

Name: Ananya Prasad

Reg No: 20BCE10093

Subject: ECE2002

Faculty: Dr Jitendra Kumar

Slot: B11+B12+B13

Date: 13 February, 2021

## ASSIGNMENT 1

## Binary to decimal

1. (i)  $(011011)_2$ 

$$\Rightarrow 0 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$$

$$0 + 16 + 8 + 0 + 2 + 1 = (27)_{10}$$

$$(ii) (001001)_2 \Rightarrow 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$

$$= 8 + 1 = (9)_{10}$$

$$(iii) (11010010)_2 \Rightarrow 1 \times 2^7 + 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$$

$$= 128 + 64 + 0 + 16 + 0 + 0 + 2 + 0$$

$$= (210)_{10}$$

## 2. Decimal to binary

(i)  $(334)_{10}$ 

2	334	R
2	167	0
2	83	1
2	41	1
2	20	1
2	10	0
2	5	0
2	2	1
2	1	0
	0	1

$= (101001110)_2$

(ii)  $(445)_{10} =$

2	445	R
2	222	1
2	111	0
2	55	1
2	27	1
2	13	1
2	6	1
2	3	0
2	1	1
	0	1

$$\Rightarrow (11011101)_2$$

(iii)  $(243)_{10} =$

2	243	R
2	121	1
2	60	1
2	30	0
2	15	0
2	7	1
2	3	1
2	1	1
	0	1

$$\Rightarrow (11110011)_2$$



$$(iv) (0.78125)_{10} \Rightarrow 0.78125$$

 $\times 2$ 

$$1.5625 \rightarrow 0.5625$$

 $\downarrow$   
1

 $\times 2$ 

$$1.125$$

 $\times 2$ 

$$0.25$$

 $\downarrow$   
1

 $\times 2$ 

$$0.5$$

 $\times 2$ 

$$1$$

 $\downarrow$   
1

$$\Rightarrow (0.11001)_2$$

3 Binary to hexadecimal

$$(i) (\overline{01101101})_2 = (6D)_{16}$$

$$(ii) (\overline{0010010111})_2 = \overline{000010010111} = 097 = (97)_{16}$$

4 Hexadecimal to binary

$$(i) (EASD)_{16} \Rightarrow (\overline{1110101001011101})_2$$

$$(ii) (11A)_{16} \Rightarrow (\overline{000100011010})_2$$

$$\begin{aligned}
 5(a) \quad 0101 &\Rightarrow 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = 4 + 1 = 5 \\
 + 0001 &\Rightarrow 0 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = 0 + 1 = 1 \\
 (0110)_2 &\Rightarrow 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 = 4 + 2 = 6
 \end{aligned}
 \left. \vphantom{\begin{aligned} 0101 \\ + 0001 \end{aligned}} \right\} = (6)_{10}$$

$$\begin{aligned}
 (b) \quad 1101 &\Rightarrow 2^3 + 2^2 + 2^0 = 8 + 4 + 1 = 13 \\
 + 1100 &\Rightarrow 2^3 + 2^2 + 2^1 = 8 + 4 + 2 = 14 \\
 (11011)_2 &\Rightarrow 2^4 + 2^3 + 2^2 + 2^1 = (27)_{10}
 \end{aligned}$$

$$\begin{aligned}
 (c) \quad 0111 &\Rightarrow 2^2 + 2^1 + 2^0 = 4 + 3 = 7 \\
 + 1000 &\Rightarrow 2^3 = 8 \\
 (1111)_2 &\Rightarrow 2^3 + 2^2 + 2^1 + 2^0 = (15)_{10}
 \end{aligned}$$

$$\begin{aligned}
 (d) \quad 0111 &\Rightarrow 2^2 + 2^1 + 2^0 = 7 \\
 + 1010 &\Rightarrow 2^3 + 2^1 = 10 \\
 (10001)_2 &= 2^4 + 2^0 = 17
 \end{aligned}$$

$$6(i) (10110.0101)_2$$

$$\begin{aligned}
 &\Rightarrow 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 + 0 \times 2^{-1} + 1 \times 2^{-2} + 0 \times 2^{-3} + 1 \times 2^{-4} \\
 &= 16 + 4 + 2 + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} \\
 &= (22.3125)_{10}
 \end{aligned}$$

$$\begin{aligned}
 (ii) (16.5)_{16} &= 1 \times 16^1 + 6 \times 16^0 + 5 \times 16^{-1} \\
 &= 16 + 6 + 0.3125 \\
 &= (22.3125)_{10}
 \end{aligned}$$



$$\begin{aligned}
 \text{(iii)} \quad (26.24)_8 &= 2 \times 8^1 + 6 \times 8^0 + 2 \times 8^{-1} + 4 \times 8^{-2} \\
 &= 16 + 6 + 0.25 + 0.0625 \\
 &= (22.3125)_{10}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad (DA DA.B)_{16} &= 13 \times 16^3 + 10 \times 16^2 + 13 \times 16^1 + 10 \times 16^0 + 11 \times 16^{-1} \\
 &= 53248 + 2560 + 208 + 10 + 0.6875 \\
 &= (56026.6875)_{10}
 \end{aligned}$$

$$\begin{aligned}
 \text{(v)} \quad (1010.1101)_2 &= 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 + 1 \times 2^{-1} + 1 \times 2^{-2} + 0 \times 2^{-3} + 1 \times 2^{-4} \\
 &= 8 + 2 + 0.5 + 0.25 + 0.0625 \\
 &= (10.8125)_{10}
 \end{aligned}$$

— x — x — x — x —