $\mathbf{110\ 1101_2 \rightarrow ?_{16}}$ ($6D_{16}$)
  - $\mathbf{110010011_2 \rightarrow ?_{16}}$ (193_{16})
  - $\mathbf{111001001010_2 \rightarrow ?_{16}}$ ($E4A_{16}$)

4. Conversione esadecimale → binario

- **(06)**
  - **0x5C → ?$_2$** (1011100_2)
  - **0xC17 → ?$_2$** (110000010111_2)
  - **0x141 → ?$_2$** (101000001_2)
  - **0xAB0C → ?$_2$** (1010101100001100_2)

- **(07,08)**
  - **0xB23 → ?$_2$** (101100100011_2)
  - **0x223 → ?$_2$** (1000100011_2)
  - **0x104D → ?$_2$** (1000001001101_2)

- **(09)**
  - **0xA71 → ?$_2$** (101001110001_2)
  - **0x193 → ?$_2$** (110010011_2)
  - **0x7004 → ?$_2$** (111000000000100_2)

- **(10)**
  - **0xF15 → ?$_2$** (111100010101_2)
  - **0x23A → ?$_2$** (1000111010_2)
  - **0x90D1 → ?$_2$** (1001000011010001_2)

- **(11)**
  - **0xBD4 → ?$_2$** (101111010100_2)
  - **0x159 → ?$_2$** (101011001_2)
  - **0xB062 → ?$_2$** (1011000001100010_2)

- **(12,13)**
  - **0x958 → ?$_2$** (100101011000_2)
  - **0x307 → ?$_2$** (1100000111_2)
  - **0xA142 → ?$_2$** (1010000101000010_2)

- **(14)**
  - **0xA51 → ?$_2$** (101001010001_2)
  - **0x746 → ?$_2$** (11101000110_2)
  - **0xB214 → ?$_2$** (1011001000010100_2)

5. Somme binarie

- **(06)**
  - **$100101_2 + 101_2 = ?_2$** (101010_2 37+5=42)
  - **$11100011_2 + 1101101_2 = ?_2$** ($101010000_2$ 227+109=336)
  - **$101_2 + 101110101_2 = ?2$** (101111010_2 5+373=378)
  - **$100100110_2 + 101110101_2 = ?_2$** ($1010011011_2$ 294+373=667)

- **(07,08)**
  - **$1111111_2 + 10101000_2 = ?_2$** ($100100111_2$ 127+168=295)
  - **$1010_2 + 101010111_2 = ?_2$** ($101100001_2$ 10+343=353)
  - **$110110100_2 + 101010101_2 = ?_2$** ($1100001001_2$ 436+341=777)

- **(09)**
  - **$1111011_2 + 10101000_2 = ?_2$** ($100100011_2$ 123+168=291)
  - **$110_2 + 101011111_2 = ?_2$** ($101100101_2$ 6+351=357)
  - **$110111100_2 + 101100001_2 = ?_2$** ($1100011101_2$ 444+353=797)

- **(10)**
  - **$1000101_2 + 11101110_2 = ?_2$** ($100110011_2$ 69+238=307)
  - **$1101_2 + 110011001_2 = ?_2$** ($110100110_2$ 13+409=422)
  - **$100110110_2 + 100100001_2 = ?_2$** ($1001010111_2$ 310+289=599)

- **(11)**
  - **$1011101_2 + 11001100_2 = ?_2$** ($100101001_2$ 93+204=297)
  - **$10011_2 + 110111001_2 = ?_2$** ($111001010_2$ 19+441=460)
  - **$111100110_2 + 110101001_2 = ?_2$** ($1110001111_2$ 486+425=911)

- **(12,13)**
  - **$111010_2 + 1001000_2 = ?_2$** ($10000010_2$ 58+72=130)
  - **$100010_2 + 1101111011_2 = ?_2$** ($1110011101_2$ 34+891=925)
  - **$101110001_2 + 1001001001_2 = ?_2$** ($1110111010_2$ 369+585=954)

- **(14)**
  - **$100100_2 + 1010011_2 = ?_2$** ($1110111_2$ 36+83=119)
  - **$10000110_2 + 1001001111_2 = ?_2$** ($1011010101_2$ 134+591=725)
  - **$111001010_2 + 10101001_2 = ?_2$** ($1001110011_2$ 458+169=627)

