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)

2. Conversione decimale → binario

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

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

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

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

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

3. Conversione binario → esadecimale
- ➢ **(06)**
  - ○ $110101_2 \rightarrow ?_{16}$ $\qquad$ (35_{16})
  - ○ $101011_2 \rightarrow ?_{16}$ $\qquad$ $(2B_{16})$
  - ○ $100111100000_2 \rightarrow ?_{16}$ $\qquad$ $(9E0_{16})$
  - ○ $11110100010_2 \rightarrow ?_{16}$ $\qquad$ $(7A2_{16})$

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

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

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

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

4. Conversione esadecimale → binario
- ➢ **(06)**
  - ○ $0x5C \rightarrow ?_2$ $\qquad$ (1011100_2)
  - ○ $0xC17 \rightarrow ?_2$ $\qquad$ (110000010111_2)
  - ○ $0x141 \rightarrow ?_2$ $\qquad$ (101000001_2)
  - ○ $0xAB0C \rightarrow ?_2$ $\qquad$ (1010101100001100_2)

- ➢ **(07,08)**
  - ○ $0xB23 \rightarrow ?_2$ $\qquad$ (101100100011_2)
  - ○ $0x223 \rightarrow ?_2$ $\qquad$ (1000100011_2)
  - ○ $0x104D \rightarrow ?_2$ $\qquad$ (1000001001101_2)

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

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

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

5. Somme binarie

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

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

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

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

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

6. Sottrazioni binarie (in complemento a due)

- ➢ **(06)**
  - o $1001_2 - 110_2 = ?_2$ ($+11_2$ 9-6 = 3)
  - o $101_2 - 1011_2 = ?_2$ ($-110_2 = 11010_{CA2}$ 5-11 = -6)
  - o $10011_2 - 1111_2 = ?_2$ ($+100_2$ 19-15 = 4)
  - o $1001_2 - 10111_2 = ?_2$ (*Eseguire i calcoli a 8 bit, segno compreso*)
          ($-1110_2 = 11110010_{CA2}$ 9-23 = -14)

- ➢ **(07,08)**
  - o $11_2 - 1100_2 = ?_2$ ($-1001_2 = 10111_{CA2}$ 3-12 = -9)
  - o $11001_2 - 1001_2 = ?_2$ ($+10000_2$ 25-9 = 16)
  - o $101_2 - 101111_2 = ?_2$ (*Eseguire i calcoli a 8 bit*)
          ($-101010_2 = 11010110_{CA2}$ 5-47 = -42)

- ➢ **(09)**
  - o $111_2 - 1010_2 = ?_2$ ($-11_2 = 11101_{CA2}$ 7-10 = -3)
  - o $11101_2 - 1001_2 = ?_2$ ($+10100_2$ 29-9 = 20)
  - o $101_2 - 101001_2 = ?_2$ (*Eseguire i calcoli a 8 bit*)
          ($-100100_2 = 11011100_{CA2}$ 5-41 = -36)

- ➢ **(10)**
  - o $10_2 - 1001_2 = ?_2$ ($-111_2 = 11001_{CA2}$ 2-9 = -7)
  - o $11011_2 - 101_2 = ?_2$ ($+10110_2$ 27-5 = 22)
  - o $-101_2 - 110100_2 = ?_2$ (*Eseguire i calcoli a 8 bit*)
          ($-111001_2 = 11000111_{CA2}$ -5-52 = -57)

- ➢ **(11)**
  - o $101_2 - 1011_2 = ?_2$ ($-110_2 = 11010_{CA2}$ 5-11= -6)
  - o $10001_2 - 1111_2 = ?_2$ ($+10_2$ 17-15 = 2)
  - o $-111_2 - 101010_2 = ?_2$ (*Eseguire i calcoli a 8 bit*)
          ($-110001_2 = 11001111_{CA2}$ -7-42 = -49)

7. Conversione in floating point secondo lo standard IEEE 754

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

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

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

- ➢ **(10)**
  - ○ **$+19{,}5625_{10}$ = <s,e,m>?**   (<0,01111111,10010000000000000000000>)
  - ○ **$-7{,}5_{10}$ = <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>?**   (<1,01111011,10011001100110011001100>)