

ICT Assignment

Number Conversion

Q1. Binary to Decimal

a) 10101

1	0	1	0	1
16	8	4	2	1

$$16 + 4 + 1$$

$$= (21)_{10}$$

b) 10101010101010

1	0	1	0	1	0	1	0	1	0	1	0
2048	1024	512	256	128	64	32	16	8	4	2	1

$$2048 + 512 + 128 + 32 + 8 + 2$$

$$= (2730)_{10}$$

c) 1101000111101

1	1	0	1	0	0	0	1	1	1	1	0	1
4096	2048	1024	512	256	128	64	32	16	8	4	2	1

$$4096 + 2048 + 512 + 32 + 16 + 8 + 4 + 1$$

$$= (6717)_{10}$$

d) 10101111

1	0	1	0	1	1	1	1
256	128	64	32	16	8	4	2

$$256 + 64 + 16 + 8 + 4 + 2 + 1$$

$$= (351)_{10}$$

e) 10010110

1	0	0	1	0	1	1	0
128	64	32	16	8	4	2	1

$$128 + 64 + 4 + 2$$

$$= (150)_{10}$$

Q2. Decimal to Binary

a) 58

2	58	
2	29 - 0	
2	14 - 1	
2	7 - 0	= (111010) ₂
2	3 - 1	
2	1 - 1	
	0 - 1	

b) 2023

2	2023		2	2023
2	674 - 1	2	1011 - 1	
2	337 - 0	2	505 - 1	
2	168 - 0	2	252 - 1	
2	84 - 0	2	126 - 0	
2	42 - 0	2	63 - 0	
2	21 - 0	2	31 - 1	
2	10 - 1	2	15 - 1	
2	5 - 0	2	7 - 1	
2	2 - 1	2	3 - 1	
2	1 - 0	2	1 - 1	
2	0 - 1	2	0 - 1	

(11111100111)₂

Q2 c) 5696

2	5696
2	2848 - 0
2	1424 - 0
2	712 - 0
2	356 - 0
2	178 - 0
2	89 - 0
2	44 - 1
2	22 - 0
2	11 - 0
2	5 - 1
2	2 - 1
2	1 - 0
2	0 - 1

d) 2688

2	2688
2	1344 - 0
2	672 - 0
2	336 - 0
2	168 - 0
2	84 - 0
2	42 - 0
2	21 - 0
2	10 - 1
2	5 - 0
2	2 - 1
2	1 - 0
	0 - 1

Q2 e) 1652

2	1652
2	826 - 0
2	413 - 0
2	206 - 1
2	103 - 0
2	51 - 1
2	25 - 1
2	12 - 1
2	6 - 0
2	3 - 0
2	1 - 1
	0 - 1

Q2 c) 2313

2	2313
2	1156 - 1
2	578 - 0
2	289 - 0
2	144 - 1
2	72 - 0
2	36 - 0
2	18 - 0
2	9 - 0
2	4 - 1
2	2 - 0
2	1 - 0
	0 - 1

Q2 a) $3 \cdot 578$

$$\begin{array}{r} 3 \\ \times 2 \\ \hline 1 - 1 \end{array} \quad \cdot 578 \times 2 = 1 \cdot 156 - 1$$

$$\begin{array}{r} 1 - 1 \\ \times 2 \\ \hline 0 - 1 \end{array} \quad \cdot 156 \times 2 = 0 \cdot 312 - 0$$

$$\begin{array}{r} 0 - 1 \\ \times 2 \\ \hline \end{array} \quad \cdot 312 \times 2 = 0 \cdot 624 - 0$$

$$\begin{array}{r} \cdot 624 \times 2 = 1 \cdot 248 - 1 \end{array}$$

$$\begin{array}{r} \cdot 248 \times 2 = 0 \cdot 496 - 0 \end{array}$$

$$\begin{array}{r} \cdot 496 \times 2 = 0 \cdot 992 - 0 \end{array}$$

$$\begin{array}{r} \cdot 992 \times 2 = 1 \cdot 984 - 1 \end{array}$$

$$\begin{array}{r} \cdot 984 \times 2 = 1 \cdot 968 - 1 \end{array}$$

$$\begin{array}{r} \cdot 968 \times 2 = 1 \cdot 936 - 1 \end{array}$$

$$\begin{array}{r} (1) \cdot 936 \times 2 = 1 \cdot 872 - 1 \end{array}$$

$$\begin{array}{r} \cdot 872 \times 2 = 1 \cdot 744 - 1 \end{array}$$

$$\begin{array}{r} \cdot 744 \times 2 = 1 \cdot 488 - 1 \end{array}$$

$$\begin{array}{r} \cdot 488 \times 2 = 0 \cdot 976 - 0 \end{array}$$

$$\begin{array}{r} \cdot 976 \times 2 = 1 \cdot 952 - 1 \end{array}$$

$$\begin{array}{r} \cdot 952 \times 2 = 1 \cdot 904 - 1 \end{array}$$

$$\begin{array}{r} \cdot 904 \times 2 = 1 \cdot 808 - 1 \end{array}$$

$$\begin{array}{r} \cdot 808 \times 2 = 1 \cdot 616 - 1 \end{array}$$

$$\begin{array}{r} \cdot 616 \times 2 = 1 \cdot 232 - 1 \end{array}$$

$$\begin{array}{r} \cdot 232 \times 2 = 0 \cdot 464 - 0 \end{array}$$

$$\begin{array}{r} \cdot 464 \times 2 = 0 \cdot 928 - 0 \end{array}$$

$$\begin{array}{r} \cdot 928 \times 2 = 1 \cdot 856 - 1 \end{array}$$

$$\begin{array}{r} \cdot 856 + 1 \end{array}$$

longest

$$= (11 \cdot 10010011111011111001)_2$$

Q2 e) 123.75_0

$$\begin{array}{r}
 & | \\
 2 & 123 \\
 & 61 - 1 \quad 0.75 \times 2 = 1.5 \quad - 1 \\
 & 30 - 1 \quad 1.5 \times 2 = 1.0 \quad - 1 \\
 & 15 - 0 \\
 & 7 - 1 \\
 & 3 - 1 \\
 & 1 - 1 \\
 & 0 - 1
 \end{array}$$

