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Soal

1) Konversi bilangan oktal berikut ini ke bilangan decimal, biner dan hexadecimal

a) 243 (8)

Jwb:

1) Decimal

2 4 3

$8^2 \ 8^1 \ 8^0$

$(2 \times 64) + (4 \times 8) + (3 \times 1)$

$= 128 + 32 + 3$

$= 163 (10)$

2) Biner

2 4 3

010 | 100 | 011

$\rightarrow 010100011 (2)$

3) Hexadesimal

2 4 3

010 | 100 | 011

~~010100011~~

~~4~~

~~00010100011~~

$\rightarrow 00010100011 (16)$

$= 10 \ 3$

$= A \ 3$

b) 156 (8)

Jwb:

1) Decimal

1 5 6

$8^2 \ 8^1 \ 8^0$

$(1 \times 64) + (5 \times 8) + (6 \times 1)$

$= 64 + 40 + 6$

$= 110 (10)$

2) Biner

1 5 6

001 | 101 | 110

$2^2 2^1 2^0 \ 2^2 2^1 2^0 \ 2^2 2^1 2^0$

~~001101110~~

$\rightarrow 001101110 (2)$

3) Hexadesimal

1 5 6

001 | 101 | 110

$00001101110 (16)$

$= 6 \ 4$

$= 6 \ E$

2) konversi bilangan desimal berikut ini ke bilangan oktal, biner, dan hexa desimal.

a) 442 (10)

b) 926 (10)

Jwb:

1) a) ~~oktal~~

2	4	2	0
2	2	1	1
2	1	1	0
2	5	5	1
2	2	7	1
2	1	3	1
2	6	0	1
2	3		1

64	4	2
	4	2
		7

a) oktal

8	4	42	2
8		55	7
		6	

= 672 (8)

a) ~~oktal~~

8	4	4	2	58	= 581 (10)
2		2		1	

b) Biner

2	4	4	2	0	= 110111010 (2)
2	2	2	1	1	
2	1	1	0	0	
2	5	5	1		
2	2	7	1		
2	1	3	1		
2	6	0	1		
2	3		1		

c) Heksadesimal

$$\begin{array}{r}
 16 \overline{) 442} \quad 10 = A \uparrow = 1BA_{(16)} \\
 16 \overline{) 27} \quad 11 = B \\
 1
 \end{array}$$

d) a) Oktal

$$\begin{array}{r}
 8 \overline{) 926} \quad 26 \uparrow = 1636_{(8)} \\
 8 \overline{) 115} \quad 3 \\
 8 \overline{) 14} \quad 6 \\
 1
 \end{array}$$

b) Biner

$$\begin{array}{r}
 2 \overline{) 926} \quad 0 = 11001110_{(2)} \\
 2 \overline{) 463} \quad 1 \\
 2 \overline{) 231} \quad 1 \\
 2 \overline{) 115} \quad 1 \\
 2 \overline{) 57} \quad 1 \\
 2 \overline{) 28} \quad 0 \\
 2 \overline{) 14} \quad 0 \\
 2 \overline{) 7} \quad 1 \\
 2 \overline{) 3} \quad 1 \uparrow \\
 1
 \end{array}$$

c) Heksadesimal

$$\begin{array}{r}
 16 \overline{) 926} \quad 14 = E \uparrow = 38E_{(16)} \\
 16 \overline{) 57} \quad 9 \\
 3
 \end{array}$$

3) konversi bilangan biner berikut ini ke bilangan desimal, oktal, dan heksadesimal.

