

Homework #1

Submission instructions:

1. For this assignment you should turn in a '.pdf' file with your answers.
Name your file 'YourNetID_hw1.pdf'
2. **Each question should start on a new page.**
3. **Typing your solutions would grant you 5 extra points.**
4. **You should submit your homework in the Gradescope system.**
Note that when submitting the pdf file, you would be asked to assign the pages from your file to their corresponding questions.
5. **You can work and submit in groups of up to 4 people. If submitting as a group, make sure to associate all group members to the submission on gradescope.**
6. **You are expected to justify all your answers (not just to give the final answer).**
As a rule of thumb, for questions taken from zyBooks, the format of your answers, should be like the format demonstrated in the sample solutions we exposed.

Question 1:

A. Convert the following numbers to their decimal representation. Show your work.

1. $10011011_2 =$

2. $456_7 =$

3. $38A_{16} =$

4. $2214_5 =$

B. Convert the following numbers to their binary representation:

1. $69_{10} =$

2. $485_{10} =$

3. $6D1A_{16} =$

C. Convert the following numbers to their hexadecimal representation:

1. $1101011_2 =$

2. $895_{10} =$

Question 2:

Solve the following, do all calculation in the given base. Show your work.

1. $7566_8 + 4515_8 =$

2. $10110011_2 + 1101_2 =$

3. $7A66_{16} + 45C5_{16} =$

4. $3022_5 - 2433_5 =$

Question 3:

A. Convert the following numbers to their 8-bits two's complement representation. Show your work.

1. $124_{10} =$

2. $-124_{10} =$

3. $109_{10} =$

4. $-79_{10} =$

B. Convert the following numbers (represented as 8-bit two's complement) to their decimal representation. Show your work.

1. $00011110_{8 \text{ bit } 2's \text{ comp}} =$

2. $11100110_{8 \text{ bit } 2's \text{ comp}} =$

3. $00101101_{8 \text{ bit } 2's \text{ comp}} =$

4. $10011110_{8 \text{ bit } 2's \text{ comp}} =$

Question 4:

Solve the following questions from the Discrete Math zyBook:

1. Exercise 1.2.4, sections b, c
2. Exercise 1.3.4, sections b, d

Question 5:

Solve the following questions from the Discrete Math zyBook:

1. Exercise 1.2.7, sections b, c
2. Exercise 1.3.7, sections b – e
3. Exercise 1.3.9, sections c, d

Question 6:

Solve the following questions from the Discrete Math zyBook:

1. Exercise 1.3.6, sections b - d
2. Exercise 1.3.10, sections c – f

Question 7:

Solve Exercise 1.4.5, sections b – d, from the Discrete Math zyBook:

Question 8:

Solve the following questions from the Discrete Math zyBook:

1. Exercise 1.5.2, sections c, f, i
2. Exercise 1.5.3, sections c, d

Question 9:

Solve the following questions from the Discrete Math zyBook:

1. Exercise 1.6.3, sections c, d
2. Exercise 1.7.4, sections b - d

Question 10:

Solve the following questions from the Discrete Math zyBook:

1. Exercise 1.7.9, sections c - i
2. Exercise 1.9.2, sections b - i

Question 11:

Solve the following questions from the Discrete Math zyBook:

1. Exercise 1.10.4, sections c - g
2. Exercise 1.10.7, sections c - f
3. Exercise 1.10.10, sections c – f

Question 12:

Solve the following questions from the Discrete Math zyBook:

1. Exercise 1.8.2, sections b – e
2. Exercise 1.9.4, sections c - e