

TUGAS MANDIRI 1 PSD

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PSD - C

1. a. Base 10 = 100

→ Base 2 = 100₁₀ : 2 = 50 rem 0

50 : 2 = 25 rem 0

25 : 2 = 12 rem 1

12 : 2 = 6 rem 0

6 : 2 = 3 rem 0

3 : 2 = 1 rem 1

1 : 2 = 0 rem 1

result : 100₁₀ = 1100100₂

→ Base 4 = 1100100₂

↳ 01100100

1 2 1 0

result : 100₁₀ = 1210₄

→ Base 16 = 1100100₂

↳ 01100100

6 Y

result : 100₁₀ = 64₁₆

→ Base 9 = 100₁₀

= 1 × 9² + 2 × 9 + 1

= 121₉

→ Base 18 = 100₁₈

= 5 × 18 + 10

= 5A₁₈

b. Base 16 = AE

→ Base 10 = 10 × 16 + 14

= 160 + 14

= 174₁₀

→ Base 2 = A E

result : 10101110₂

→ Base 4 = 10101110

2 2 3 2

result = 2232₄ = AE₁₆

A	1	0
B	1	1
C	1	2
D	1	3
E	1	4
F	1	5
G	1	6
H	1	7

$$\begin{aligned}\rightarrow \text{Base } 9 &= 174_{10} \\ &= 2 \times 9^2 + 1 \times 9^1 + 3 \\ &= 213_9\end{aligned}$$

$$\begin{aligned}\rightarrow \text{Base } 18 &= 174_{10} \\ &= 9 \times 18 + 12 \\ &= 9C_{18}\end{aligned}$$

$$\begin{aligned}\text{c. Base } 2 &: 10101 \\ \rightarrow \text{Base } 10 &= 2^4 + 2^2 + 2^0 \\ &= 16 + 4 + 1 \\ \text{result} &= 21_{10}\end{aligned}$$

$$\begin{aligned}\rightarrow \text{Base } 4 &: 10101 \\ &\quad 010101 \\ &\quad 111 \\ \text{result} &: 10101_2 = 111_4\end{aligned}$$

$$\begin{aligned}\rightarrow \text{Base } 16 &= 10101 \\ &\quad 00010101 \\ &\quad 15 \\ \text{result} &: 15_{16}\end{aligned}$$

$$\begin{aligned}\rightarrow \text{Base } 9 &= 21_{10} \\ &= 2 \times 9^1 + 3 \\ \text{result} &= 23_9 \\ \rightarrow \text{Base } 18 &= 21_{10} \\ &= 1 \times 18 + 3 \\ &= 13_{18}\end{aligned}$$

$$\text{d. Base } 18 : A8$$

$$\begin{aligned}\rightarrow \text{Base } 10 &= A8_{10} \\ &= 10 \times 18 + 8 \\ \text{result} &= 188_{10}\end{aligned}$$

$$\begin{aligned}\rightarrow \text{Base } 2 &= 188_{10} \\ &= 2^7 + 2^6 + 2^4 + 2^3 + 2^2 \\ &= 128 + 64 + 16 + 8 + 4\end{aligned}$$

$$\begin{aligned}\text{result} &= 10111100_2 \\ \rightarrow \text{Base } 4 &= 10111100_2 \\ &\quad 10111100 \\ &\quad 2330\end{aligned}$$

$$\text{result} = 2330_4 = A8_{18}$$

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$$\begin{aligned}\rightarrow \text{Base } 9 &= 2 \times 9^2 + 2 \times 9^1 + 8 \\ &= 228_9\end{aligned}$$

$$\begin{aligned}\rightarrow \text{Base } 16 &= 10111100 \\ &= B9_{16}\end{aligned}$$

$$\text{e. Base } 9 = 81$$

$$\begin{aligned}\rightarrow \text{Base } 10 &= 8 \times 9 + 1 \\ \text{result} &= 73_{10}\end{aligned}$$

$$\begin{aligned}\rightarrow \text{Base } 18 &= 73_{10} \\ &= 4 \times 18 + 1 \\ &= 41_{18}\end{aligned}$$