$$= (1111011.11)_2$$

Q3 Octal to Decimal

$$\begin{aligned}
 a) \quad & 743 \\
 & 7 \times 8^2 + 4 \times 8^1 + 3 \times 8^0 \\
 & (7 \times 64) + (4 \times 8) + (3 \times 1) \\
 & 448 + 32 + 3 \\
 & = (483)_{10}
 \end{aligned}$$

$$\begin{aligned}
 b) \quad & 365 \\
 & 3 \times 8^2 + 6 \times 8^1 + 5 \times 8^0 \\
 & (3 \times 64) + (6 \times 8) + (5 \times 1) \\
 & 192 + 48 + 5 \\
 & = (245)_{10}
 \end{aligned}$$

Q3 c) 3777

$$\begin{aligned}
 & 3 \times 8^3 + 7 \times 8^2 + 7 \times 8^1 + 7 \times 8^0 \\
 & (3 \times 512) + (7 \times 64) + (7 \times 8) + (7 \times 1) \\
 & 1536 + 448 + 56 + 1 \\
 & = (2047)_{10}
 \end{aligned}$$

d) 257

$$\begin{aligned}
 & 2 \times 8^2 + 5 \times 8^1 + 7 \times 8^0 \\
 & (2 \times 64) + (5 \times 8) + (7 \times 1) \\
 & 128 + 40 + 7 \\
 & = (175)_{10}
 \end{aligned}$$

e) 1204

$$\begin{aligned}
 & 1 \times 8^3 + 2 \times 8^2 + 0 \times 8^1 + 4 \times 8^0 \\
 & (1 \times 512) + (2 \times 64) + (0 \times 8) + (4 \times 1) \\
 & 512 + 128 + 0 + 4 \\
 & = (644)_{10}
 \end{aligned}$$

Q4. Decimal to Octal

a) 59

$$\begin{array}{r|l}
 8 & 59 \\
 8 & 7 - 3 \\
 8 & 0 - 7
 \end{array}
 = (73)_8$$

b) 375

$$\begin{array}{r|l}
 8 & 375 \\
 8 & 46 - 7 \\
 8 & 5 - 6 \\
 8 & 0 - 5
 \end{array}
 = (567)_8$$

Q4 c) 65536

$$\begin{array}{r}
 8 | 65536 \\
 8 | 8192 - 0 \\
 8 | 1024 - 0 \\
 8 | 128 - 0 = (200000)_8 \\
 8 | 16 - 0 \\
 8 | 2 - 0 \\
 0 - 2
 \end{array}$$

d) 819

$$\begin{array}{r}
 8 | 819 \\
 8 | 102 - 3 \\
 8 | 12 - 6 = (1463)_8 \\
 8 | 1 - 4 \\
 0 - 1
 \end{array}$$

e) 255

$$\begin{array}{r}
 8 | 255 \\
 8 | 31 - 7 \\
 8 | 3 - 7 = (377)_8 \\
 0 - 3
 \end{array}$$

Hexa to Decimal

Q5 a) 92

$$9 \times 16^1 + 2 \times 16^0$$

$$(9 \times 16) + (2 \times 1)$$

$$144 + 2$$

$$= (146)_{10}$$

b) FF

$$15 \times 16^1 + 15 \times 16^0$$

$$(15 \times 16) + (15 \times 1)$$

$$240 + 15$$

$$= (255)_{10}$$

c) 2C1

$$2 \times 16^2 + 12 \times 16^1 + 1 \times 16^0$$

$$(2 \times 256) + (12 \times 16) + (1 \times 1)$$

$$512 + 192 + 1$$

$$= (705)_{10}$$

d) 37FD

$$3 \times 16^3 + 7 \times 16^2 + 15 \times 16^1 + 13 \times 16^0$$

$$(3 \times 4096) + (7 \times 256) + (15 \times 16) + (13 \times 1)$$

$$12288 + 1792 + 240 + 13$$

$$= (14333)_{10}$$

e) 1B9

$$1 \times 16^2 + 11 \times 16^1 + 9 \times 16^0$$

$$(1 \times 256) + (11 \times 16) + (9 \times 1)$$

$$256 + 176 + 9$$

$$= (441)_{10}$$

Q6. Decimal to Hexa

a) 75

16	75
16	4 - 11 - B
	0 - 4

$$= (4B)_{16}$$

b) 314

16	314
16	19 - 10 - A
16	1 - 3

$$= (13A)_{16}$$

c) 4095

16	4095
16	255 - 15 - F
16	15 - 15 - F

$$= (FFF)_{16}$$

Q6 d)

25619

16	25619
16	1601 - 3
16	100 - 1
16	6 - 4
	0 - 6

$$= (6413)_{16}$$

e) 65760

16	65760
16	4110 - 0
16	256 - 14 - E
16	16 - 0
16	1 - 0
	0 - 1

$$= (100E0)_{16}$$