

CSE202 Logic Design I – Tutorial 01

#	Student ID	Student Name	Grade (10)
-			

Q1	Is the first remainder obtained in the division method for base conversion the most or least significant digit?
Sol 1	

Q2	Find An easy method for conversion between binary and hexadecimal?
Sol 2	

Q3	Why is it impossible to convert a decimal number to binary on a digit-by digit basis as can be done for hexadecimal?
Sol 3	

Q4	Complete the following conversion table.																																																																											
Sol 4	<table border="1"> <thead> <tr> <th>Binary (base 2)</th> <th>Octal (base 8)</th> <th>Decimal (base 10)</th> <th>Hexadecimal (base 16)</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td></tr> <tr><td>11</td><td></td><td></td><td></td></tr> <tr><td>100</td><td></td><td></td><td></td></tr> <tr><td>101</td><td></td><td></td><td></td></tr> <tr><td>110</td><td></td><td></td><td></td></tr> <tr><td>111</td><td></td><td></td><td></td></tr> <tr><td>1000</td><td></td><td></td><td></td></tr> <tr><td>1001</td><td></td><td></td><td></td></tr> <tr><td>1010</td><td></td><td></td><td></td></tr> <tr><td>1011</td><td></td><td></td><td></td></tr> <tr><td>1100</td><td></td><td></td><td></td></tr> <tr><td>1101</td><td></td><td></td><td></td></tr> <tr><td>1110</td><td></td><td></td><td></td></tr> <tr><td>1111</td><td></td><td></td><td></td></tr> <tr><td>10000</td><td>20</td><td>16</td><td>10</td></tr> </tbody> </table>	Binary (base 2)	Octal (base 8)	Decimal (base 10)	Hexadecimal (base 16)	0	0	0	0	1				10				11				100				101				110				111				1000				1001				1010				1011				1100				1101				1110				1111				10000	20	16	10			
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Q5	Convert to hexadecimal and then to binary (a) 757.25_{10} (b) 123.17_{10}																																	
Sol 5	<p>757.25_{10}</p> <table style="margin-left: 40px;"> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">$16 \overline{) 757}$</td> <td style="padding-left: 10px;"></td> <td style="padding-left: 10px;">0.25</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">$16 \overline{) 47}$</td> <td style="padding-left: 10px;">r5</td> <td style="padding-left: 10px;">$\underline{\quad} 16$</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">$16 \overline{) 2}$</td> <td style="padding-left: 10px;">r15=F₁₆</td> <td style="padding-left: 10px;">$(4).00$</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">0</td> <td style="padding-left: 10px;">r2</td> <td></td> </tr> </table> <p style="margin-left: 40px;">$\therefore 757.25_{10} = 2F5.40_{16}$ $= \underline{0010} \underline{1111} \underline{0101} \underline{0100} \underline{0000}_2$ 2 F 5 4 0</p> <hr style="width: 10%; margin-left: 0;"/> <p>123.17_{10}</p> <table style="margin-left: 40px;"> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">$16 \overline{) 123}$</td> <td style="padding-left: 10px;"></td> <td style="padding-left: 10px;">0.17</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">$16 \overline{) 7}$</td> <td style="padding-left: 10px;">r11</td> <td style="padding-left: 10px;">$\underline{\quad} 16$</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">0</td> <td style="padding-left: 10px;">r7</td> <td style="padding-left: 10px;">$(2).72$</td> </tr> <tr> <td></td> <td></td> <td style="padding-left: 10px;">$\underline{\quad} 16$</td> </tr> <tr> <td></td> <td></td> <td style="padding-left: 10px;">$(11).52$</td> </tr> <tr> <td></td> <td></td> <td style="padding-left: 10px;">$\underline{\quad} 16$</td> </tr> <tr> <td></td> <td></td> <td style="padding-left: 10px;">$(8).32$</td> </tr> </table> <p style="margin-left: 40px;">$\therefore 123.17_{10} = 7B.2B_{16}$ $= \underline{0111} \underline{1011} \underline{0010} \underline{1011}_2$ 7 B 2 B</p>	$16 \overline{) 757}$		0.25	$16 \overline{) 47}$	r5	$\underline{\quad} 16$	$16 \overline{) 2}$	r15=F ₁₆	$(4).00$	0	r2		$16 \overline{) 123}$		0.17	$16 \overline{) 7}$	r11	$\underline{\quad} 16$	0	r7	$(2).72$			$\underline{\quad} 16$			$(11).52$			$\underline{\quad} 16$			$(8).32$
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Q6	Convert to octal. Convert to hexadecimal. Then convert both of your answers to decimal, and verify that they are the same 11010110001.011 ₂
Sol 6	$EB1.6_{16} = E \times 16^2 + B \times 16^1 + 1 \times 16^0 + 6 \times 16^{-1}$ $= 14 \times 256 + 11 \times 16 + 1 + 6/16 = 3761.375_{10}$ $\begin{array}{cccc} \underline{1110} & \underline{1011} & \underline{0001} & \underline{011(0)} \\ E & B & 1 & 6 \end{array}_2$ $7261.3_8 = 7 \times 8^3 + 2 \times 8^2 + 6 \times 8^1 + 1 + 3 \times 8^{-1}$ $= 7 \times 512 + 2 \times 64 + 6 \times 8 + 1 + 3/8 = 3761.375_{10}$ $\begin{array}{cccc} \underline{111} & \underline{010} & \underline{110} & \underline{001} & \underline{011} \\ 7 & 2 & 6 & 1 & 3 \end{array}_8$

Q7	(a) Convert to hexadecimal: 1457.11 ₁₀ . Round to two digits past the hexadecimal point. (b) Convert your answer to binary, and then to octal. (c) convert your answer to base 4.										
Sol 7	1457.11_{10} <table style="margin-left: 100px;"> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">16 1457</td> <td style="padding-left: 20px;">0.11</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">16 91</td> <td style="padding-left: 20px;">16</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">16 5</td> <td style="padding-left: 20px;">(1).76</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">0</td> <td style="padding-left: 20px;">16</td> </tr> <tr> <td></td> <td style="padding-left: 20px;">(12).16</td> </tr> </table> $\therefore 1457.11_{10} = 5B1.1C_{16}$ $5B1.1C_{16} = \begin{array}{cccc} \overline{5} & \overline{B} & \overline{1} & \overline{1} & \overline{C} \\ \overline{01011011} & \overline{0001} & \overline{0001} & \overline{1100} & \\ \underline{2} & \underline{6} & \underline{6} & \underline{1} & \underline{0} & \underline{7} & \underline{0} \end{array}_2 = 2661.070_8$ $5B1.1C_{16} = \begin{array}{cccc} \underline{11} & \underline{23} & \underline{01} & \underline{01} & \underline{30} \\ 5 & B & 1 & 1 & C \end{array}_4$	16 1457	0.11	16 91	16	16 5	(1).76	0	16		(12).16
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