Homework #1
Due by Friday 7/16 11:55pm

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. $00011110_{\text{8 bit 2's comp}}$ =
2. $11100110_{\text{8 bit 2's comp}}$ =
3. $00101101_{\text{8 bit 2's comp}}$ =
4. $10011110_{\text{8 bit 2's comp}}$ =

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