6. Sottrazioni binarie (in complemento a due)

- **(06)**
  - $\mathbf{1001_2 - 110_2 = ?_2}$ ($+11_2$ 9-6 = 3)
  - $\mathbf{101_2 - 1011_2 = ?_2}$ ($-110_2 = 11010_{CA2}$ 5-11 = -6)
  - $\mathbf{10011_2 - 1111_2 = ?_2}$ ($+100_2$ 19-15 = 4)
  - $\mathbf{1001_2 - 10111_2 = ?_2}$ (*Eseguire i calcoli a 8 bit, segno compreso)* ($-1110_2 = 11110010_{CA2}$ 9-23 = -14)
- **(07,08)**
  - $\mathbf{11_2 - 1100_2 = ?_2}$ ($-1001_2 = 10111_{CA2}$ 3-12 = -9)
  - $\mathbf{11001_2 - 1001_2 = ?_2}$ ($+10000_2$ 25-9 = 16)
  - $\mathbf{101_2 - 101111_2 = ?_2}$ (*Eseguire i calcoli a 8 bit)* ($-101010_2 = 11010110_{CA2}$ 5-47 = -42)
- **(09)**
  - $\mathbf{111_2 - 1010_2 = ?_2}$ ($-11_2 = 11101_{CA2}$ 7-10 = -3)
  - $\mathbf{11101_2 - 1001_2 = ?_2}$ ($+10100_2$ 29-9 = 20)
  - $\mathbf{101_2 - 101001_2 = ?_2}$ (*Eseguire i calcoli a 8 bit)* ($-100100_2 = 11011100_{CA2}$ 5-41 = -36)
- **(10)**
  - $\mathbf{10_2 - 1001_2 = ?_2}$ ($-111_2 = 11001_{CA2}$ 2-9 = -7)
  - $\mathbf{11011_2 - 101_2 = ?_2}$ ($+10110_2$ 27-5 = 22)
  - $\mathbf{- 101_2 - 110100_2 = ?_2}$ (*Eseguire i calcoli a 8 bit)* ($-111001_2=11000111_{CA2}$ -5-52 = -57)
- **(11)**
  - $\mathbf{101_2 - 1011_2 = ?_2}$ ($-110_2 = 11010_{CA2}$ 5-11= -6)
  - $\mathbf{10001_2 - 1111_2 = ?_2}$ ($+10_2$ 17-15 = 2)
  - $\mathbf{- 111_2 - 101010_2 = ?_2}$ (*Eseguire i calcoli a 8 bit)* ($-110001_2=11001111_{CA2}$ -7-42 = -49)
- **(12,13)**
  - $\mathbf{110_2 - 1001_2 = ?_2}$ ($-11_2 = 11101_{CA2}$ 6-9= -3)
  - $\mathbf{10100_2 - 1011_2 = ?_2}$ ($+1001_2$ 20-11 = 9)
  - $\mathbf{1110_2 - 11010_2 = ?_2}$ (*Eseguire i calcoli a 8 bit)* ($-1100_2=11110100_{CA2}$ 14-26 = -12)
- **(14)**
  - $\mathbf{1001_2 - 10010_2 = ?_2}$ ($-1001_2 = 110111_{CA2}$ 9-18= -9)
  - $\mathbf{11111_2 - 1101_2 = ?_2}$ ($+10010_2$ 31-13 = 18)
  - $\mathbf{10011_2 - 101101_2 = ?_2}$ (*Eseguire i calcoli a 8 bit)* ($-11010_2=11100110_{CA2}$ 19-45 = -26)

7. Conversione in floating point secondo lo standard IEEE 754

- **(06)**
  - **$-20{,}75_{10}$ = <s,e,m>?** (<1,10000011,01001100000000000000000>)
  - **$-0{,}25_{10}$ = <s,e,m>?** (<1,01111101,00000000000000000000000>)
  - **$+10_{10}$ = <s,e,m>?** (<0,10000010,01000000000000000000000>)
  - **$-1{,}7_{10}$ = <s,e,m>?** (<1,01111111,10110011001100110011010>)

- **(07,08)**
  - **$+0{,}125_{10}$ = <s,e,m>?** (<0,01111100,00000000000000000000000>)
  - **-5_{10} = <s,e,m>?** (<1,10000001,01000000000000000000000>)

- **(09)**
  - **$+0{,}375_{10}$ = <s,e,m>?** (<0,01111101,10000000000000000000000>)
  - **-3_{10} = <s,e,m>?** (<1,10000000,10000000000000000000000>)

- **(10)**
  - **$+19{,}5625_{10}$ = <s,e,m>?** (<0,10000011,00111001000000000000000>)
  - **$-7{,}5_{10}$ = <s,e,m>?** (<1,10000001,11100000000000000000000>)
  - **$-0{,}3_{10}$ = <s,e,m>?** (<1,01111101,00110011001100110011011>)

- **(11)**
  - **$+9{,}3125_{10}$ = <s,e,m>?** (<0,10000010,00101010000000000000000>)
  - **$-0{,}125_{10}$ = <s,e,m>?** (<1,01111100,00000000000000000000000>)
  - **$0{,}1_{10}$ = <s,e,m>?** (<0,01111011,10011001100110011001100>)

- **(12,13,14)**
  - **$+17{,}375_{10}$ = <s,e,m>?** (<0,10000011,00010110000000000000000>)
  - **$-0{,}78125_{10}$ = <s,e,m>?** (<1,01111110,10010000000000000000000>)
  - **$-0{,}8_{10}$ = <s,e,m>?** (<1,01111110,10011001100110011001100>)