

CSc 1301: PRINCIPLES OF COMPUTER SCIENCE

Lab 4

Friday

Name: Ratid Shaan

Lab time: 3:00 PM

How to Submit

Please submit your answers on iCollege once you have completed (by the same day with lab time). Failure to submit will result in a **ZERO FOR THIS LAB. NO EXCEPTIONS.**

Complete the following problems for the other values and show work

Decimal

Hexadecimal

Binary

Octal

1. 10111010_2

186_{10}

BA_{16}

272_8

Octal

$$128 + 32 + 16 + 8 + 2 = 186$$

$1011 \mid 1010$
 $\boxed{8} \boxed{4} \boxed{2} \boxed{1} \mid \boxed{8} \boxed{4} \boxed{2} \boxed{1}$

$11 \rightarrow B \quad 10 \rightarrow A$

2. 11110011_2

243_{10}

$F3_{16}$

363_8

Octal

$$128 + 64 + 32 + 16 + 2 + 1 = 243$$

$1111 \mid 0011$
 $\boxed{8} \boxed{4} \boxed{2} \boxed{1} \mid \boxed{8} \boxed{4} \boxed{2} \boxed{1}$
 $15 \rightarrow F \quad 3$

3. 10101010_2

170_{10}

AA_{16}

252_8

Octal

$$128 + 32 + 8 + 2 = 170$$

$1010 \mid 1010$
 $\boxed{8} \boxed{4} \boxed{2} \boxed{1} \mid \boxed{8} \boxed{4} \boxed{2} \boxed{1}$
 $10 \rightarrow A \quad 10 \rightarrow A$

4. 11011011_2

219_{10}

DB_{16}

333_8

Octal

$$128 + 64 + 16 + 8 + 2 + 1 = 219$$

$1101 \mid 1011$
 $\boxed{8} \boxed{4} \boxed{2} \boxed{1} \mid \boxed{8} \boxed{4} \boxed{2} \boxed{1}$
 $13 \rightarrow D \quad 11 \rightarrow B$

5. $2E9_{16}$

745_{10}

135_8

1011101001_2

Octal

$2 \quad E_2 \quad 9$
 $\downarrow \quad \downarrow \quad \downarrow$
 $8 \boxed{4} \boxed{2} \boxed{1} \mid \boxed{8} \boxed{4} \boxed{2} \boxed{1} \mid \boxed{8} \boxed{4} \boxed{2} \boxed{1}$
 $0010 \quad 1110 \quad 1001$

$0010 \mid 1110 \mid 1001$
 $\boxed{4} \boxed{2} \boxed{1} \mid \boxed{4} \boxed{2} \boxed{1} \mid \boxed{4} \boxed{2} \boxed{1}$
 $1 \quad 3 \quad 5 \quad 1$

$$512 + 128 + 64 + 32 + 8 + 1 = 745$$

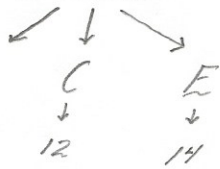
6. ACE₁₆

2766₁₀

5316₈

Octal

101011001110₂



1010 1100 1110

5 3 1 6

101011001110

2¹⁰ 2⁹ 2⁸ 2⁷ 2⁶ 2⁵ 2⁴ 2³ 2² 2¹

$$2048 + 512 + 128 + 64 + 8 + 4 + 2 =$$

2766

source

(tutorialspoint.com)

7. Write an algorithm to convert a whole decimal numeral to any base

Step 1 - Divide the decimal number to be converted by the value of the new base.

Step 2 - Get the remainder from Step 1 as the rightmost digit (least significant digit) of a new base number.

Step 3 - Divide the quotient of the previous divide by the new base.

Step 4 - Record the remainder from Step 3 as the next digit (to the left) of the new base.

Repeat Steps 3 and 4, getting remainders from right to left, until the quotient becomes zero in Step 3. The last remainder thus obtained will be the Most Significant Digit (MSD) of the new base number.

8. Prove your Algorithm with the decimal number 45 into binary

45₁₀ → 101101₂

$$45 \div 2 = 22 \text{ R } 1 \text{ (LSD)}$$

$$22 \div 2 = 11 \text{ R } 0$$

$$11 \div 2 = 5 \text{ R } 1$$

$$5 \div 2 = 2 \text{ R } 1$$

$$2 \div 2 = 1 \text{ R } 0$$

$$1 \div 2 = 0 \text{ R } 1 \text{ (MSD)}$$