NYU, Tandon School of Engineering
Bridge to CS — Summer 2020

Homework #1
Due by Friday 7/17 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 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