37) a) 38_{16}

$3 = 0011_2$ $8 = 1000$

$38_{16} = 00111000_2$

b) 59_{16}

$5 = 0101$ $9 = 1001$

$59_{16} = 01011001_2$

c) $A14_{16}$

$A = 10 = 1010_2$ $1 = 0001_2$

$4 = 0100$

$A14_{16} = 101000010100_2$

d) $5C8_{16}$

$5 = 0101$ $C = 12 = 1100$

$8 = 1000$

$5C8_{16} = 010111001000_2$

e) 4100_{16}

$4 = 0100$ $1 = 0001$

$0 = 0000$ $0 = 0000$

$4100_{16} = 0100000100000000_2$

f) $FB17_{16}$

$F = 15 = 1111$ $B = 11 = 1011$

$1 = 0001$ $7 = 0111$

$FB17_{16} = 1111101100010111_2$

g) $8A9D_{16}$

$8 = 1000$ $A = 10 = 1010_2$

$9 = 1001$ $D = 13 = 1101$

$8A9D_{16} = 1000101010011101_2$

39) a) 23_{16}

$= (2 \cdot 16^1) \cdot (3 \cdot 16^0)$

$= 32 \cdot 3$

$23_{16} = 35_{10}$

b) 92_{16}

$= (9 \cdot 16^1) \cdot (2 \cdot 16^0)$

$= 144 \cdot 2$

$92_{16} = 146_{10}$

c) $1A_{16}$

$= (1 \cdot 16^1) \cdot (10 \cdot 16^0)$

$= 16 \cdot 10$

$1A_{16} = 26_{10}$

d) $8D_{16}$

$= (8 \cdot 16^1) \cdot (13 \cdot 16^0)$

$= 128 \cdot 13$

$8D_{16} = 141_{10}$

e) $F3_{16}$

$= (15 \cdot 16^1) \cdot (3 \cdot 16^0)$

$= 240 \cdot 3$

$F3_{16} = 240_{10}$

f) EB_{16}

$= (14 \cdot 16^1) \cdot (11 \cdot 16^0)$

$= 224 \cdot 11$

$EB_{16} = 235_{10}$

g) $5C2_{16}$

$= (5 \cdot 16^2) \cdot (12 \cdot 16^1) \cdot (2 \cdot 16^0)$

$= 1280 \cdot 192 \cdot 2$

$5C2_{16} = 1474_{10}$

h) 700_{16}

$= (7 \cdot 16^2) \cdot (0 \cdot 16^1) \cdot (0 \cdot 16^0)$

$= 1792 \cdot 0 \cdot 0$

$700_{16} = 1792_{10}$

40) a) 8_{10}

$= 8_{16}$

b) 14_{10}

$= E_{16}$

c) 33_{10}

$\frac{33}{16} = 2.063 \rightarrow 0.063 \times 16 = 1$ LSD

$2/16 = 0 \rightarrow 2 = MSD$

$33_{10} = 21_{16}$

d) 52_{10}

$\frac{52}{16} = 3.25 \rightarrow 0.25 \times 16 = 4$ LSD

$\frac{3}{16} = 0 \rightarrow 3 = MSD$

$52_{10} = 34_{16}$

e) 284_{10}

$\frac{284}{16} = 17.75 \rightarrow 0.75 \times 16 = 12 = C$

$\frac{17}{16} = 1.063 \rightarrow 0.063 \times 16 = 1$

$\frac{1}{16} = 0 \rightarrow 1 = MSB$

$284_{10} = 11C_{16}$

f) 2890_{10}

$\frac{2890}{16} = 180.63 \rightarrow 0.63 \times 16 = 10 = A$

$\frac{180}{16} = 11.25 \rightarrow 0.25 \times 16 = 4$

$\frac{11}{16} = 0 \rightarrow 11 = B = MSB$

$2890_{10} = B4A_{16}$

g) 4019_{10}

$\frac{4019}{16} = 251.188 \rightarrow 0.88 \times 16 = 3$

$\frac{251}{16} = 15.688 \rightarrow 0.688 \times 16 = 11 = B$

$\frac{15}{16} = 0 \rightarrow 15 = F = MSB$

$4019_{10} = FB3_{16}$

h) 6500_{10}

$\frac{6500}{16} = 406.25 \rightarrow 0.25 \times 16 = 4$

$\frac{406}{16} = 25.38 \rightarrow 0.38 \times 16 = 6$

$\frac{25}{16} = 1.56 \rightarrow 0.56 \times 16 = 9$

$6500_{10} = 1964_{16}$

50) a) $0001_2 = 1_{10}$

b) $0110_2 = 6_{10}$

c) $1001_2 = 9_{10}$

d) 00011000_2

$0001_2 = 1_{10}$ $1000_2 = 8_{10}$

$= 18_{10}$

e) 00011001_2

$0001_2 = 1_{10}$ $1001_2 = 9_{10}$

$= 19_{10}$

f) 00110010_2

$0011_2 = 3_{10}$ $0010_2 = 2_{10}$

$= 32_{10}$

g) 01000101_2

$0100_2 = 4_{10}$ $0101_2 = 5_{10}$

$= 45_{10}$

h) 10011000_2

$1001_2 = 9_{10}$ $1000 = 8_{10}$

$= 98_{10}$

i) $100001110 00_2$

$1000_2 = 8_{10}$ $0111_2 = 7_{10}$ $1000_2 = 8_{10}$

$= 878_{10}$

56) Binary to Gray code

a) 11011

$1 \cdot 1 \cdot 0 \cdot 1 \cdot 1$

1 0 1 1 0

b) 1001010

$1 \cdot 0 \cdot 0 \cdot 1 \cdot 0 \cdot 1 \cdot 0$

1 1 0 1 1 1

c) 1111 0 111 0111 0

$1 \cdot 1 \cdot 1 \cdot 1 \cdot 0 \cdot 1 \cdot 1 \cdot 1 \cdot 0 \cdot 1 \cdot 1 \cdot 1 \cdot 0$

1 0 0 0 1 1 0 0 1 1 0 0 1

57) Gray code to binary

a) 1010

1 0 1 0

1 1 0 0

b) 00010

0 0 0 1 0

0 0 0 1 1

c) 1100001 0001

1 1 0 0 0 0 1 0 0 0 1

1 0 0 0 0 0 1 1 1 1 0

60) Decimal Gray Code

63) Determine which parity codes
are in error

a) 1 00110010

Parity bit is 1 so the remainder
of the code should have odd
number of 1s. It does, no error

b) 01101010

Parity bit is 0 so the remainder
of the code should have even
number of 1s. It does not.
this code has an error.

c) 10111110 1000101 0

Parity bit is 1 so the remainder
of the code should have an
odd number of 1s. It does
so there is no error

B has an error