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Subject : Digital Logic Design

Assignment : 02

Q: Add & multiply the following number without converting them to decimal.

a) Binary number 1011 & 101.

Addition in Binary

$$\begin{array}{r} 1011 \text{ —— } 11 \\ +\ 0101 \text{ —— } 5 \\ \hline 1110 = 15 \end{array}$$

So $1011 + 101 = 1110$

Multiplication in Binary

$$\begin{array}{r} 1011 \quad (11 \text{ in decimal}) \\ 0101 \\ \hline 1011 \quad (1011 \times 1) \\ \quad\quad 1 \\ \hline 100000 \\ 101100 \end{array}$$

So $1011 \times 101 = 11111$ Binary

* Hexadecimal Number : 2E & 34.

Addition in Hexadecimal.

$$\begin{array}{r} 2E \\ +\ 34 \\ \hline 62 \end{array}$$

$\therefore$ $2E = 2 \times 16 + 14 = 46$ (dec)

$\therefore$ $34 = 3 \times 16 + 4 = 52$ (dec)

Multiplication in Hexadecimal

& 46+52 = 98(dec)
98(dec) = b2(hex)

$$\begin{array}{r} 2\ E \\ \times\ 3\ 4 \\ \hline 9\ 5\ 8 \end{array}$$

So 2E x 34 = 958 (hex).

Q1.18: Perform subtraction on the given unsigned binary number using the 2's complement of the subtracted. Where the result should be negative, find the 2's complement & affix a minus sign.

b) 100010 - 10010

100010

subtracted = 100110

1st Complement of 10010 - 011001

Add 1 01101o (2's complement)

Performed Addition

$$\begin{array}{r} 1\,0\,0\,0\,1\,0 \\ +\ 0\,1\,1\,0\,1\,0 \\ \hline 1\,1\,1\,1\,0\,0 \end{array}$$

& no carry out so result is negative.

1st complement of 111100 - 000011

Add 1 - 0001001 (using decimal)

Result - 000100

Q1.21 If the number $(+9742)_{10}$ & $(+641)_{10}$ are in signed magnitude 10 format their sum is $(+(0)383)_{10}$ & required five digit & a sign. Convert the number to signed -10's complement from & find the following sums.

c) $(-9,742) + (+641)$

$$\begin{array}{r} 90258 \\ +\ 00641 \\ \hline 90899 \end{array}$$

(negative sign no carry).

Q1.22: Convert decimal (6514) both BCD & ASCII codes for ASCII & even bit is to appended at the left.

a) Convert 6514 to BCD (Binary Coded decimal)

6 5 1 4

6 - 0110

5 - 0101

1 - 0001

4 - 0100

Thus 6514 in BCD = 0110010100010100.

Convert 6514 to ASCII & Even Parity.

Decimal	Binary (7-bit ASCII)	Even Parity Bit	8 bit ASCII
6	0110110	0	00110110
5	0110101	1	10110101
1	0110001	1	10110001
4	0110100	0	00110100

Q1.23 Respect the unsigned deamal number.

a) Convert 791 & 658 to BCD.

791 — 011110010001

658 — 011001011000.

Perform BCD Addition.

	0111	1001	001
+	0110	0101	1000
	0010	0100	1001

Q: 1.24 formula ——?

a) Weight code (63, 11)

0 — 0000
1 — 0001
2 — 0010
3 — 0011
4 — 0100
5 — 0101
6 — 0110
7 — 0111
8 — 1000
9 — 1001

for example digit 7

$6\times0+3\times1+1\times1+1\times1 = 3+1+1 = 7$ Ans.

b) Weighted code (6421)

6421 stand BCD representation

Q1.33) The state of a 12-bit register is 100010010111. What is its content if it represents.

a) Three decimal digit in BCD.

1000 1001 0111

Binary	Decimal Equivalent
1000	8
1001	9
0111	7

b) Theree decimal digit in the excess-3 codes.

Convert each 4-bits group to decimal.

1000 — 8

1001 — 9

0111 — 7

Subtract 3 from each value.

$8-3=5$

$9-3=6$

$7-3=4$

c) Three decimal digit in 84-2=1 code

Binary	Decimal Equivalent
1000	8
1001	9
0111	7

d) Binary Number.

Convert decimal.

$\Rightarrow 1\times2^{11} + 0\times2^{10} + 0\times2^{9} + 0\times2^{8} + 1\times2^{7} + 0\times2^{6} + 0\times2^{5} + 1\times2^{4} +$

$0 * 2^{3} + 1\times2^{2} + 1\times2^{1} + 1\times2^{0}$

$= 2048 + 128 + 16 + 4 + 2 + 1$

$= 2199.$