Chris Hunt HW1 ENGR271

1) Convert the Following unsigned binary numbers to decimal.

a) $1010_2 \rightarrow 1(2^3) + 1(2^1) = \boxed{10_{10}}$

b) $1000\ 0110_2 \rightarrow 1(2^7) + 1(2^2) + 1(2^1) = \boxed{134_{10}}$

c) $1011\ 1101_2 \rightarrow 1(2^7) + 1(2^5) + 1(2^4) + 1(2^3) + 1(2^2) + 1(2^0) = \boxed{189_{10}}$

d) $1111\ 1000\ 1000\ 0010_2 \rightarrow 1(2^{15}) + 1(2^{14}) + 1(2^{13}) + 1(2^{12}) + 1(2^{11}) + 1(2^7) + 1(2^1)$

$= \boxed{63618_{10}}$

2) Convert the Following hexadecimal numbers to decimal

a) $F56B_{16} \rightarrow 15(16^3) + 5(16^2) + 6(16^1) + 11(16^0) = \boxed{62827_{10}}$

b) $ABC_{16} \rightarrow 10(16^2) + 11(16^1) + 12(16^0) = \boxed{2748_{10}}$

c) $DAD_{16} \rightarrow 13(16^2) + 10(16^1) + 13(16^0) = \boxed{3501_{10}}$

d) $FEED_{16} \rightarrow 15(16^3) + 14(16^2) + 14(16^1) + 13(16^0) = \boxed{65261_{10}}$

3) Convert the decimal numbers to binary using method 1

a) $59_{10} \geq 32 = 2^5$
$27 \geq 16 = 2^4$
$11 \geq 8 = 2^3$
$3 < 4 = 2^2$
$3 \geq 2 = 2^1$
$1 \geq 1 = 2^0$

$59 - 32 = 27$
$27 - 16 = 11$
$11 - 8 = 3$
$3 - 2 = 1$
$1 - 1 = 0$

2^5 1
2^4 1
2^3 1
2^2 0
2^1 1
2^0 1

$\rightarrow \boxed{111011_2}$

b) $73_{10} \geq 64 = 2^6$
$9 < 32$
$9 < 16$
$9 \geq 8 = 2^3$
$1 < 4$
$1 < 2$
$1 \geq 1 = 2^0$

$73 - 64 = 9$
$9 - 8 = 1$

2^6 1
2^5 0
2^4 0
2^3 1
2^2 0
2^1 0
2^0 1

$\rightarrow \boxed{1001001_2}$

c) $135_{10} \geq 128 = 2^7$
$7 < 64$
$7 < 32$
$7 < 16$
$7 < 8$
$7 \geq 4$
$3 \geq 2$
$1 \geq 1$

$135 - 128 = 7$
$7 - 4 = 3$
$3 - 2 = 1$
$1 - 1 = 0$

2^7 1
2^6 0
2^5 0
2^4 0
2^3 0
2^2 1
2^1 1
2^0 1

$\rightarrow \boxed{10000111_2}$

Chris Hunt HW1 ENGR 271

4) Convert the Following binary numbers to decimal using method 2.

a) $36_{10}/2 = 18$
$18/2 = 9$
$9/2 = 4$
$4/2 = 2$
$2/2 = 1$
$1/2 = 0$

no remainder 0
no remainder 0
remainder 1 1
no remainder 0
no remainder 0
remainder 1 1

$\rightarrow \boxed{100100_2}$

b) $78_{10}/2 = 39$
$39/2 = 19$
$19/2 = 9$
$9/2 = 4$
$4/2 = 2$
$2/2 = 1$
$1/2 = 0$

no remainder 0
remainder 1 1
remainder 1 1
remainder 1 1
no remainder 0
no remainder 0
remander 1 1

$\rightarrow \boxed{1001110_2}$

c) $299_{10}/2 = 149$
$149/2 = 74$
$74/2 = 37$
$37/2 = 18$
$18/2 = 9$
$9/2 = 4$
$4/2 = 2$
$2/2 = 1$
$1/2 = 0$

remainder 1 1
remainder 1 1
no remainder 0
remainder 1 1
no remainder 0 $\rightarrow \boxed{100101011_2}$
remainder 1 1
no remainder 0
no remainder 0
remainder 1 1

5. Convert the Following binary numbers to hexadecimal.

a) $1010\ 0011_2$
A 3
$\rightarrow \boxed{A3_{16}}$

b) $1100\ 0010\ 1001_2$
C 2 9
$\rightarrow \boxed{C29_{16}}$

c) $0101\ 0011\ 0001_2$
5 3 1
$\rightarrow \boxed{531_{16}}$

d) $1001\ 0010\ 1000\ 0101_2$
9 2 8 5
$\rightarrow \boxed{9285_{16}}$

6. Convert the Following hexadecimal numbers to binary

a) $C521_{16} \rightarrow \boxed{1100\ 0101\ 0010\ 0001_2}$

b) $76BA_{16} \rightarrow \boxed{0111\ 0110\ 1011\ 1010_2}$

c) $1FE5_{16} \rightarrow \boxed{0001\ 1111\ 1110\ 1010_2}$

d) $ECE271_{16} \rightarrow \boxed{1110\ 1100\ 1110\ 0010\ 0111\ 0001_2}$

Chris Hunt

HW1

EMGR 271

7) Convert the following decimal numbers to hexadecimal. method 1

a) $413_{10} \geq 256$
$157 \geq 16$
$13 \geq 1$

$413 - 256 = 157$
$157 - (16 \cdot 9) = 13$
$13 - (13 \cdot 1) = 0$

16^2 1
16^1 9
16^0 D
→ $19D_{16}$

b) $633_{10} \geq 256$
$121 \geq 16$
$9 \geq 1$

$633 - (2 \cdot 256) = 121$
$121 - (7 \cdot 16) = 9$
$9 - (9 \cdot 1) = 0$

16^2 2
16^1 7
16^0 9
→ 279_{16}

c) $2233_{10} \geq 256$
$185 \geq 16$
$9 \geq 1$

$2233 - (8 \cdot 256) = 185$
$185 - (11 \cdot 16) = 9$
$9 - (9 \cdot 1) = 0$

16^2 8
16^1 B
16^0 9
→ $8B9_{16}$

8) Convert the Following decimal numbers to hexadecimal. Method 2

a) $104_{10}/16 = 6$ remainder of 8
$6/16 = 0$ remainder of 6

8
6
→ 68_{16}

b) $593_{10}/16 = 37$ remainder of 1
$37/16 = 2$ remainder of 5
$2/16 = 0$ remainder of 2

1
5
2
→ 251_{16}

c) $3049_{10}/16 = 190$ remainder of 9
$190/16 = 11$ remainder of 14
$11/16 = 0$ remainder of 11

9
E
B
→ $BE9_{16}$