100 days of coding.com

1) convert 11111 in to decimal number system.

$(11111)_2$ 1 1 1 1 1

$2^4\ 2^3\ 2^2\ 2^1\ 2^0$

$\Rightarrow 16+8+4+2+1$

$\Rightarrow 31$ // $\Rightarrow (31)_{10}$

2 | 31
2 | 15 1
2 | 7 1
2 | 3 1
1 1

$\Rightarrow (11111)_2$

2) convert 0111 into decimal system.

$(0111)_2$ 0 1 1 1

$(7)_{10}$ $2^3\ 2^2\ 2^1\ 2^0$

$\Rightarrow 0+4+2+1$

$\Rightarrow 7$ //

2 | 7
2 | 3 1
1 1

$(111)_2$

$(0111)_2$

$(7)_{10}$

3) convert 1001010001 into decimal number system.

$(1001010001)_2$

1 0 0 1 0 1 0 0 0 1

$2^9\ 2^8\ 2^7\ 2^6\ 2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0$

$512+0+0+64+0+16+0+0+0+1$

$\Rightarrow 593$ //

$\therefore (593)_{10}$

2 | 593
2 | 296 1
2 | 148 0
2 | 74 0
2 | 37 0
2 | 18 1
2 | 9 0
2 | 4 1
2 | 2 0
1 0

4) convert following 4-bit numbers from binary to decimal.

i) $(0101)_2$ 0 1 0 1

$2^3\ 2^2\ 2^1\ 2^0$

$\Rightarrow 0+4+0+1$

$\Rightarrow 5$ //

2 | 5
2 | 2 1
1 0

$\Rightarrow (5)_{10}$ $\Rightarrow (101)_2$

ii) $(0111)_2$ 0 1 1 1

$(7)_{10}$ $2^3\ 2^2\ 2^1\ 2^0$

$0+4+2+1$

$\Rightarrow (7)_{10}$

2 | 7
2 | 6 1
2 | 3 0
1 1

2 | 7
2 | 3 1
1 1

3. $(0011)_2$

0 0 1 1

2^3 2^2 2^1 2^0

$0+0+2+1$

$\Rightarrow 3$ $\Rightarrow (3)_{10}$

$2\overline{)3}$ 1

1

4. $(1001)_2$

1 0 0 1

2^3 2^2 2^1 2^0

$8+0+0+1$

$\Rightarrow 9$ $(9)_{10}$

$2\overline{)9}$ 1

$2\overline{)4}$ 0

$2\overline{)2}$ 0

1

(1001)

5. $(1011)_2$

1 0 1 1

2^3 2^2 2^1 2^0

$8+0+2+1$

$\Rightarrow 11$ $(11)_{10}$

$2\overline{)11}$

$2\overline{)5}$ 1

$2\overline{)2}$ 1

1 0

6. $(1111)_2$

1 1 1 1

2^3 2^2 2^1 2^0

$8+4+2+1$

$\Rightarrow 15$ $(15)_{10}$

$2\overline{)15}$

$2\overline{)7}$ 1

$2\overline{)3}$ 1

1 1

7. $(0000)_2$

0 0 0 0

2^3 2^2 2^1 2^0

$0+0+0+0$

$\Rightarrow 0$ $(0)_{10}$

$2\overline{)0}$ 0

$2\overline{)0}$ 0

0 0

8. $(1101)_2$

1 1 0 1

2^3 2^2 2^1 2^0

$8+4+0+1$

$\Rightarrow 13$

$(13)_{10}$

$2\overline{)13}$ 1

$2\overline{)6}$

$2\overline{)3}$ 0

1 1

5a) convert 8-bit binary to decimal.

i) 00010101

$(00010101)_2$

0 0 0 1 0 1 0 1

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

$0+0+0+16+0+4+0+1$

$\Rightarrow 21$ $\Rightarrow (21)_{10}$

2	21	
2	10	1
2	5	0
2	2	1
	1	0

$(10101)_2$

6a) convert 16-bit binary to decimal.

i) $(1011010100010101)_2$

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

$2^{15}\ 2^{14}\ 2^{13}\ 2^{12}\ 2^{11}\ 2^{10}\ 2^9\ 2^8\ 2^7\ 2^6\ 2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0$

$32768+0+8192+4096+0+1024+0+256+0+0+0+16+0+4+0+1$

$\Rightarrow 46,357$

$(46357)_{10}$

2	46357	
2	23178	1
2	11589	0
2	5794	1
2	2897	0
2	1448	1
2	724	0
2	362	0
2	181	0
2	90	1
2	45	0
2	22	1
2	11	0
2	5	1
2	2	1
	1	0