Exercises Rosen p. 269

Integers repres. and Algo

1 a $(231)_{10}$

$= 230 = 115 \cdot 2 + 1$

$115 = 2 \cdot 57 + 1$

$57 = 2 \cdot 28 + 1$

$28 = 2 \cdot 14 + 0$

$14 = 2 \cdot 7 + 0$

$7 = 2 \cdot 3 + 1$

$3 = 2 \cdot 1 + 1$

$1 = 2 \cdot 0 + 1$

$(1110\ 0111)_2$

b $(4532)_{10}$

$= 2 \cdot 2266 + 0$

$2266 = 2 \cdot 1133 + 0$

$1133 = 2 \cdot 566 + 1$

$566 = 2 \cdot 283 + 0$

$283 = 2 \cdot 141 + 1$

$141 = 2 \cdot 70 + 1$

$70 = 2 \cdot 35 + 0$

$35 = 2 \cdot 17 + 1$

$17 = 2 \cdot 8 + 1$

$8 = 2 \cdot 4 + 0$

$4 = 2 \cdot 2 + 0$

$2 = 2 \cdot 1 + 0$

$1 = 2 \cdot 0 + 1$

$= (1\ 0001\ 1011\ 0100)_2$

(c) 97 644

$= 48\,822 \cdot 2 + 0$

$48\,822 = 24\,411 \cdot 2 + 0$

$24\,411 = 12\,205 \cdot 2 + 1$

$12\,205 = 6\,102 \cdot 2 + 1$

$6\,102 = 3\,051 \cdot 2 + 0$

$3\,051 = 1\,525 \cdot 2 + 1$

$1\,525 = 762 \cdot 2 + 1$

$762 = 381 \cdot 2 + 0$

$381 = 190 \cdot 2 + 1$

$190 = 95 \cdot 2 + 0$

$95 = 47 \cdot 2 + 1$

$47 = 23 \cdot 2 + 1$

$23 = 11 \cdot 2 + 1$

$11 = 5 \cdot 2 + 1$

$5 = 2 \cdot 2 + 1$

$2 = 2 \cdot 1 + 0$

$1 = 2 \cdot 0 + 1$

$(1\,0111\,1101\,0110\,1100)_2$

3) $(1\,1111)_2$

$= 2^4 + 2^3 + 2^2 + 2 + 1$

$= 16 + 8 + 4 + 2 + 1$

$= (31)_{10}$

$(10\,0000\,0001)_2$

$= 2^9 + 1 = (513)_{10}$

$(1\ 0101\ \ 0101)_2$

$= 2^8 + 2^6 + 2^4 + 2^2 + 1$

$= (341)_{10}$

5) $(572)_8 = (1\ 0111\ 1010)_2$

$(5)_8 = (101)_2$
$(7)_8 = (111)_2$
$(2)_8 = (010)_2$

$(1604)_8 = (1\ 1000\ 0100)_2$

$(1)_8 = (001)_2$
$(6)_8 = (110)_2$
$(0)_8 = (000)_2$
$(4)_8 = (100)_2$

$(423)_8 = (100011\ 0011)_2$

$(4)_8 = (100)_2$
$(2)_8 = (010)_2$
$(3)_8 = (011)_2$

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7 $(8OE)_{16} = (1000\ 0000\ 1110)_2$

$(8)_{16} = (1000)_2$
$(0)_{16} = (0000)_2$
$(E)_{16} = (1110)_2$

$(13SAB)_{16} = (1\ 0011\ 0101\ 1010\ 1011)_2$

$(1)_{16} = (0001)_2$
$(3)_{16} = (0011)_2$
$(S)_{16} = (0101)_2$
$(A)_{16} = (1010)_2$
$(B)_{16} = (1011)_2$

$(ABBA)_{16} = (1010\ 1011\ 1011\ 1010)_2$

$(A)_{16} = (1010)_2$
$(B)_{16} = (1011)_2$

9 $(ABCDEF)_{16}$

$= (1010\ 1011\ 1100\ 1101\ 1110\ 1111)_2$

11

$(1011\ 0111\ 1011)_2$

$= (B7B)_{16}$

13 N/A

15 N/A

17 $(7345321)_8$

$= (111\ 011\ 100\ 101\ 011\ 010\ 001)_2$

$(10\ 1011\ 1011)_2$

$= (1273)_8$

19 N/A

21 (a)

$$\begin{array}{r} 100\ 0111 \\ +\ 111\ 0111 \\ \hline 1011\ 1110 \end{array}$$

$$\begin{array}{r} 100\ 0111 \\ \cdot\ 111\ 0111 \\ \hline 100\ 0111 \\ 100\ 0111\ \cdot \\ 100\ 0111\ \cdot\cdot \\ 000\ 0000\ \cdot\cdot\cdot \\ 100\ 0111\ \cdot\cdot\cdot\cdot \\ 100\ 0111\ \cdot\cdot\cdot\cdot\cdot \\ +\ 100\ 0111\ \cdot\cdot\cdot\cdot\cdot\cdot \\ \hline 100\ 0011\ 0000\ 0001 \end{array}$$