You must show all your work! Answers without supporting work will not be given credit. Write answers in spaces provided. Illegible work falls under the *Intended Purpose* policy.

You must upload any digital submission as a SINGLE PDF DOCUMENT. Multiple file submissions or files of any other type will not be accepted.

This assignment is worth 10/60 ($\approx 17\%$) of Assignment points

Name:_____

1. Convert the following as indicated: (2 points)

   (a) 00101001_2 to a decimal integer,

Answer:_____ 10

(b) 10101010_2 to a hexadecimal integer,

Answer: _____ 16

(c) $D4_{16}$ to an 8-bit unsigned binary integer, and

Answer: _____ 2

Cont.

(d) 178_{10} to an 8-bit unsigned binary integer.

Answer: _____ 2

Cont.

2. Compute the **4-bit binary** sum of the following 4-bit unsigned binary integers. Provide the base-10 result as well. Do allow values to overflow—that is do not add bits in excess of the 4 bits. Additionally, provide decimal($base_{10}$) integer values [1]: (2 points)

   (a) $0110 + 1000$

   Answer:_____ 2

   Answer:_____ 10

   (b) $1001 + 0111$

   Answer:_____ 2

   Answer:_____ 10

[1] Take into account overflow. Do not tell me that $15_{10} + 15_{10} = 30_{10}$. I know you know that. In 4-bit, it would be 0_{10}

Cont.

3. Convert the following to **8-bit two's complement-encoded binary** integers and perform the indicated operations. You must show all conversions into and out of two's complement encoding. Provide your results in 8-bit two's complement binary and base-10 or base-16, as requested: (2 points)

   (a) $27_{10} - 15_{10}$

Answer: _____ 2

Answer: _____ 10

Cont.

(b) $-2F_{16} - 4E_{16}$

Answer: _____ 2

Answer: _____ 16

Cont.

4. For each of the following, show their conversion to binary coded decimals (BCD) as 8421-code: (2 points)

   (a) 1473_{10}

Answer:_____

   (b) 476_8

Answer:_____

Cont.

5. Decode the two following 8-bit binary **strings** into ASCII characters[2] characters: (2 points)

   (a) 01110100 01111001 01110110 01101101

Answer:_____

   (b) 01110100 01111000 01110100 00110010 01100010 01101001

Answer:_____

[2]You may use the 7-bit ASCII from the book, but do keep in mind ASCII values, like all values in a computer, are at least 8-bits in size.

The End.