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CS383

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I pledge my honor that I have abided by the Stevens Honor System

Exercise 1:

1. In client-server architecture, client computers have to request services from a remote server running a specific program. Peer-to-peer systems share resources with all computers on the network.

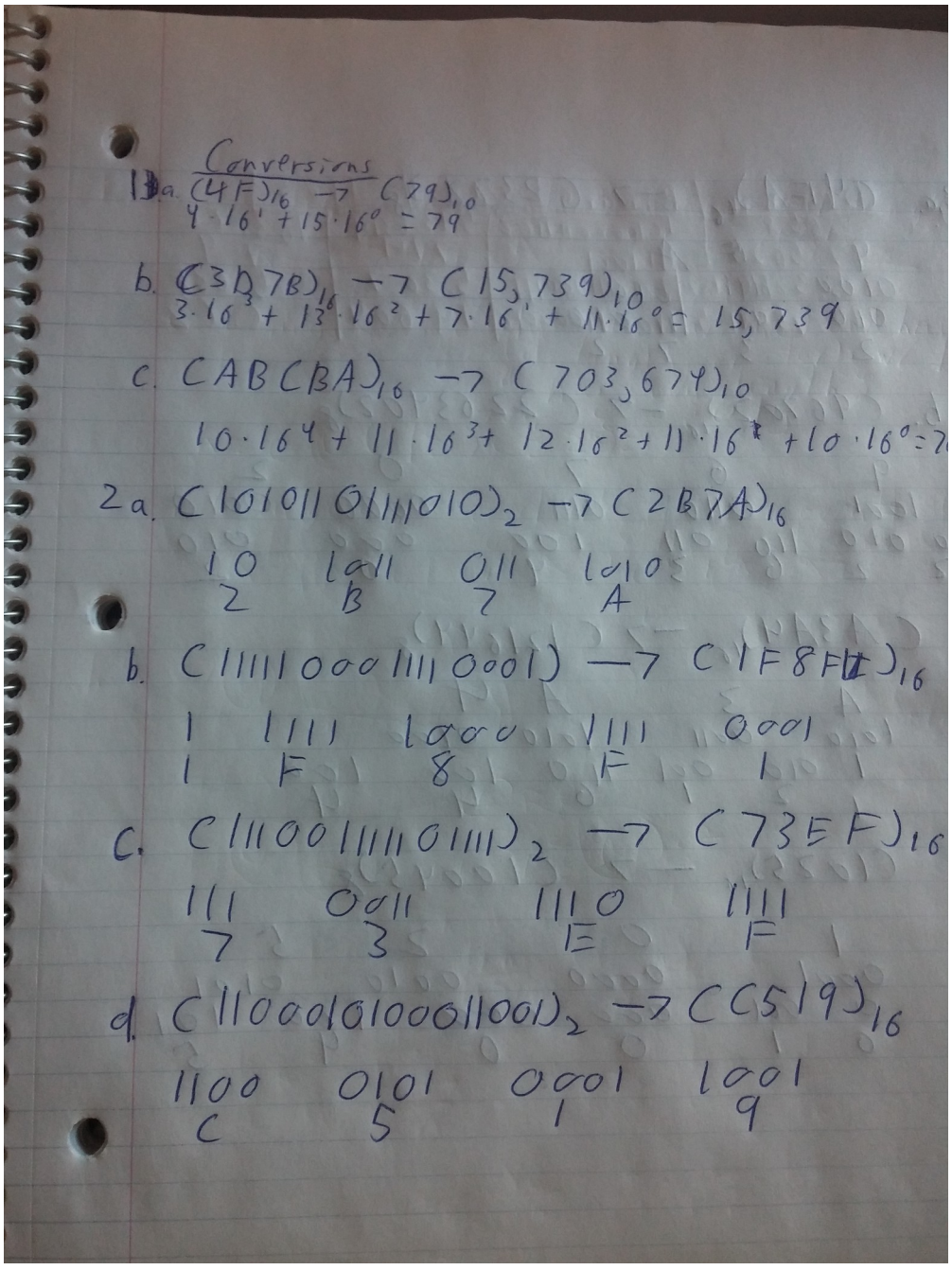
2. The purpose of the OS is to connect the user to the hardware of the computer.

