More examples on number conversions

Taken from

Digital Electronics: Principles, Devices and Applications Anil K. Maini
 ISBN: 978-0-470-03214-5

Example 1.3
We will find the binary equivalent of (13.375)10.
Solution
• The integer part = 13

Divisor	Dividend	Remainder
2	13	—
2	6	1
2	3	0
2	1	1
—	0	1

• The binary equivalent of (13)10 is therefore (1101)2
• The fractional part = .375
• 0.375 × 2 = 0.75 with a carry of 0
• 0.75 × 2 = 0.5 with a carry of 1
• 0.5 × 2 = 0 with a carry of 1
• The binary equivalent of (0.375)10
= (.011)2
• Therefore, the binary equivalent of (13.375)10
= (1101.011)2

Example 1.4
*We will find the octal equivalent of (73.75)10_*
Solution
• The integer part = 73

Divisor	Dividend	Remainder
8	73	—
8	9	1
8	1	1
—	0	1

• The octal equivalent of (73)10
= (111)8
• The fractional part = 0.75
• 0.75 × 8 = 0 with a carry of 6
• The octal equivalent of (0.75)10
= (.6)8
• Therefore, the octal equivalent of (73.75)10
= (111.6)8

Example 1.5

*Let us determine the hexadecimal equivalent of (82.25)10_*

Solution

• The integer part = 82

Divisor Dividend Remainder

16 82 —

16 5 2

— 0 5

• The hexadecimal equivalent of (82)10

= (52)16

• The fractional part = 0.25

• 0.25 × 16 = 0 with a carry of 4

• Therefore, the hexadecimal equivalent of (82.25)10

= (52.4)16

Example 1.6

*Let us find the binary equivalent of (374.26)8 and the octal equivalent of (1110100.0100111)2_*

Solution

• The given octal number = (374.26)8

• The binary equivalent = (011 111 100.010 110)2

= (011111100.010110)2

• Any 0s on the extreme left of the integer part and extreme right of the fractional part of the equivalent

binary number should be omitted. Therefore, (011111100.010110)2

= (11111100.01011)2

• The given binary number = (1110100.0100111)2

• (1110100.0100111)2

= (1 110 100.010 011 1)2

= (001 110 100.010 011 100)2

= (164.234)8

Example 1.7

Let us find the binary equivalent of (17E.F6)16 and the hex equivalent of (1011001110.011011101)2.

Solution

• The given hex number = (17E.F6)16

• The binary equivalent = (0001 0111 1110.1111 0110)2

= (000101111110.11110110)2

= (101111110.1111011)2

• The 0s on the extreme left of the integer part and on the extreme right of the fractional part have

been omitted.

• The given binary number = (1011001110.011011101)2

= (10 1100 1110.0110 1110 1)2
• The hex equivalent = (0010 1100 1110.0110 1110 1000)2
= (2CE.6E8)16

Example 1.8
*Let us find the octal equivalent of (2F.C4)16 and the hex equivalent of (762.013)8_*

Solution
• The given hex number = (2F.C4)16.
• The binary equivalent = (0010 1111.1100 0100)2
= (00101111.11000100)2
= (101111.110001)2
= (101 111.110 001)2
= (57.61)8.
• The given octal number = (762.013)8.
• The octal number = (762.013)8
= (111 110 010.000 001 011)2
= (111110010.000001011)2
= (0001 1111 0010.0000 0101 1000)2
= (1F2.058)16.