Ayşe Hale Ardıç
14.11.2023

TABAN ARİTMATİĞİ

1)

a) $(2076)_8$ $\overset{3\ 2\ 1\ 0}{}$

$= 2.8^3 + 0 + 7.8^1 + 6.8^0$

$= 2.6561 + 0 + 27 + 6$

$= 13122 + 0 + 27$

$= 13149$

$3^4 = 81$ $\quad 81 \times 81 = 6561$

b) $(430)_5$ $\overset{2\ 1\ 0}{}$

$= 4.5^2 + 3.5^1 + 0$

$= 4.25 + 15$

$= 100 + 15$

$= 115$

c) $(1010111)_2$ $\overset{6\ 5\ 4\ 3\ 2\ 1\ 0}{}$ $= 1.2^6 + 0 + 1.2^4 + 0 + 1.2^2 + 1.2^1 + 1.2^0$

$= 64 + 0 + 16 + 0 + 4 + 2 + 1$

$= 87$

d) $(2AB)_{16}$ $\overset{2\ 1\ 0}{}$ $= 2.16^2 + A.16^1 + B.16^0$

$= 2.256 + 15.16 + 14.1$

$= 512 + 240 + 14$

$= 766$

$16 \times 16 = 256$ $\quad 16 \times 15 = 240$

e) $(2170)_{10} = (?)_2$

2170	2	1085	2	542	2	271	2	135	2	67	2
017		08		14		07		15		07	
16		05		14		06		14		06	
10		04		02		11		13		13	
10		1		0		1		1		1	
0											

33	2	16	2	8	2
13		16		0	
12		0			
1					

$(2170)_{10} = (10000111101)_2$

f) $(520)_6$ $\overset{2\ 1\ 0}{}$ $= 5.6^2 + 2.6^1 + 0$

$= 180 + 12$

$= 192$

192	7	27	7
14		21	3
52			
49			
3		6	

$(520)_6 = (363)_7$

36 × 5 = 180

$64 \times 4 = 256$ $\quad 64 \times 8 = 512$

g) $(1443)_8 = 1.8^3 + 4.8^2 + 4.8^1 + 3.8^0$

$= 512 + 256 + 32 + 3$

$= 803$

803 | 14 — 70 | 57 — 103 | 56 — 98 | 4 — 5 | 1

$(1443)_8 = (803)_{10} = (415)_{16}$

2)

a) $(332,123)_4 = 3.4^2 + 3.4^1 + 2.4^0 + 1.\frac{1}{4} + 2.\frac{1}{16} + 3.\frac{1}{64}$

$= 48 + 12 + 2 + \frac{1}{4} + \frac{1}{8} + \frac{3}{64}$ $\quad (16) \quad (8) \quad (1)$

$= 62 + \frac{27}{64}$

$= \frac{3995}{64}$

$= (62,421875)_{10}$

b) $(423,12)_5 = 4.5^2 + 2.5^1 + 3.5^0 + \frac{1}{5} + \frac{2}{25}$

$= 113 + \frac{7}{25}$

$= \frac{2832}{25}$

$= (113,28)_{10}$

c) $(13,25)_{10} = (\ )_2$

13 | 2 — 12 | 6 | 2 — 1 | 3 | 2 — 0 | 1

$0,25.2 = 0,5$

$0,5.2 = 1$

$1.2 = 2$

$(301,01)_2$

d) $(419,12109375)_{10} = (?)_{16}$

419 | 16 — 32 | 26 | 16 — 99 | 16 — 96 | 1 — 3 | 10

$0,12109375.16 = 1,9376$

$0,9376.16 = 15,0016$

$0,0016.16 = 0,0256$

$0,0256.16 = 0,4096$

$0,4096.16 = 6,5536$

$0,5536.16 = 8,8576$

$0,8576.16 = 13,7216$

$(1103,1150068\,13)_{16}$

e) $(451,203125)_{10} = (?)_8$

$451 \mid 8$
$40 \mid 56 \mid 8$
$51 \; 56 \mid 7$
$-48 \; 0$
3

$0,203125 \cdot 8 = 1,625$
$0,625 \cdot 8 = 5$

$(703,15)_8$

f) $(21,102)_3 = (?)_5$

$= 1.3^1 + 1.3^0 + 1.\frac{1}{3} + 0 + 2.\frac{1}{27}$

$= 3 + 1 + \frac{1}{3} + \frac{2}{27}$

$= \left(\frac{92}{27}\right)_{10}$

$= (3,407)_{10}$

$0,407 \cdot 5 = 2,035$
$0,035 \cdot 5 = 0,175$
$0,175 \cdot 5 = 0,875$
$0,875 \cdot 5 = 4,375$
$0,375 \cdot 5 = 1,875$

