



**King Fahd University of Petroleum and Minerals  
Department of Computer Engineering**

**DIGITAL LOGIC DESIGN COE 202**

**Homework 1, October 18, 2008**

<b>Problems</b>	<b>Grading</b>
1	
2	
3	
4	
5	
<b>TOTAL</b>	

**Student Name:**.....

**Student ID:**.....



$$\begin{array}{r|l} 5 & 1 \\ 2 & 1 \\ 1 & 0 \\ 0 & 1 \end{array}$$

$$\begin{aligned} (369.3125)_{10} &= (101110001.0101)_2 \\ &= (101110001.010100)_2 = (561.24)_8 \\ &= (000101110001.0101)_2 = (171.5)_{16} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad (10111101.101)_2 &= 2^7 + 2^5 + 2^4 + 2^3 + 2^2 + 2^0 + 2^{-1} + 2^{-3} \\ &= 128 + 32 + 16 + 8 + 4 + 1 + 0.5 + 0.125 \\ &= (189.625)_{10} \\ (010111101.101)_2 &= (275.5)_8 \\ (10111101.1010)_2 &= (\text{BD.A})_{16} \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad (326.5)_8 &= 3 * 8^2 + 2 * 8^1 + 6 * 8^0 + 5 * 8^{-1} \\ &= 192 + 16 + 6 + 0.625 \\ &= (214.625)_{10} \\ (326.5)_8 &= (011010110.101)_2 = (11010110.101)_2 \\ (326.5)_8 &= (11010110.1010)_2 = (\text{D6.A})_{16} \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad (\text{F3C7.A})_{16} &= 15 * 16^3 + 3 * 16^2 + 12 * 16^1 + 7 * 16^0 + 10 * 16^{-1} \\ &= 61440 + 768 + 192 + 7 + 0.625 \\ &= (62407.625)_{10} \\ (\text{F3C7.A})_{16} &= (111100111000111.1010)_2 = (1111001111000111.101)_2 \\ (\text{F3C7.A})_{16} &= (001111001111000111.101)_2 = (171707.5)_8 \end{aligned}$$

Decimal	Binary	Octal	Hexadecimal
<b>369.3125</b>	<b>101110001.0101</b>	<b>561.24</b>	<b>171.5</b>
<b>189.625</b>	<b>10111101.101</b>	<b>275.5</b>	<b>BD.A</b>
<b>214.625</b>	<b>11010110.101</b>	<b>326.5</b>	<b>D6.A</b>
<b>62407.625</b>	<b>1111001111000111.101</b>	<b>171707.5</b>	<b>F3C7.A</b>

### 5. Question-5:

$$\begin{aligned} \text{(a)} \quad (\text{BEE})_r = (2699)_{10} &\Rightarrow 11 * r^2 + 14 * r^1 + 14 * r^0 = (2699)_{10} \\ &\Rightarrow 11 * r^2 + 14 * r + 14 = (2699)_{10} \quad (\text{note that } r \text{ must be } \geq 15) \\ &\Rightarrow 11 * r^2 + 14 * r - 2685 = 0 \\ &\Rightarrow (11r + 179)(r - 15) = 0 \\ &\Rightarrow r = -16.27 \quad \text{or} \quad r = 15 \\ &\Rightarrow r = 15 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad (365)_r = (194)_{10} &\Rightarrow 3 * r^2 + 6 * r^1 + 5 * r^0 = (194)_{10} \\ &\Rightarrow 3 * r^2 + 6 * r + 5 = (194)_{10} \quad (\text{note that } r \text{ must be } \geq 7) \\ &\Rightarrow 3 * r^2 + 6 * r - 189 = 0 \\ &\Rightarrow r^2 + 2 * r - 63 = 0 \\ &\Rightarrow (r + 9)(r - 7) = 0 \\ &\Rightarrow r = -9 \quad \text{or} \quad r = 7 \\ &\Rightarrow r = 7 \end{aligned}$$