a) ~~100100~~ 1010₍₂₎

b) 111100₍₂₎

c) 1110101₍₂₎

d) 1100101010₍₂₎

Jawab:

a) a) Desimal

$$1010_{(2)} = (1 \times 2^3) + (0 \times 2^2) + (1 \times 2^1) + (0 \times 2^0) \\ = 8 + 0 + 2 + 0 = 10_{(10)}$$

b) Oktal

$$1010_{(2)} = \overbrace{1010}^{12_{(8)}} = 12_{(8)} \quad \overbrace{001010}^{12_{(8)}} = 12_{(8)} \\ \quad \quad \quad 1 \quad 2 \quad \quad \quad 1 \quad 2$$

c) Heksa desimal

$$1010_{(2)} = 1010 \\ \quad \quad \quad 2^3 \quad 2^2 \quad 2^1 \quad 2^0 \\ \quad \quad \quad \underline{8 \quad 4 \quad 2 \quad 1} \\ 8 + 0 + 2 + 0 = 8 + 2 = 10 = A_{(16)}$$

b) a) desimal

$$111100_{(2)} = (1 \times 2^5) + (1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (0 \times 2^0) \\ = 32 + 16 + 8 + 4 + 0 + 0 = 60_{(10)}$$

b) Oktal

$$111100_{(2)} = \overbrace{111100}^{70_{(8)}} = 70_{(8)} \quad \overbrace{0011100}^{74_{(8)}} = 74_{(8)} \\ \quad \quad \quad 1 \quad 7 \quad 0 \quad \quad \quad 0 \quad 7 \quad 4$$

c) Heksadesimal

$$111100_{(2)} = \overbrace{111100}^{32} = 32 \\ \quad \quad \quad \overbrace{2^5 \quad 2^4 \quad 2^3 \quad 2^2 \quad 2^1 \quad 2^0} \\ \quad \quad \quad \underline{32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1} \\ \quad \quad \quad 32 \quad 16 \quad 8 \quad 4 \quad 0 \quad 0$$

c) Heksadesimal

$$111100_{(2)} = \cancel{111100}$$

$$\cancel{2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0} = (1 \times 2^5) +$$

$$\cancel{32 + 16 + 8 + 4 + 0 + 0}$$

$$\cancel{111100}$$

$$\cancel{= (1 \times 2^5) + (1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (0 \times 2^0)}$$

$$\cancel{= 8 + 0 + 2 + 0 = 10 = A}$$

$$\cancel{00111100} = \cancel{3C}$$

$$00111100 = 3C_{(16)}$$

$$\cancel{= (0 \times 2^7) + (1 \times 2^6) + (1 \times 2^5) + (1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (0 \times 2^0)} = (0 \times 2^3) +$$

$$\cancel{(1 \times 2^2) + (1 \times 2^1) + (0 \times 2^0)} = \cancel{8 + 4 + 0 + 0 = 12 = C}$$

$$(0 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (0 \times 2^0) =$$

$$(1 \times 2^2) + (1 \times 2^1) + (0 \times 2^0) = 8 + 4 + 0 + 0$$

$$= 0 + 0 + 2 + 1 = 12 = C$$

$$= 3$$

c) ~~1110101~~

c) a) desimal

$$1110101_{(2)} = (1 \times 2^6) + (1 \times 2^5) + (1 \times 2^4) + (0 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$$

$$= 64 + 32 + 16 + 0 + 4 + 0 + 1 = 117_{(10)}$$

b) Oktal

$$1110101_{(2)} = 001110101 = 165_{(8)}$$

$$165$$

c) Heksadesimal

$$1110101_{(2)} = 01110101 = 75_{(16)}$$

$$75$$

d) a) desimal

$$1100101010_{(2)} = (1 \times 2^9) + (1 \times 2^8) + (0 \times 2^7) + (0 \times 2^6) + (1 \times 2^5) + (0 \times 2^4) +$$

$$(1 \times 2^3) + (0 \times 2^2) + (1 \times 2^1) + (0 \times 2^0)$$

$$= 512 + 256 + 0 + 0 + 32 + 0 + 8 + 0 + 2 + 0$$

$$= 810_{(10)}$$

b) Oktal

 $1100101010_{(2)}$

$$= 001100101010 = 1452_{(8)}$$

1 4 5 2

c) Heksadesimal

 $1100101010_{(2)}$

$$= 001100101010 = 32A_{(16)}$$

3 2 10 = A

4) konversi bilangan heksadesimal berikut ini ke bilangan desimal, oktal, dan biner

a) CFB₍₁₆₎

Jwb:

•) Desimal

C F B₍₁₆₎

$$= 12 \ 15 \ 11$$

$$= (12 \times 16^2) + (15 \times 16^1) + (11 \times 16^0)$$

$$= 3072 + 240 + 11 = 3323_{(10)}$$

•) Oktal

C F B₍₁₆₎

$$= 12 \ 15 \ 11$$

 $11001111011_{(2)}$ $11001111011_{(2)}$ $11001111011_{(2)}$

$$\begin{array}{ccccccc} 110 & 011 & 111 & 011 \\ \downarrow & \downarrow & \downarrow & \downarrow \\ 6 & 3 & 7 & 3 \end{array}$$
(6373)₈

a) Biner

C F B

 $= 12 \ 15 \ 11$

110011111011

110011111011 (2)

b) 8 E

Jwb:

a) Desimal

8 E (16)

 $= 8 \ 14$ $= (8 \times 16^1) + (14 \times 16^0)$ $= 128 + 14 = 142 (10)$

b) Oktal

8 E (16)

 $= 8 \ 14$

10001110

10001110 (2)

10001110 (2)

~~10001110~~

0101001110

2 1 6

216 (8)

c) Biner

8 E

 $= 8 \ 14$ $= 10001110$ $= 10001110 (2)$

d) D 45 (16)

a) Desimal

D 45 (16)

 $= 13 \ 45 = (13 \times 16)$ $= (13 \times 16^1) + (45 \times 16^0)$ $= 208 + 45 = 253 (10)$

b) Oktal

D 45 (16)

 $= 13 \ 45$ $=$

c. D45 (16)

Jwb: a) Desimal

D 4 5 (16)

 $= 13 \ 4 \ 5$

$$= (13 \times 16^2) + (4 \times 16^1) + (5 \times 16^0)$$

$$= 3328 + 64 + 5 = 3397 (10)$$

b) Oktal

D 4 5 (16)

 $= 13 \ 4 \ 5$

1101 | 000 | 0100

110101000101 (2)

110101000101 (2)

110 | 101 | 000 | 1101

6 5 0 5

 $= 6505 (8)$

c) Biner

D 4 5 (16)

 $= 13 \ 4 \ 5$

1101 | 0100 | 0101

110101000101 (2)

d. B6E (16)

Jwb:

a) Desimal

B 6 E (16)

 $= 11 \ 6 \ 14$ $= 11 \ 6 \ 14$

$$= (11 \times 16^2) + (6 \times 16^1) + (14 \times 16^0)$$

$$= 2816 + 96 + 14 = 2926 (10)$$

b) Oktal

B 6 E

 $= 11 \ 6 \ 14$ $= 11 \ 6 \ 14$

$$= 1011 | 0110 | 1110$$

$$= 101101101110 (2)$$

~~101101101110 (2)~~

(Sambungan ~~bagian~~ Oktal bagian D...)

$$= 1011\ 0110\ 1110\ (2) = 1011\ 101\ 101\ 1110 = 5556\ (8)$$

$$\cancel{= 1011\ 101\ 101\ 1110} \quad 5\ 5\ 5\ 6$$

o) Biner

B 6 E

$$= 11\ 6\ 14$$

$$= 1011\ 0110\ 1110$$

$$= 1011\ 0110\ 1110\ (2)$$

$$E. 1\ B\ 6\ (16)$$

Jwb:

o) Desimal

1 B 6

$$= 1\ 11\ 6$$

$$= \cancel{0001\ 1011\ 0110}$$

$$= \cancel{0001\ 1011\ 0110\ (2)}$$

o) Desimal

1 B 6 (16)

$$= 1\ 11\ 6$$

$$= (1 \times 16^2) + (11 \times 16^1) + (6 \times 16^0)$$

$$= 256 + 176 + 6 = 438\ (10)$$

o) Oktal

1 B 6 (16)

$$= 1\ 11\ 6$$

$$= 0001\ 1011\ 0110$$

$$= 0001\ 1011\ 0110\ (2)$$

$$0001\ 1011\ 0110\ (2)$$

$$= 0001\ 10\ 110\ 110 = 666\ (8)$$

$$0\ 6\ 6\ 6$$

o) Biner

1 B 6 (16)

$$= 1\ 11\ 6$$

$$= 0001\ 1011\ 0110$$

$$= 0001\ 1011\ 0110\ (2)$$

$$F. E\ 9\ 7\ (16)$$

Jwb:

o) Desimal

E 9 7 (16)

$$= 14\ 9\ 7$$

$$= (14 \times 16^2) + (9 \times 16^1) + (7 \times 16^0)$$

$$= 3584 + 144 + 7 = 3735\ (10)$$

$$= 3735\ (10)$$

b) Oktal

E 9 7 (16)

 $= 14 \ 9 \ 7$ $= 1110 \mid 1001 \mid 0111$ $= 1110 \ 1001 \ 0111 \ (2)$ ~~$1110 \ 1001 \ 0111$~~ $= 1110 \ 1001 \ 0111 \ (2)$ $= 111 \mid 010 \mid 010 \mid 111$ $7 \ 2 \ 2 \ 7 = 7227 \ (8)$

c) Biner

E 9 7 (16)

 $= 14 \ 9 \ 7$ $= 1110 \mid 1001 \mid 0111$ $= 1110 \ 1001 \ 0111 \ (2)$

5. Lakukan Operasi aritmatika Pada biner berikut:

a. $1010101010 \ (2) + 1010101 \ (2)$ ~~Jwb:~~~~Data A = 1010101010 Data A = 1010101010~~~~Data B = 1010101 Data B = 1010101~~~~Data A = 1010101010 =~~~~Data B = 1010101 =~~

Jwb:

~~Data A = 1010101010 = 682~~~~Data B = 1010101 = 67 +~~ ~~$1011111111 = 852$~~

Data A = 1010101010 = 682

Data B = 1010101 = 67 +

 $1011111111 = 749$

$$b) 100111_2 - 0110_2$$

Jwb:

~~$$\begin{array}{r}
 100111 \\
 - 0110 \\
 \hline
 000000 \\
 100111 \\
 - 100111 \\
 \hline
 000000 \\
 0111101010
 \end{array}$$~~

$$\begin{array}{r}
 100111 = 39 \\
 - 0110 = 6 \\
 \hline
 100001 = 33
 \end{array}$$

$$c) 1101_2 \times 0100$$

Jwb:

$$\begin{array}{r}
 1101 \\
 \times 0100 \\
 \hline
 0000 \\
 0000 \\
 1101 \\
 \hline
 0000 \\
 0110100
 \end{array}$$

$$d) 11001101_2 : 101_2$$

Jwb:

~~$$\begin{array}{r}
 1111 \\
 101 \overline{) 11001101} \\
 \underline{101} \\
 110 \\
 \underline{101} \\
 111 \\
 \underline{101} \\
 101 \\
 \underline{101} \\
 0000
 \end{array}$$~~

~~$$\begin{array}{r}
 101 \overline{) 11001101} = 1111 \\
 \underline{100} \\
 110 \\
 \underline{101} \\
 111 \\
 \underline{101} \\
 10
 \end{array}$$~~

$$d) 11001101_{(2)} : 101_{(2)}$$

Jwb:

$$101 \overline{) 1100110} = 11$$

$$\underline{101}$$

$$\underline{100}$$

$$\underline{101}$$

$$\underline{110}$$

$$101 \overline{) 1100110} = 1110$$

$$\underline{101}$$

$$\underline{110}$$

$$\underline{101}$$

$$\underline{110}$$

$$\underline{101}$$

$$\underline{101}$$

$$\underline{101}$$

$$\underline{0}$$

$$\underline{0}$$

$$d) 11001101_{(2)} : 101_{(2)}$$

Jwb:

$$11001101_{(2)} : 101$$

$$= 128 + 64 + 0 + 0 + 8 + 4 + 0 + 1 : 4 + 0 + 1$$

$$= 205$$

$$: 5 = 41 = 101001$$