$(3,20041)_5$

g) $(1101,11)_2 = (?)_3 =$

$= 1.2^3 + 1.2^2 + 0 + 1.2^0 + 1.\frac{1}{2} + 1\frac{1}{4}$

$= 8 + 4 + 1 + \frac{3}{4}$

$= \frac{55}{4}$

$= (13,75)_{10}$

$13 \mid 3$
$9 \; 3 \mid 3$
$4 \; 3 \mid 1$
1

$0,75 \cdot 3 = 2,25$
$0,25 \cdot 3 = 0,75$
$0,75 \cdot 3 = 2,25$

$(104,20)_3$

h) $(57,42)_8 = (?)_2$

$= 5.8^1 + 7.8^0 + \frac{4}{8} + \frac{2}{64}$

$= 40 + 7 + \frac{36}{64} \; \frac{17}{32}$

$= \frac{1361}{32}$

$= (42,53125)_{10}$

42 | 2
4 | 21 | 2
02 | 2 | 10
0 | 1

0,53125 . 2 = 1,0625
0,0625 . 2 = 0,125
0,125 . 2 = 0,25
0,25 . 2 = 0,5
0,5 . 2 = 1

$(101,10001)_2$

i) $(1223,22)_4 = (?)_6$

$= 1.4^3 + 2.4^2 + 2.4^1 + 3.4^0 + \frac{1}{4} + \frac{1}{16}$

$= 64 + 32 + 8 + 3 + \frac{5}{16}$

$= 107 + \frac{5}{16}$

$= \frac{1717}{16} = (107,3125)_{10}$

107 | 6
1 | 17 | 6
47 | 12 | 2
42 | 5
5

0,3125 . 6 = 1,875
0,875 . 6 = 5,25
0,25 . 6 = 1,5
0,5 . 6 = 3

$(225,151)_6$

3) $(247)_m = (97)_{10}$ ise $m = ?$

$4 < m$

$2 \cdot m^2 + 4 \cdot m + 1 \cdot m^0 = 97$

$2m^2 + 4m + 1 = 97$

$2m^2 + 4m = 96$

$m = 6$

4) $(203)_a = (110101)_2$ ise $a = ?$

$(110101)_2 = 1 \cdot 2^5 + 1 \cdot 2^4 + 0 + 1 \cdot 2^2 + 0 + 1$

$= 32 + 16 + 4 + 1$

$= (53)_{10} = (203)_a$

$2 \cdot a^2 + 3 = 53$

$2 \cdot a^2 = 50$

$a = 5$

5) $(13)_a \cdot (15)_a = (231)_a$ ise a kaçtır?

$a = 2$

15 × 13 = 01, 23 → 231

15 | 2 → 14 | 7 → 1

10 | 2 → 10 | 5 → 0

5 | 3 → 4 | 1 → 1 elde

6) $(321)_m \cdot (3)_m = (2013)_m$ ise m kaçtır?

$m = 5$

$m > 3$

321 × 3 → 2013

6 | 5 → 5 | 1

10 | 5 → 10 | 2

$(23,31)_6$

7) $(431)_n \cdot (4)_n = (2354)_n$ ise n kaçtır?

$$\begin{array}{r} 431 \\ \times \quad 4 \\ \hline 54 \end{array}$$

$\begin{array}{r|l} 12 & 7 \\ \hline 7 & 1 \text{ elde} \\ \hline 5 & \end{array}$ $\begin{array}{r|l} 17 & 7 \\ \hline 14 & 2 \text{ elde} \\ \hline 3 & \end{array}$ $n=7$

2354

8) $\underset{5^2 5^1 5^0}{124} + \underset{5^2 5^1 5^0}{103} = \underset{7^2 7^1 7^0}{abc}$

$25+10+4+25+3 = 49a+7b+c$

$67 = 49a+7b+c$

$9 = 7a+b$

$c=3$
$b=2$
$a=1$
(6)

9) $\underset{4^3 4^2 4^1 4^0}{30a2} = \underset{8^2 8^1 8^0}{31b}$

$1324+4a = 134+8+b$

$4a-b = 8$

$a=3$
$b=4$
(7)

10) $\underset{8^2 8^1 8^0}{12x} = \underset{x^1 x^0}{34}$

$64+16+x = 3x+4$

$2x = 76$

$x=38$