$$\begin{aligned}\rightarrow \text{Base } 2 &= 73 : 2 = 36 \text{ rem } 1 \\ &\quad 36 : 2 = 18 \text{ rem } 0 \\ &\quad 18 : 2 = 9 \text{ rem } 0 \\ &\quad 9 : 2 = 4 \text{ rem } 1 \\ &\quad 4 : 2 = 2 \text{ rem } 0 \\ &\quad 2 : 2 = 1 \text{ rem } 0 \\ &\quad 1 : 2 = 0 \text{ rem } 1\end{aligned}$$

$$\begin{aligned}\text{result} &= 1001001_2 \\ \rightarrow \text{Base } 4 &= 1001001_2 \\ &= 01001001 \\ &= 1021\end{aligned}$$

$$\begin{aligned}\text{result} &: 81_9 = 1021_4 \\ \rightarrow \text{Base } 16 &= 1001001_2 \\ &= 01001001 \\ &\quad 49 \\ \text{result} &= 81_9 = 49_{16}\end{aligned}$$

$$\text{f. Base } 4 = 32_4$$

$$\begin{aligned}\rightarrow \text{Base } 2 &= 32_4 \\ &= 32 \\ &= 1110\end{aligned}$$

$$\text{result} = 1110_2 = 32_4$$

$$\begin{aligned}\rightarrow \text{Base } 10 &= 32_{10} \\ &= 3 \times 4 + 2\end{aligned}$$

$$\begin{aligned}\text{result} &= 14 \\ \rightarrow \text{Base } 16 &= 14_{10} \\ \text{result} &= E_{16}\end{aligned}$$

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$$\begin{aligned} \rightarrow \text{Base } 9 &= 14_{10} \\ &= 1 \times 9^1 + 5 \\ \text{result} &= 15_9 = 32_4 \\ \rightarrow \text{Base } 18 &= 14_{10} \\ &= 18_8 = 32_4 \end{aligned}$$

$$\begin{aligned} 2. a. 1001_2 &= 11_8 \\ 13_4 &= 0111_2 = 7_8 \end{aligned}$$

Carry

$$\begin{array}{r} 1 \\ 11 \\ 7 \\ \hline 20 \end{array} +$$

$$\begin{aligned} b. 2022_{10} \\ 135_8 &= 64 + 24 + 5 \\ &= 93_{10} \end{aligned}$$

Carry

$$\begin{array}{r} 1 \\ 2022 \\ 93 \\ \hline 2115 \end{array} +$$

$$= 2048 + 64 + 2 + 1$$

$$= 10000100001_2$$

$$c. 290822_{16} = 001010010001000000... \\ 1000000100010010000000...$$

Borrow

$$\begin{array}{r} 11111 \\ 100000100010 \\ 10010010 \\ \hline 011110010000 \end{array}$$

result

$$= 001010010000$$

$$011110010000_2 = 2688912_{10}$$

$$d. 6043_8 = 110000100011_2$$

Borrow

$$\begin{array}{r} 111111 \\ 110000100011 \\ 11001 \\ \hline 101111101010_2 \end{array}$$

$$\begin{array}{r} e. 1001 \\ 110 \\ \hline 0000 \end{array} \times$$

$$\begin{array}{r} 1001 \\ 1001 \\ \hline 110110 \end{array} +$$

$$f. 4008 = 4 \times 64 = 256$$

$$010_2 = 2$$

$$256 / 2 = 128_{10}$$

$$\begin{array}{r} g. 87_{16} = 10110111 \\ 302_4 = 110010 \\ 10110111 \\ 10110111 \\ \hline 10110111 \end{array} \times$$

$$\begin{array}{r} 10110111 \\ 100011101111 \\ \hline 100011101111_2 \end{array} +$$

$$h. 11011 = 2^4 + 2^3 + 2^1 + 1 = 16 + 8 + 2 + 1 = 27$$

$$\frac{513}{27} = \frac{171}{9} = \frac{57}{3} = \frac{19}{1} = 19$$

$$= 2^4 + 2 + 1 = 10011_2$$

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3. Code:

0	0	1	0	1	1	1	1	0	1	0	1	0	1	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

parity 8:

parity 4:

parity 2:

parity 1:

Errors: 8 4 2 1 = pos: 7
0 1 1 1

Message: 001011010101010

4. a. 110110₂

MSB 1

XOR 01101 = 10110₁ gray

6011010_{gray}

MSB 0

XOR 10011 = 01001₂