3. When building a system, decomposition and abstraction are necessary. Decomposition is dividing the system into separate components to be used by abstraction. Abstractions are models of these parts of the system, and using these it is easier to analyze each individual part, as opposed to looking at the system as a whole.

4. Primary storage (RAM) hold data for access by the CPU. Secondary storage is any external storage devices not directly accessible by the CPU.

5. Bitmaps are large files used for images with a great amount of detail. Object images are created by geometrically defined shapes/lines. The size of object images depends on the complexity of the geometry of the image, but still requires less storage space than bitmap images.

6. BCD is Binary Coded Decimal. The range of BCD is an entire decimal digit less than that of binary. In addition calculations in BCD are more stressful on the CPU as the CPU must convert base 10 numbers into binary before actually carrying out any calculations.



3.a. $(4F{-}A)_{16} \rightarrow (2372)_8$

4 F = A
0100 1111 1010
010 011 111 010
2 3 7 2

b. $(96702)_{16} \rightarrow (2260402)_8$

9 6 7 0 2
1001 0110 0111 0000 0010
10 010 110 011 100 000 010
2 2 6 3 4 0 2

c. $(A3A4)_{16} \rightarrow (121644)_8$

A 3 A 4
1010 0011 1010 0100
1 010 001 110 100 100
1 2 1 6 4 4

d. $(1025)_{16} \rightarrow (10045)_8$

1 0 2 5
0001 0000 0010 0101
0 001 000 000 100 101
0 1 0 0 4 5

4a.
$$\begin{array}{r} {\scriptstyle 1\,1\,1\,1} \\ 1\,1\,1\,1 \\ +\ 1\,0\,0\,1 \\ \hline 1\,0\,1\,0\,0 \end{array} \qquad (10100)_2 \rightarrow (20)_{10}$$

b.
$$\begin{array}{r} {\scriptstyle 1\,1\,1\,1\,1\,1\,1} \\ 1\,1\,0\,1\,1\,0\,1 \\ +\ 1\,1\,1\,1\,0\,1 \\ \hline 1\,0\,1\,0\,1\,0\,1\,0 \end{array} \qquad (10101010)_2 \rightarrow (170)_{10}$$

c.
$$\begin{array}{r} {\scriptstyle 1\,1\,1\,1} \\ 1\,1\,1\,1\,0\,0 \\ +\ 1\,0\,1\,0\,1\,0\,1 \\ \hline 1\,1\,1\,0\,1\,0\,0\,1 \end{array} \qquad (11101001)_2 \rightarrow (233)_{10}$$

5. $(31454)_8 \rightarrow (13100)_{10}$

$3 \cdot 8^4 + 1 \cdot 8^3 + 4 \cdot 8^2 + 5 \cdot 8^1 + 4 \cdot 8^0 = 13100$

$(10110111)_2 \rightarrow (183)_{10}$

$1 \cdot 2^7 + 1 \cdot 2^5 + 1 \cdot 2^4 + 1 \cdot 2^2 + 1 \cdot 2 + 1 = 183$

$(FAB)_{16} \rightarrow (4011)_{10}$

$15 \cdot 16^2 + 10 \cdot 16 + 11 = 4011$

6.

a.

Decimal	Binary	Octal	Hex
355.8	101100011.100	543.6314	163.CC
7.5625	111.1001	7.14	7.9
5.388671875	101.011000111	5.307	5.638
12.757812	1100.11000010	14.604	C.C2

Exercise 3

1.

Mailbox	Mnemonic Code	Numeric Code
00	IN	901
01	ADD	198
02	STO	399
03	OUT	902

2. The program produces the wrong output. Instead of subtracting the second and third inputs from the first, the program subtracts the first from the second, and then that from the third input.

Mailbox	Mnemonic Code	Numeric Code
00	IN	901
01	STO	301
02	IN	901
03	STO	302
04	IN	901
05	ADD	102
06	STO	302
07	LDA	501
08	SUB	202
09	OUT	902
10	HLT	000